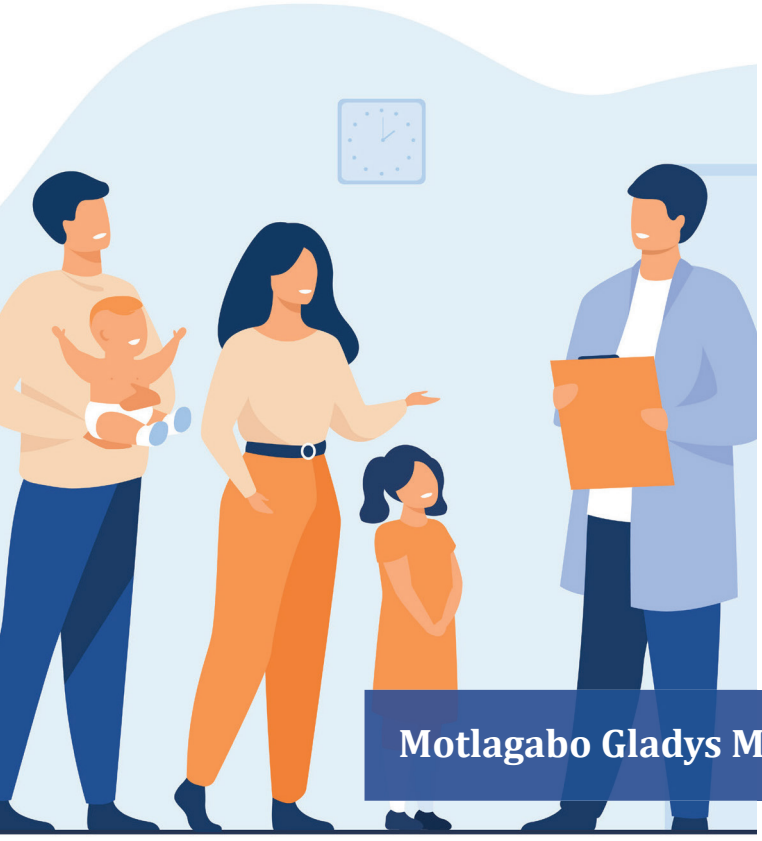
Male partner involvement in prenatal and postnatal care

MALE PARTNER INVOLVEMENT IN PRENATAL AND POSTNATAL CARE: IMPLICATIONS FOR PREVENTION OF MOTHER-TO-CHILD TRANSMISSION OF HIV PROGRAMS IN RURAL SOUTH AFRICA



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THESIS

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CHAPTER 1.

General Introduction

This thesis presents five empirical studies that utilized data gathered in a large-scale clinic-based randomized controlled trial (RCT) conducted in selected primary health care facilities offering prevention of mother-to-child transmission of HIV (PMTCT) services in Mpumalanga province, in South Africa. The work in this thesis specifically focuses on positive male partner involvement in prenatal and postnatal care. Research studies from different parts of the world have shown that positive male partner involvement is an important contributor to positive maternal health, infant health and infant developmental outcomes (WHO, 2015; Yargawa & Leornardi-Bee, 2015; Singh et al., 2014). In addition, male partner involvement in PMTCT during prenatal and postnatal care plays a significant role in the effectiveness of programs for PMTCT and as such has been recommended as one of the strategies that should be implemented to improve adherence to PMTCT interventions in South Africa (Levtov et al., 2015; WHO, 2012; UNAIDS, 2011; SANAC, 2011).

The goal of this thesis was to promote, through empirical research, male partner involvement in PMTCT during prenatal and postnatal care as an important factor that is needed for improved health and PMTCT outcomes among HIV positive women and HIV exposed infants in rural South Africa. The first step in working towards the aforementioned goal was to explore the attitudes towards male partner involvement in maternal health (i.e., during pregnancy, childbirth, and after childbirth) among men in rural South Africa. The next steps were to investigate social, behavioural, individual and female partner-related factors associated with male partner involvement in PMTCT during prenatal care in the same setting, to investigate male partner involvement in prenatal and postnatal care as a predictor of maternal health and infant development, and to examine whether male partner involvement, in turn, is negatively associated with intimate partner violence experienced by women attending PMTCT services.

This introductory chapter covers important literature with regards to the background of male partner involvement in maternal health matters, the definitions and measures of male partner involvement, the importance of male partner involvement in maternal and infant health and PMTCT, the determinants of male partner involvement in maternal health and PMTCT, and the challenges or barriers to male partner involvement. The theories that served as helpful frameworks in understanding and explaining male partner involvement are briefly discussed. This

chapter concludes by mentioning the aim of this thesis, describing the study setting and participants, and providing an overview of the studies reported in this thesis.

Background: Male partner involvement in maternal health and related issues

About 99% of global maternal deaths occur in low and middle-income countries (WHO, 2014). As such, the reduction and prevention of maternal morbidity and mortality have gained attention internationally and strategies have been put in place to promote better maternal health. Ever since the Cairo International Conference on Population and Development (ICPD) in 1994, and the Beijing World Conference for Women in 1995, the emphasis has been put to a great extent on encouraging male partner involvement in sexual and reproductive health including maternal and newborn health (UNDAW, 1995; UNPD, 1994).

Maternal and infant health refers to the health of both women and infants during pregnancy, childbirth, and the postpartum period (WHO, 2017). Prevention of mother-to-child transmission of HIV (PMTCT) is offered as a routine component of standard maternal and infant healthcare and is a set of interventions designed to reduce the transmission of HIV from HIV infected pregnant women to their babies (Open University, 2017). Core interventions of PMTCT include HIV counseling and testing, providing antiretroviral drugs to HIV positive pregnant women, safe delivery practices, and safe infant feeding practices (Open University, 2017). As per the South African PMTCT protocol, all pregnant women should receive pre and post HIV counseling and testing, and referral to CD4 assessment and HIV medication if HIV positive (NDOH, 2015). Prenatal adherence to HIV medication is important for the pregnant mother while postnatal adherence to HIV medication is essential for both mother and infant. Furthermore, the PMTCT protocol includes adherence to antenatal care visits and postpartum infant care visits.

In many low and middle-income countries, men are the key decision-makers and chief providers for their families often determining women's access to economic resources and healthcare services. They may thus play a central role in several critical decisions in prenatal and postnatal care, such as participating in programs for PMTCT, attending antenatal or postnatal

clinic appointments, choosing the place of delivery, and the method of infant feeding (Nesane et al., 2016; Yargawa & Leornardi-Bee, 2015).

As a result, there has been growing recognition on the importance of male partner involvement in facilitating women's access to maternal healthcare services aimed at getting more women to have the best possible maternal healthcare benefits with the ultimate goal of reducing and preventing maternal morbidity and mortality. This is especially important in low and middle-income countries where maternal mortality is high and male partner involvement in maternal health and related matters is low. However, there are challenges in implementing male partner involvement in these countries mainly due to socio-cultural and structural factors. Furthermore, the fact that male partner involvement in maternal health and related matters is defined and perceived differently in various countries is a challenge in its conceptualization and implementation.

Definitions and measures of male partner involvement in maternal health and related matters

Although the importance of male partner involvement in maternal health including in PMTCT is widely acknowledged (Singh et al., 2014; WHO, 2015; Yargawa & Leornardi-Bee, 2015), there is no common definition and/or standardized measure of male partner involvement in this context. Hence, its definition and meaning vary across studies. Previous studies have defined male partner involvement in maternal health and related care as men taking part in their pregnant partner's birth plans, encouraging exclusive breastfeeding and immunization for their children, supporting their partners, and communicating about pregnancy-related health care (Bhatta, 2013; Montgomery et al., 2011). Other studies have defined male partner involvement as male participation in HIV testing solely during antenatal care (Byamugisha et al., 2011; Ditekemena et al., 2011; Msuya et al., 2008), while others defined it as male participation in couple counseling (Byamugisha et al., 2010; Reece et al., 2010; Nkuoh et al., 2010). In most instances, male partner involvement has been defined as a man's physical presence in the antenatal or postnatal clinic with his female partner, which is the most commonly used measure of male partner involvement (Montgomery et al., 2011).

Studies have used multiple indicators to form an index that captures a broader notion of male partner involvement (Byamugisha et al., 2010; Tilahun & Mohammed, 2015; Ampt et al., 2015). These indicators capture different aspects of male support for maternal health care prenatally and postnatally, such as 'accompaniment to antenatal/postnatal care appointments', 'financial support' and 'couple communication'. For example, Byamugisha et al. (2010) used a male partner involvement index using six measures, namely, the 'male partner accompanying his wife to antenatal care appointment', 'knowing the antenatal care schedule', 'discussing the antenatal care activities with female partner', 'providing money for antenatal care fees', 'knowledge of what happens at the antenatal care visit", and "condom use with the female partner during the current pregnancy".

Similarly, in this thesis, prenatal and postnatal male partner involvement was measured using an eleven-item index to measure prenatal male partner involvement in PMTCT (Jones et al. 2016), that is, 'male partner attends antenatal care visits with you; male partner knows your antenatal appointment time; discussed antenatal HIV prevention for your baby with your male partner; male partner supports your antenatal visits financially; male partner knows what happens in the antenatal clinic; after testing for HIV, partner asked to take an HIV test; told partner that you were told to take ARV drugs (HIV medication); discussed feeding options for your baby with your partner; discussed the place of delivery for the baby with your partner; discussed testing your baby for HIV with your partner; and discussed condom use with your partner'. Furthermore, postnatal male partner involvement in PMTCT was measured using an eleven item index that included items such as, 'attending infant care visits with your female partner', 'supporting your partner's infant care visits financially', 'knowing your partner's infant care appointment times', and 'discussing health care for your baby with your partner' (Jones at al. (2016).

The importance of male partner involvement

Male partner involvement has been recommended as crucial to maternal, newborn, and child health in South Africa and other countries and, as such, has been promoted as an effective intervention to improve maternal and newborn health outcomes (UNAIDS, 2011; Levtov et al., 2015; SANAC, 2011; WHO, 2012). Moreover, male partner involvement in PMTCT programs has

been promoted as one of the priority interventions to improve PMTCT outcomes in sub-Saharan African countries (WHO, 2012; UNAIDS, 2011). In South Africa, the National Strategic Plan on HIV, STIs, and TB promotes the involvement and engagement of men to strengthen PMTCT programs (SANAC, 2011). However, the ways in which the involvement and engagement of men are supposed to be carried out are not clear. That is, detailed guidelines on increasing male partner involvement and concrete descriptions on achieving this in South Africa are lacking (van den Berg et al., 2015). This thesis serves as a source of information that needs to be considered in the development of appropriate interventions and/or detailed guidelines for increasing male partner involvement in rural South Africa.

There is ample evidence that male partner involvement promotes better maternal and infant health outcomes, PMTCT outcomes, and improved health behavior. A systematic review of 14 studies on male partner involvement and maternal health outcomes indicated that prenatal male partner involvement significantly decreased the likelihood of prenatal and postpartum depression, decreased the likelihood of childbirth complications, and improved utilization of maternal health services such as skilled birth attendance (Yargawa & Leornardi-Bee, 2015). Male partner involvement has also been reported to lead to reduced maternal stress through emotional, logistical, and financial support (Kaye et al., 2014). In a South African study, lack of prenatal male partner involvement was associated with depressive symptoms among a sample of HIV positive pregnant women (Peltzer et al., 2016). Male partner involvement has also been associated with increased adherence to antiretroviral medication during pregnancy (Peltzer & Shikwane, 2011). A study by Peltzer et al. (2018) in rural South Africa among a sample of women showed that prenatal male partner involvement was associated with depression. With regards to infant health and developmental outcomes, fathers' involvement during pregnancy correlated with reductions in prematurity and infant mortality among infants (Alio et al., 2011a; Alio et al., 2011b).

HIV exposure is a life-long condition that continues to impact the health and wellbeing of a child long after exposure has ended (Sugandhi et al., 2013). According to Sugandhi et al. (2013), there is some evidence that HIV exposure in utero or during the postnatal period affects the

development of the infant's immune and other organ systems. In addition, HIV exposure and maternal placental responses to the virus have resulted in modifications or interference with the immune response of HIV exposed uninfected infants, resulting in immunological abnormalities and increased susceptibility to childhood diseases (Kuhn et al. 2005; Filteau, 2009). Available literature has shown that infants born to HIV infected women are at increased risk of delayed development, poor stress regulation, lower birth weight and physical growth (Stringer et al., 2014; Dobrova-Krol et al., 2010; Le Doare et al., 2012; Whitehead et al., 2014), which may persist into childhood and adulthood (O'Connor et al., 2002; Buss et al., 2011; van den Berg et al., 2004). Non-experimental studies have shown a beneficial effect of postnatal male partner involvement on infant outcomes, such as enhanced cognitive development (Sarkadi, et al., 2008; Sethna et al., 2017). Another non-experimental study by Rodriguez et al. (2017) has shown a detrimental influence of lack of prenatal male partner involvement on gross motor development of HIV-exposed infants in rural South Africa. Still, there is a lack of literature in South Africa on both prenatal and postnatal male partner involvement in maternal and child health and its (causal) relationship to infant health and/or developmental outcomes.

Determinants of male partner involvement in maternal and child health, and in PMTCT

Research in low and middle-income countries have reported low male partner involvement in maternal and child health care matters including in PMTCT (Mepham et al., 2011; Ditekemena et al., 2012; Nanjala & Wamalwa, 2012; Theuring et al., 2009; van den Berg et al., 2015). The low levels of male partner involvement in maternal and child matters including PMTCT are attributed to socio-cultural and structural challenges. These challenges or barriers have been identified at the individual, inter-individual, community, and health systems levels.

Studies have cited the following personal and family level factors as barriers to male partner involvement in prenatal care and related services including PMTCT: men's unwillingness to know their HIV status (Aarnio et al., 2009; Morfaw et al., 2013), men's lack of knowledge about the services (Nyasulu, 2007), marriage instability (Aarnio et al., 2009), fear of potential dissolution of marriage upon disclosure of HIV-positive status, fear of stigmatization, and lack of appropriate communication between partners (Kanyama et al., 2004; Morfaw et al., 2013). Male partner

involvement in maternal and child health has been negatively associated with the number of children (Ampt et al., 2015; Tweheyo et al., 2010) where men in couples who have more children were less likely to accompany their spouses at antenatal care appointments (Tweheyo et al., 2010).

Couple related challenges in implementing male partner involvement are worth noting. Men with multiple partners may not want to be seen in clinics with their female partners (Mullick et al., 2005). Furthermore, male partner involvement in prenatal and postnatal care may not always be possible especially in abusive relationships. Women's unwillingness to get their partners involved due to fear of domestic violence, stigmatization or divorce has also been identified as a barrier (Morfaw et al., 2013; Salvador et al., 2018). HIV infected women are at increased risk of different forms of violence, predominantly physical, sexual, and emotional violence (Hale & Vazquez, 2011; Aryal et al., 2012). Intimate partner violence (IPV) has been cited as one of the major challenges in the adherence to PMTCT protocols/interventions in South Africa and other countries (Hampanda, 2012; Nassali et al., 2009; Hatcher et al., 2016). Intimate partner violence in HIV positive women has been linked to lower self-reported ARV adherence, decreased viral load suppression, and greater risk of death (Hatcher et al., 2014; Nassali et al., 2009).

Community-level factors that serve as barriers to male partner involvement in maternal health and related matters (including in PMTCT) include culturally embedded traditional gender norms that discourage men from attending health services (Kura et al., 2013; van den Berg et al., 2015). In South Africa, as in most other African countries, family planning, pregnancy and childbirth have long been regarded as mainly women's affairs (Mullick et al., 2005; Kiptoo, 2017; Maluka & Peneza, 2018). Most countries in Sub-Saharan Africa are patriarchal, wherein men perceive maternal health issues including pregnancy and childbirth to be the sole responsibility of women and practice gender norms that disapprove of males engaging in antenatal care activities (Auvinen et al., 2013; Dunlap et al., 2014; Farquhar et al., 2004; Morfaw et al., 2013; Kinanee & Ezekiel-Hart, 2011; Singh et al., 2014). Women, in turn, perceive men's primary role to be financial, specifically to pay for antenatal care services (Dunlap et al., 2014).

Health system barriers include health service delivery issues (Chinkonde et al., 2009), such as services offered in an area traditionally viewed as a woman's domain (Aarnio et al., 2009). Unfavourable environments in health facilities such as an open clinic infrastructure have been reported as one of the barriers to male partner involvement in pregnancy and childbirth-related services (Maluka & Peneza, 2018; Mullick et al., 2005). Men have previously viewed health care settings to be unwelcoming, intimidating, and unsupportive (Kaye et al., 2014; Koo et al., 2013). Long waiting times at the antenatal care clinics, male unfriendly PMTCT services, and distance from the health facility have been cited as barriers to male partner involvement (Morfaw et al., 2013; Tweheyo et al., 2010). The attitudes of health care providers have also been cited as a barrier to the involvement of male partners in maternal and related matters during and after pregnancy (Koo et al., 2013; Larsson et al., 2010).

Besides barriers, facilitators of male partner involvement in prenatal and postnatal care have also been identified (Ampt et al., 2015; Amano & Musa, 2016; Abuhay et al., 2014; Ditekemena et al., 2012; Byamugisha et al, 2010). These include socio-demographic factors, individual factors, as well as health facility-related actions. Age, level of education, relationship status, and employment status were found to be significantly associated with male partner involvement in maternal and newborn health and in PMTCT in Eastern Uganda, Abidjan, Kinshasa, Kenya, Cameroon, Tanzania, The Democratic Republic of the Congo, Rwanda, and Myanmar (Byamugisha et al., 2010; Ampt et al., 2015; Ditekemena et al., 2012; Manjate et al., 2015). For instance, male partner involvement in maternal and newborn health by men in Myanmar has been positively associated with spouses' level of education and men's level of knowledge of maternal and newborn health, and negatively correlated with the number of children (Ampt et al., 2015). A review of studies in Sub-Saharan Africa identified determinants of male partner involvement in maternal and child health, with a specific focus on PMTCT (Ditekemena et al., 2012). In the afore-mentioned review, male partner involvement in PMTCT was positively associated with older age, monogamous relationships and cohabiting (Ditekemena et al., 2011), and higher levels of education (Byamugisha et al., 2010). Furthermore, a systematic review of studies in Sub-Saharan Africa cited men's older age, higher education, being employed, trustful

monogamous marriages, and providers' politeness as enablers of male partner involvement (Manjate et al., 2015).

Financial dependence of women facilitated spousal involvement in PMTCT programs (Morfaw et al., 2013). This meant that prior to going to a health facility for antenatal care appointment, the process of asking for and giving money created an opportunity for both spouses to talk about antenatal care and PMTCT, and as a result men gained more knowledge on antenatal care and PMTCT. Furthermore, male partner involvement in maternal and child health has been positively associated with men's knowledge of maternal and neonatal health and female partner's level of education (Ampt et al., 2015). Morfaw et al. (2013) have reported that men's prior knowledge of HIV and prior HIV testing facilitated their involvement in PMTCT programs.

Other factors associated with men's involvement in PMTCT programs include awareness of personal serostatus and having heard about PMTCT, and having previously discussed HIV testing with female partners (Byamugisha et al., 2010). A study among married men in Northern Uganda showed that men who were knowledgeable of ANC services, obtained health information from a health worker and whose spouses utilized skilled delivery at last pregnancy, were more likely to accompany their spouses at antenatal care (Tweheyo et al., 2010).

According to a systematic review of studies in Sub-Saharan Africa, Asia, and Europe (Morfaw et al., 2013), inviting men to the hospital for voluntary counseling and HIV testing and offering of PMTCT services to men at sites other than antenatal care clinics were key health system facilitators of male partner involvement in PMTCT.

Theoretical explanations of male partner involvement

Male partner involvement, in maternal health and related matters including PMTCT, is a complex social and behavioral issue and can thus be explained using a multi-theoretical perspective such as in Fishbein et al. (2001). Fishbein et al. (2001) consolidated multiple theories such as Social Cognitive Theory (Bandura, 1986), Theory of Reasoned Action (Fishbein, 1980), Health Belief Model (Rosenstock, 1974; Becker, 1974), Self-Regulation and Self-Control, and

Subjective Culture and Interpersonal relations, to explain most types of behaviour. Using main components drawn from the aforementioned theories, Fishbein et al. (2001) argued that a set of eight factors appeared to account for most of the variance in any given deliberate behaviour. These factors are intention, environmental constraints, skills, anticipated outcomes (or attitude), norms, self-standards, emotion, and self-efficacy, with the first three factors viewed as necessary and sufficient for producing any behaviour and the last five as influencing the strength and direction of intention.

Fishbein et al. (2001) assert that for behaviour to occur, a person must have a strong positive *intention* to perform the behaviour, have the *skills* necessary to perform the behaviour, and have a supportive *environment* that is free of constraints to enable the behaviour. In addition, the person must, believe that the advantages (benefits, anticipated positive outcomes) of performing the behaviour will outweigh the disadvantages (costs, anticipated negative outcomes), perceive more social (normative) pressure and support to perform the behaviour than not to, and perceive that performance of the behaviour is more consistent than inconsistent with his or her self-image. Also, the person's *emotional* reaction to performing the behaviour must be more positive than negative, and the person must perceive that he or she has the capabilities to perform the behaviour under several different circumstances (*self-efficacy*).

Therefore, for men to be involved in PMTCT during and after pregnancy, they must have strong positive intentions and necessary skills to do so and overcome any environmental constraints that might make it impossible to get involved. Furthermore, men's beliefs that the advantages of being involved will outweigh the disadvantages, provided that they perceive more social pressure to perform the behaviour than not to, is key to involvement. Also, men should perceive that their actions in supporting their female partners are more consistent with their self-image.

In addition, the Social Support Theory (SST), has also been a useful framework in understanding and explaining the different aspects of prenatal and postnatal male partner involvement in this thesis. From the perspective of the SST, male partner involvement in PMTCT is seen as a form of social support that a male partner provides to his HIV positive female partner

who is attending health care clinic visits during and after pregnancy. Social support may have a positive influence on health and is described as help provided through social relationships and interactions (Holt-Lunstad & Uchino, 2015). It is always intended by the sender to be helpful and is thus distinguished from intentional negative interactions such as angry criticism, hassling, and undermining (Upenn, 2019). The four main types of social support are commonly described as emotional (provision of empathy, love, trust, and caring), instrumental (provision of tangible aid and services), informational (provision of advice, suggestions, and information), and appraisal (provision of feedback useful for self-reevaluation and affirmation).

Aim of the thesis

The importance of male partner involvement in maternal and child health and in PMTCT programs in South Africa is acknowledged. However, there is limited research in South Africa on male partner involvement during and following pregnancy, not to mention in PMTCT programs, which impedes the development of contextualized appropriate interventions.

The present thesis comprises of seven chapters and presents five empirical studies utilizing data collected in a clinic randomized controlled trial (named 'Protect Your Family Project/ Vikela Umndeni') aimed at increasing the adherence and uptake of PMTCT protocols and increasing male partner involvement in prenatal and postnatal care. The full details of the study protocol for this project are reported elsewhere in a published paper (Jones et al., 2014). The work in this thesis reports on the different aspects of male partner involvement during the prenatal and postnatal periods mainly in the context of PMTCT.

In the clinic-based RCT, I played an instrumental role as the Research Project Coordinator during the planning and implementation phase of the 'Protect Your Family Project'. This included serving as a trainer for fieldwork supervisors and data collectors and as a data collector in some parts of the project. I also took part in discussions with broader project team members leading to the conceptualization and planning of this project.

Study setting and participants

The 'Protect Your Family Project/ Vikela Umndeni' was conducted at selected twelve primary health care facilities offering PMTCT services in the Nkangala and Gert-Sibande districts in Mpumalanga Province, in South Africa. The primary health care facilities were situated particularly in the Thembisile Hani and Emalahleni municipalities (Nkangala district) and Dipaleseng, Govan Mbeki, and Msukalikwa municipalities (Gert-Sibande district). A clear indication of these areas is illustrated in the map provided in Figure 1. The quantitative data used in this thesis was collected during the prenatal and postnatal periods of the HIV positive women and their partners, aged 18 years and older, attending PMTCT services in the aforementioned health care facilities. The qualitative data was collected among selected men aged 18 years and older who attended the same health care facilities.

Mpumalanga Province is predominantly rural and had a population of 4.04 million in 2011. It is characterized by a high poverty rate (39.4%), including a high unemployment level (29.5%) and low educational levels in 2011 (Mpumalanga Provincial Government, 2013). In the population group of 20 years and older 14.1% had no schooling, 29.5% had completed secondary education or matric, and 9.2% had attained qualifications higher than matric (Mpumalanga Provincial Government, 2013).

Mpumalanga Province is one of the areas with the highest maternal mortality ratios and neonatal death rates in South Africa, at about 115.4/100,000 and 7.9/1,000 births in 2014 and 2015, respectively (Mpumalanga Province Health Department, 2016). Nkangala District had the highest maternal mortality ratio in the province at 198.1/100,000 births, which is much higher than the provincial average. Gert Sibande District had the highest neonatal death rate in the province at 8.9/1000 births, which is much higher than the provincial average. The provincial average rate of antenatal visits before 20 weeks is low at 55.5%, with both the Gert Sibande and Nkangala districts having even lower rates, at 46.7% and 54.5%, respectively (MpuDoH, 2016). Furthermore, the province has one of the lowest rates of PMTCT participation and one of the highest antenatal clinic HIV prevalence rates (37%) in the country (Jones et al., 2014).

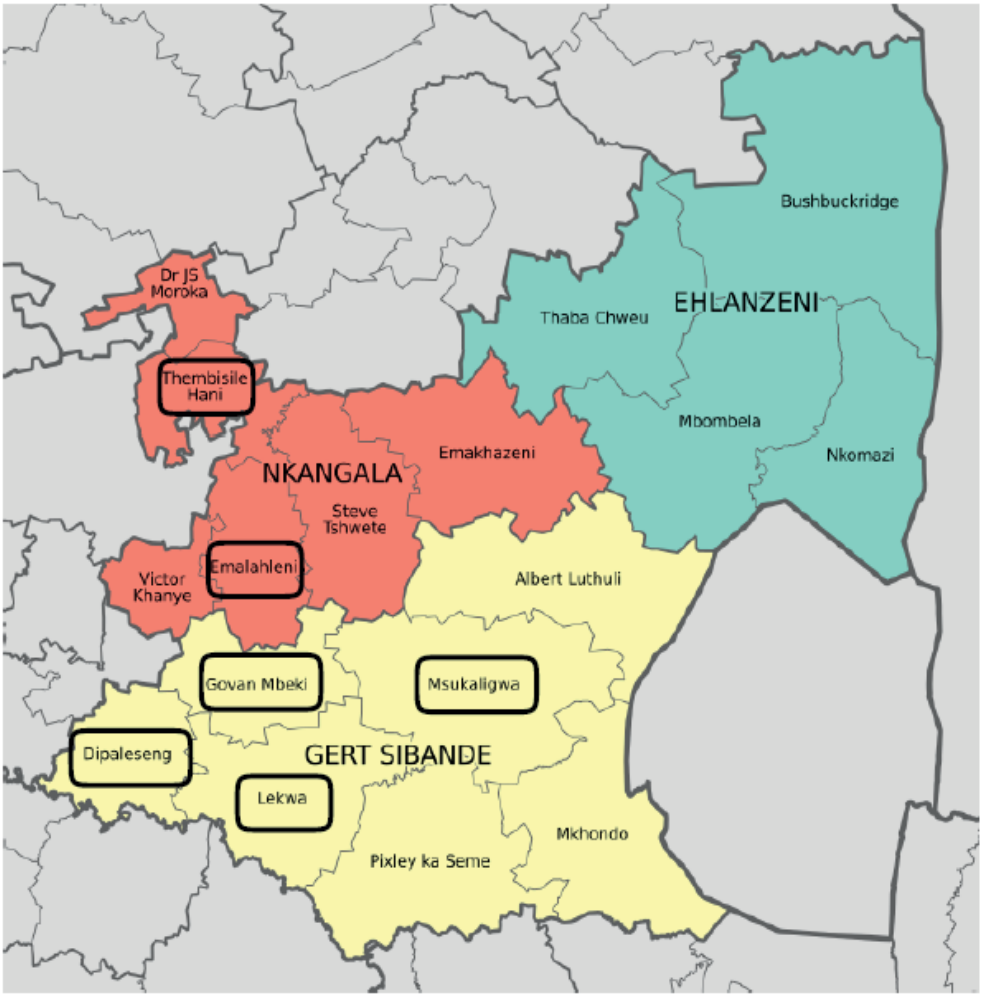

Figure 1. Map of the Mpumalanga province showing the district municipalities (Nkangala and Gert Sibande) where the clinic-based RCT was conducted.

Source: Wikipedia (2018); Municipal Demarcation Board ((2016)

*The municipalities are circled; districts are labelled in capital letters and coloured in red and yellow.

Overview of the thesis

In exploring the perceptions of male partner involvement in rural South Africa, a qualitative study was conducted among men, which is presented in **Chapter Two**. **Chapter Three** presents the second study, which investigated the prevalence of male partner involvement and associated factors thereof in programs for PMTCT in rural South Africa. This is followed by an investigation of the influence of male partner involvement on maternal health among HIV infected mothers in rural South Africa presented in **Chapter Four**. The influence of male partner involvement on infant development in rural South Africa, the fourth study, is presented in **Chapter Five**. The fifth study, reported in **Chapter Six**, is aimed at assessing the prevalence of prenatal and postnatal intimate partner violence and its predictors among HIV infected women attending PMTCT services in rural South Africa. Finally, **Chapter Seven** presents a general discussion incorporating all the findings of the five studies presented in this thesis as well as methodological issues (limitations). In addition, the implications for practice and recommendations for future research were stated.

Chapters Three, Four, and Five are cross-sectional studies derived from the same big quantitative dataset while Chapter Six is a longitudinal study using data from a clinic-randomized PMTCT controlled trial. Chapter Two makes use of qualitative data collected in a sub-study that was conducted alongside the controlled trial.

2

CHAPTER 2.

A qualitative exploration of the meaning and understanding of male partner involvement in pregnancy-related care among men in rural South Africa

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1. INTRODUCTION

Developing countries account for about 99% of global maternal deaths (World Health Organization, 2014). In many such countries, men are the key decision-makers and chief providers, often determining women's access to economic resources, and may greatly influence behavior regarding the use of contraceptives, availability of nutritious food, women's workload; and the allocation of money, transport, and time for women to attend health services (Nesane et al., 2016; Yargawa & Leornardi-Bee, 2015). In all of these ways, men can play a central role that greatly influences maternal and infant health outcomes.

Pregnancy necessitates a number of critical decisions, such as attending clinic appointments, choosing the delivery method, and determining how to feed the infant—all decisions that can be greatly enhanced by the involvement of the father of the baby or the male partner. Traditionally, maternal health issues including pregnancy and childbirth have predominantly been seen and treated as feminine matters (Kinanee & Ezekiel-Hart, 2011; Singh et al., 2014), making male partner involvement (MPI) in these issues, not a priority. However, many men, when given an opportunity, are willing to be positively involved in matters affecting reproductive health (Levtov et al., 2015; van den Berg et al., 2015). Studies indicate men's willingness to be involved in the care of their female partners during pregnancy, at birth, and after birth (Bhatta, 2013; Daumbaugh et al., 2014; Kaye et al., 2014; Vermeulen et al., 2016). In a study by Kaye et al. (2014) in Uganda among men who came to the hospital to visit their admitted partner, most men were willing to learn about their expected roles before and during childbirth and were eager to support their partners during this time. However, men in a study in Tanzania did not wish to be more actively involved in antenatal care and delivery, and study respondents perceived men as being breadwinners and their main role in pregnancy and childbirth being to support their partners financially (Maluka & Peneza, 2018).

Male partner involvement during and following pregnancy has been promoted as an effective intervention to improve maternal and newborn health outcomes. There is evidence that MPI promotes better maternal health outcomes and improved health behavior. A systematic review of 14 studies on MPI and maternal health outcomes indicated that MPI during pregnancy

significantly decreased the likelihood of antenatal and postpartum depression, decreased likelihood of childbirth complications, and improved utilization of maternal health services such as skilled birth attendance (Yargawa & Leornardi-Bee, 2015). Comparable results were found in a study conducted by Kaye et al. (2014), where it was reported that MPI reduces maternal stress through emotional, logistical, and financial support (Yargawa & Leornardi-Bee, 2015). In South Africa, lack of MPI was associated with depressive symptoms among a sample of HIV positive pregnant women (Peltzer et al., 2016). Male partner involvement has also been associated with increased adherence to antiretroviral medication during pregnancy (Peltzer & Shikwane, 2011).

The meaning and understanding of MPI during and following pregnancy may vary in different contexts, but it is most commonly defined as a man's physical presence in the antenatal or postnatal clinic with his female partner (Montgomery et al., 2011). Furthermore, MPI is defined as men taking part in their pregnant partner's birth plans, encouraging exclusive breastfeeding and immunization for their children; supporting their partners, and communicating about pregnancy-related health care (Bhatta, 2013; Montgomery et al., 2011). Men can support their partners by helping to prepare for delivery, saving money, arranging transportation to the birthing center, reducing workload during pregnancy, and providing emotional support (Bhatta, 2013; Vermeulen et al., 2016).

Studies in Africa and elsewhere have highlighted challenges of MPI in pregnancy-related health care services. Barriers to MPI in prenatal health care services have been identified as personal, family, community, and health systems factors. Studies have cited the following personal- and family-level factors as barriers to MPI in prenatal care and related services: unwillingness of men to know their HIV status (Aarnio et al., 2009), men's lack of knowledge about the services (Nyasulu, 2007), marriage instability (Aarnio et al., 2009), fear of potential dissolution of marriage consequent to disclosure of HIV-positive status, fear of stigmatization, and lack of appropriate communication between partners (Kanyama et al., 2004). Community-level factors include culturally embedded traditional gender norms that discourage men from attending health services (Kura et al., 2013; van den Berg et al., 2015).

Most countries in Sub-Saharan Africa are patriarchal in nature, wherein men perceive prenatal care to be the sole responsibility of women and practice gender norms that disapprove of males engaging in prenatal care activities (Auvinen et al., 2013; Dunlap et al., 2014; Farquhar et al., 2004; Morfaw et al., 2013). Women, in turn, perceive men's primary role to be financial, specifically to pay for antenatal care services (Dunlap et al., 2014). Men who had fathered a child and were no longer involved, or were *absent fathers*, admitted that poverty also prevented them from being involved because they identified the role of father with the role of being a financial provider (Eddy et al., 2013). Health system barriers include health delivery system factors (Chinkonde et al., 2009), such as services offered in an area traditionally viewed as a woman's domain (Aarnio et al., 2009). Men have found health care settings to be unwelcoming, intimidating, and unsupportive (Kaye et al., 2014).

There is a widely held belief that MPI is very important (Singh et al., 2014; WHO, 2015; Yargawa & Leornardi-Bee, 2015), yet there is no common understanding of what MPI is, and its meaning may vary in different contexts. Male partner involvement has been highlighted as a maternal, newborn, and child health priority in South Africa and other countries and, as such, has been promoted as an effective intervention to improve maternal and newborn health outcomes (UNAIDS, 2011; Levtov et al., 2015; SANAC, 2011; WHO, 2012). The province of Mpumalanga, South Africa, is predominantly rural and is characterized as one of the areas with the highest maternal mortality ratios and neonatal death rates in South Africa (i.e., 115.4/100,000 and 7.9/1,000 births, respectively, in 2014 and 2015; Mpumalanga Province Health Department, 2016). Nkangala District had the highest maternal mortality ratio in the province at 198.1/100,000 births, which is much higher than the provincial average. Gert Sibande District had the highest neonatal death rate in the province at 8.9/1000 births, which is much higher than the provincial average. The provincial average rate of antenatal visits before 20 weeks is low at 55.5%, with both the Gert Sibande and Nkangala districts having even lower rates, at 46.7% and 54.5%, respectively (MpuDoH, 2016).

Despite the importance attached to men's involvement in South Africa, there is limited research on MPI during and following pregnancy, particularly from males' perspectives, which

impedes the development of contextualized appropriate interventions. The main aim of this article is to explore the meaning and understanding of MPI among South African men and to consider strategies for culturally appropriate integration of male partners in antenatal and postnatal care programs in rural clinics in Mpumalanga.

Theoretical Framework

Male partner involvement in pregnancy-related care in the present study was informed through using social support theory. Social support is a positive social interaction and is described as the help provided through social relationships and interactions (Bartholomew et al., 2011). The four main types of social support are emotional (provision of empathy, love, trust, and caring), instrumental (provision of tangible aid and services), informational (provision of advice, suggestions, and information), and appraisal (provision of feedback useful for self-reevaluation and affirmation; Bartholomew et al., 2011).

Male partner involvement can take the form of positive social interaction between two partners in an intimate relationship who, together, need to make efforts and important decisions for the health of the expected baby. A male partner can provide instrumental or emotional support to his pregnant partner who needs antenatal and postnatal care services. In showing support for his female partner, a male partner can encourage her to attend (and accompany her to) antenatal care, help prepare and save money for delivery and arrange transportation to the birthing center, support good nutrition, reduce workload during pregnancy, and provide emotional support (Bhatta, 2013; Vermeulen et al., 2016).

The meaning attached to MPI and men's understanding of MPI in prenatal and postnatal care may be explained by their attitudes toward it, their subjective norms, and perceived behavioral control regarding MPI. The theory of planned behavior (TPB) was used as a guide to explain men's willingness with regards to supporting their pregnant partners during and after pregnancy. The TPB suggests that intention, the most important determinant of behavior, is determined by three conceptually independent constructs: attitude, subjective norms, and perceived behavioral control (Ajzen, 1988). According to TPB, attitudes toward a certain behavior (MPI, in this case) are influenced by beliefs about what is entailed in performing the behavior and

outcomes of the behavior (Glanz & Rimer, 1997). Subjective norms are influenced by beliefs about social standards and motivation to comply with those norms (Glanz & Rimer, 1997). Perceived behavioral control is affected by the presence or lack of things that will make it easier or harder to perform the behavior (Glanz & Rimer, 1997).

2. METHODS

An exploratory qualitative study was conducted between August 2015 and June 2016 at six selected primary health care clinics in Mpumalanga. Six focus group discussions (FGDs) were conducted and consisted of 53 men in total from communities representing both peri-urban and rural areas. Clinics were purposively selected from each of the five sub-districts represented in the study (i.e., Thembisile Hani, Msukalikwa, Dipaleseng, Emalahleni, and Govan Mbeki).

Study Setting

The study was conducted at six primary health care clinics situated in Nkangala District (with a population of 1,407,465) and Gert Sibande District (with a population of 1,076,612), in Mpumalanga (MpuDoH, 2016).

Selection and Recruitment of Participants

Male participants were recruited using convenience sampling by study fieldworkers based at the clinics, with assistance from clinic staff. Men who were visiting the clinic were referred to the study fieldworkers by clinic nurses after receiving health service. The fieldworkers then explained the study to each of the men; those who were willing to participate in the study were taken through an informed consent process. Men were then scheduled for a group session on a specific date and time at the clinic. A list was compiled of all men who were going to be part of a FGD in each clinic. Each men's FGD consisted of about eight to 10 participants.

The inclusion criteria for men were as follows: (a) Participants must be men who have fathered at least one child in their lifetime or have a partner who is currently pregnant (it was assumed that all participants would have been exposed to antenatal care services by having a pregnant wife and would thus be able to make a significant contribution during the discussions),

(b) participants had to be willing to participate in the FGDs, (c) participants had to be able to give written consent, and (d) participants had to be 18 years of age or older.

Data Collection

Focus Group Discussions were conducted by study researchers in either seSotho or isiZulu, took about 45 minutes on average, and were audio-recorded. Participants were each compensated South African Rand 50 (~US$5) for their participation.

Focus Group Guide

The FGD guide was developed based on literature review from similar studies in Sub-Saharan Africa (Brittain, 2014; Mohlala et al., 2012). Questions were derived from FGDs that had been conducted with pregnant women who were part of a larger study in community health centers in two districts in Mpumalanga (Jones et al., 2014). The questions were specifically aimed at eliciting the understanding of MPI in the South African socio-economic and cultural context. The study personnel followed a FGD guide, and all held a master's- or doctoral-level degree.

The following questions were used as guides to introduce topics for the discussions:

- What is the understanding and interpretation of MPI in child care before the baby is born?
- In what ways should male partners be involved in supporting their partners while they are still pregnant?
- Should men accompany their partners to clinic appointments during pregnancy, and why?
- What could be some of the reasons that would make it difficult for men to accompany their partners when they go to the clinic during pregnancy?
- What kind of experiences have men had when attending clinic appointments with their partners?
- What are the attitudes of clinic staff toward males attending clinic appointments with their partners?
- What is the understanding of MPI during the birth of the child?
- What is the understanding and interpretation of MPI in child care after the baby is born?

- How does the general community define or understand the meaning of MPI during and following pregnancy?

Data Analysis

The audio-recorded FGDs were simultaneously transcribed and translated verbatim into English by project staff who took notes during the discussions. These notes were used as a basis for the transcripts. Grounded theory (Glaser & Strauss, 2009) was used for coding and analyzing transcripts line by line. The analysis focused on understanding different aspects of MPI among participants. Open, axial, selective, and theoretical coding strategies were employed (Glaser, 2005). Thematic disagreements, though rare (<5%), were discussed until consensus was reached among coders. Furthermore, discussions were conducted to redefine codes and themes. Coders also considered how knowledge, assumptions, and beliefs may have influenced codes, themes, and the overall qualitative analytic strategy. Finally, coders and authors used theoretical memoing (Glaser, 1998) to compare and contrast different domains of MPI pre- and postnatally.

Ethical Considerations

Prior to study onset, approval was obtained from the Human Sciences Research Council Research Ethics Committee, the University of Miami Institutional Review Board, and the Mpumalanga Department of Health and Welfare (provincial, district, sub-district and clinic levels). Written informed consent for participation and digital recording was obtained from each participant.

3. RESULTS

Participants (*n* = 53) had an average age of 35.5 years (range between 26 and 50 years). Seven themes were identified and included: perception of male roles, prenatal MPI, postnatal MPI, men's willingness to become involved, challenges at clinic level, community attitudes and beliefs, and challenges at family and partner level.

Perception of Male Roles

There were different perceptions of male roles in supporting their partners before and after birth. Both instrumental and emotional support, as explained in the social support theory, clearly describe men's perceptions of their roles in supporting their female partners. All participants believed that a man's role was to care for and provide for his significant other, but they disagreed on the extent to which, and the manner in which, this should be done. While some men thought that expressing love and helping out with some physical tasks for their partner were necessary, many men thought that providing financially was the primary duty in supporting their partners. One participant said, "To give her love and take care of her".

Those who felt that only financial contributions were required were of the opinion that it is a cultural norm and an expectation for men to provide financially for their families and not do any physical tasks to support their pregnant partners:

> *[T]he society we are living in believes that a man can only be involved financially. As men, they think that you must only provide financially and even the elders will tell the exact same thing. Bonding with your child and things like that, they only believe it's for women to do and men become pressurized.*

As explained by the TPB, men's perceived role of being a financial provider was influenced by their traditional societal beliefs and norms and their motivation to comply with those norms. Traditionally, in most ethnic groups in South Africa, men were seen as (financial) providers, and it would seem culturally inappropriate to involve men in the caring duties in households. It seems some men in the FGDs felt that they are under pressure to perform womanly duties if they support their partners in any way other than financially.

Prenatal Male Partner Involvement

Men had varying perceptions of their roles during the prenatal period. All the men agreed that their partners should be given support during pregnancy. Some advocated for increased sharing of the workload, others for avoiding emotionally wounding her, and still others advocated for simply bringing her to the clinic and waiting in line but not attending the actual antenatal care appointment. One participant was quoted as saying,

> *Yes, I know that it's always full here at the clinic but I'm not staying far from the clinic so I would wake up at 5 o'clock in the morning to stand the queue and my partner would come around 7 and by that time I'd be number 2 or 3. When she gets in I would go back home to drink tea or do whatever that I want to do and she'll be back home around 9.*

A few men showed support for attending the actual antenatal care visit with partner. Those who mentioned that they had attended clinic visits with their pregnant partner did it so that they could have access to the same information as their partner. However, it seems as if sometimes a man could not attend the antenatal care appointment due to restricted access. One participant put it this way:

> *I used to accompany her to the clinic always, they'd check her and give her other dates and by doing that I was also aware of her dates. Sometimes they'd agree but sometimes I was not allowed to go in.*

Postnatal Male Partner Involvement

Men had mixed views regarding ways in which their partner could be supported following pregnancy. While some men believed that only providing money was necessary, others believed that they should provide other forms of instrumental support. Some participants spoke of taking more of a backseat role because of a lack of knowledge of paternity leave or an unwillingness to miss work to care for the baby. However, even when taking the backseat, some agreed that men should provide financial support. Others felt that their culture dictated that they remain distant in the early days of the baby's life:

> *You can't just go around and come back to hold your newborn baby. After the baby is born, even after work, you can't just go in where the baby is. You should keep your distance, and during that time you must sleep in the visitor's room until the baby is 10 days old.*

It seems one participant understood that taking an active role in caring for the baby, like bathing him or her, would be good, as this will make the baby feel comfortable with both parents:

> *Bathing the baby is our responsibility, and the baby must know that these people are both my parents. Also, if the baby needs something, he or she can go to either of us, even if the baby wants to bathe he'll be able to go to both of us.*

Other participants still believed that they should continue supporting their partners by taking over some of the household workload, even after birth:

> *I believe that you need to take care of the house chores, like cleaning, cooking and so on. You'll find that some of the women give birth through C-section and she won't be able to bend and do the chores, so you need to take over those departments and you also need to do the washing.*

Men's Willingness to Be Involved

This aspect is explained by the TPB in that some men's willingness to be involved seems to have been determined by their attitudes toward MPI and their perceptions of whether their significant others approve or disapprove (subjective norm) of MPI. The majority of men showed unwillingness and embarrassment (negative attitude) in taking time off/leave from work to allow time to care for their child. They believed that the task of caring for the baby and showing related support to the partner should be left to women (subjective norm) and other trained professionals. One said, "Men don't like to take leave." Another said,

> *I think trained people are the ones who are allowed in there, and there are also male nurses who are trained to do the job; only if you're trained you can do the job but if you're not trained you can't do the job.*

Some men reported that when they did take time off, they often spent it doing things that gave them pleasure, such as drinking beer, rather than using this time to give support to their partner. One participant was quoted as saying,

> *It's just we, as men, are ignorant, and we don't take things seriously and also we have fear, that's why men are seen as failures. I can take those three days, only to find out that I took those three days to do my own things.*

A few spoke of standing firm against this culture and caring for their child and being involved, regardless of what others would think (positive attitude and perceived behavioral control).

Challenges at Clinic Level

Participants shared their experiences when attending clinic appointments with their partners and commented on staff attitudes toward men. Overall, it seemed that men found the clinics unfriendly and intimidating. Participants mentioned that the majority of the people attending clinics were women, so any men who attended felt out of place. Additionally, long clinic waiting times discouraged men from attending, as they were often impatient and had other things to do, such as getting back to their workplaces: "What I've noticed is that we don't have patience, and another thing that makes us impatient is the long queues that we have to stand in at the clinic, and also we have busy schedules during the day." One participant shared a positive experience when he visited his partner the day after their baby was born—he was praised and encouraged by women at the ward when he held his baby despite being the only man there:

> *I was the only one who was holding my baby and I felt like I was betraying men, so that's why I decided to return there again. But it was for a good cause, because many women were praising me and encouraging me, saying I'm doing a good thing.*

In some clinics, participants mentioned that clinic staff did not allow men into certain areas, such as the labor ward, and it was not clear to men in which areas they were allowed to go. This limited their involvement in the process:

> *The issue is, there should be a male section here at the clinic, because I got lost once and I found myself in the in the maternity ward. I was told that men are not allowed in there,*

so it would be nice to have a section were women are not allowed, but men, and that would encourage us to come to clinic.

Unwelcoming staff attitudes, inconsistent schedules, and stringent rules regarding male attendance in the clinics also appeared to discourage men from attending. It was suggested that creating areas specifically for men would encourage them to be more involved. This is what one participant had to say:

I can't remember well, but it was for six-months or six-weeks appointment, the way the sisters were talking to me made me think twice about coming back again, because they'd say, "Ladies please shift to the other side." By that time, I'd be among them so it made feel that they don't even care that I'm also there too for my baby's appointment.

In addition, some men felt that clinic space could not accommodate men. In some cases, they were not allowed to be present during the birth of their child because multiple women were already in the room. The lack of privacy also seemed to affect men's ability to communicate and express themselves. With multiple patients being simultaneously attended to, it seemed staff did not have the opportunity to explain procedures to men. One participant reported feeling lost during the process despite being allowed to participate: "During my wife's pregnancy, they didn't allow me to get in, because there were so many pregnant women in that room and you'd find they see three or four pregnant women at the same time." Another said,

Yes sometimes we feel ashamed because you're in queue of pregnant ladies and yet you don't know how it feels to be pregnant. As you know, that makes it difficult for men to express themselves among women. We just follow the procedure but sometimes we don't know what's going on.

Community Attitudes and Beliefs

Community views of MPI in pregnancy-related matters were discussed by participants. They also discussed reasons it was difficult to accompany their partners to antenatal and postnatal care visits. Drawing from the TPB, men's behavior (supporting their female partners) was determined by their subjective norms, which are influenced by their perceptions regarding

traditional societal beliefs and norms in prenatal issues. Participants reported that the clinic environment and pregnancy-related matters were considered by their communities to be in the women's domain: "In our Black culture, there are things that should be done by women and not by men but now when you accompany your wife to the clinic people might think otherwise, and they'll gossip behind your back."

Men who attended clinics with partners felt uncomfortable; some mentioned that they would be judged or deemed *bewitched* if they attended the clinics with their partners. Many feared that if they assisted in the housework or care of the baby, it would appear that their wives had given them *isidliso* (meaning a love potion): "For an example if your wife is at work during the week and… then you decide to do the washing during the weekend, some people would think that your wife has given the love potion." According to the men, they would be stigmatized if others found that they were involved in caring for their partner during pregnancy. This is what one participant had to say about when a man accompanies his partner to the clinic: "Yes, in our Black community 'isidliso' makes a man to be a laughing stock and they'd think you're not mentally fit."

Challenges at Family/Partner Level

Family- and partner-related issues that limited male involvement were raised by participants. According to participants, some women were reluctant to have men present for the actual birth of their baby, because the women feared being teased for their actions when they were giving birth or after delivery. Participants also felt that women feared that having men present might negatively affect their male partner's psyche. One man shared that he might not be ready to witness childbirth, as it would involve seeing his partner screaming:

I think some women, they don't like us to see the actual birth.

I haven't seen that, but I can imagine, you as man, it will affect you in a certain way.

I don't think I would stand the screams, when she screams I would also end up crying.

Another issue was that during the late stages of pregnancy, a woman is often encouraged to go live with her family, causing her partner to feel disconnected and isolated from the

pregnancy/birthing process. Some men even felt that women withheld information from them. One participant felt that despite a man's desire to ensure his child's safety by being more involved and learning more about caretaking, the woman would conceal information from him. Another shared that women may not want men to be involved in their child's life and may go as far as to prohibit men from seeing the infant:

> *Sometime(s), they spend 30 days at their parent's home after giving birth. But it becomes a challenge, because you must go there every day to visit the baby, and that's where they think you might bring evil spirits. In some cases, before you can enter the room where the baby is, they first burn the incense. Even my mother told me, that if you have been having sex a night before you visit your baby, the baby would have a foam-like thing coming from the mouth.*

4. DISCUSSION

The present study examined the meaning and understanding of MPI among men visiting primary health care clinics in rural communities in Mpumalanga. Men's understanding of their roles as perceived by the community, within the cultural context, and the health care setting, highlighted important focal points to consider in the planning of interventions aimed at improving MPI during and following pregnancy in rural South Africa.

Perceptions of MPI differed among men; however, they were generally understood as giving partners instrumental support through running errands, sharing domestic chores, and providing financial and emotional support. Men who defined partner support as limited to giving financial help did not endorse the view of carrying out physical tasks for pregnant women, as they mentioned that these tasks were meant for women according to the *elders* and the *society* in which they resided. These findings are similar to those in the Singh et al. (2014) study, in which men from two villages in Uganda believed that issues related to pregnancy and childbirth were in the women's domain, with men's main responsibility being provision of funds. Evidently, there is a need for a community-level intervention aimed at the normalization of MPI during and

following pregnancy. For example, an intervention was implemented in the community of Ekiadolor in Nigeria, where group health talks were conducted, applying local culture and gender norms among males to improve their attitudes and practices regarding their involvement in prenatal care (Adeleye, Aldoory, & Parakoyi, 2011).

Accompanying partners to the clinic was also perceived to be a form of partner support by most men, even though they did not necessarily attend the antenatal care appointment. Holding a spot for women in the waiting queues or making arrangements for transportation to and from the clinic were considered equivalent to participation in the clinic visit. This is in contrast to the current literature, which commonly defines MPI as attending the clinic visit with the female partner (Alusio et al., 2011; Bhatta, 2013; Montgomery et al., 2011).

Culture and community structures play a role in men's perceptions of MPI, subsequently influencing their behavior. Hence, men expressed anxiety about the opinions of community members regarding support of their partners. Some men responded to this perceived social norm by choosing to limit support and to avoid being seen as *bedeviled* by the woman. In other instances, men felt it was not possible to be involved, either due to their partner's personal issues or because partners choose to distance themselves from the men during late stages of pregnancy upon observing such cultural norms. Men's perceptions and attitudes toward MPI, including those of the community, need to be improved if desired male involvement is to be achieved. This can be accomplished through the implementation of evidence-based interventions. The Men as Partners program in South Africa, for example, manipulated gender norms ascribed to traditional partner relations and challenged male attitudes and behaviors that compromised the health of women (Peacock & Levack, 2004). The program, as explained by Peacock and Levack (2004) was carried out through a partnership of civil society organizations collaborating with governmental and academic institutions and sought to transform men's attitudes and behaviours to promote their constructive role in sexual and reproductive health, including HIV/AIDS.

Negative experiences in health care facilities were also mentioned as barriers to MPI. Men in this study felt the clinics were unfriendly. They reported unwelcoming clinic staff attitudes, felt that the clinic space could not accommodate them, and noted stringent rules regarding male

presence in some clinic spaces. Similar results were reported in other countries with health care delivery systems that fail to welcome men and further limit men's participation to culturally defined traditional gender roles (Auvinen et al., 2013; Chikonde et al., 2009; Dunlap et al., 2014; Morfaw et al., 2013; Tadesse et al., 2004). Future interventions should focus on making health care facilities to be male friendly and antenatal care services more responsive and acceptable to male partners. This can be achieved, for example, by engaging maternal, neonatal and child health or antenatal care staff as agents in transforming facilities into gender-sensitive spaces, where women and men are welcomed as clients (van den Berg et al., 2015). Furthermore, staff members in health care facilities need to be equipped to recognize and sensitively discuss with clients how gender-inequitable beliefs and behaviors adversely affect health.

The current study sought to identify and clarify MPI during and following pregnancy within the South African context. The men in this study established their own vision for providing support for their partners. However, it is not clear that the outcomes attributed to MPI are clearly linked to women's health outcomes, and results suggest the importance of further research on the role of MPI in South Africa.

This study has limitations inherent in qualitative research: The opinions of a sample of men may not necessarily be generalizable to all population groups in South Africa. Additionally, the majority of men lived in rural settings, where traditional roles may be more dominant than elsewhere in South Africa, and the activities identified as representing MPI do not encompass all possible roles. Previous research has characterized MPI as clinic attendance, partner support, communication, knowledge of HIV and prevention of mother-to-child transmission of HIV, and disclosure of HIV status with the purpose of promoting adherence to prevention of mother-to-child transmission practices, and to include accompanying partners to clinic visits (Jennings et al., 2014; Montgomery et al., 2011).

Challenges to MPI identified in this study have been previously addressed and included personal, family, community, and health systems factors (Nyondo et al., 2014). Future initiatives should address known barriers to MPI, including concerns about HIV testing and status disclosure

(Aarnio et al., 2009; Nyasulu, 2007; Nyasulu & Nyasulu, 2011), poor communication between partners, and fear of stigmatization (Kanyama et al., 2004).

5. CONCLUSION

The present study provides support for concerted efforts to work with both men and women within the South African context, to explore the important roles of all members of the family, in working together to provide the best possible health outcomes for mother and infant. In particular, future interventions should focus on making antenatal care services more responsive to male partners and improving male partner accessibility in health care facilities. Cultural level challenges, which may limit men's willingness to become involved in pregnancy-related care, maybe surmounted as social norms change.

3

CHAPTER 3.

Factors associated with male partner involvement in programs for the prevention of mother-to-child transmission of HIV in rural South Africa

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1. INTRODUCTION

There is ample evidence documenting the positive contributions men can make in the successful prevention of mother-to-child transmission of HIV (PMTCT) (WHO, 2012). As such, male partner involvement (MPI) in PMTCT programs has been promoted as one of the priority interventions to improve PMTCT outcomes in sub-Saharan African countries (WHO, 2012; UNAIDS, 2011). In South Africa, the National Strategic Plan on HIV, STIs and tuberculosis (TB) promotes the involvement and engagement of men to strengthen PMTCT programs (SANAC, 2011). However, the realization of MPI in sub-Saharan countries is challenging because of male-related and structural factors (Auvinen et al., 2013).

In many countries, sexual and reproductive health (SRH) programs and services are centered around women, with men often lacking information that could assist them in making decisions regarding healthy behaviors and the roles they could play to promote overall family health, including accessing HIV prevention, care and treatment services (WHO, 2012). Men's constructive involvement has led to positive health outcomes for women, children and families [Peacock et al., 2009]. Studies have demonstrated that men are interested in being involved in health promotion for their families and communities, such as in PMTCT and family-planning programs (WHO, 2012; Peacock et al., 2009; Tijou Traore et al., 2009).

Male partner involvement in PMTCT counters prevailing traditional gender norms in many patriarchal societies in sub-Saharan Africa (WHO, 2012). Men have seen health seeking in SRH to be a "women's task". They have generally seen the antenatal clinic as a space meant for women, and the definition and organization of the antenatal care program as fundamentally female-oriented (WHO, 2012; Reece et al., 2010). Predictably, men think that antenatal clinic activities fall outside their area of responsibility (Orne-Gliemann et al., 2010; Falnes et al., 2011). They perceive that visiting the antenatal clinic would be "unmanly" (WHO, 2012; Montgomery et al., 2006; Chikonde et al., 2009), and therefore feel uncomfortable at the thought of being the only man present in the antenatal clinic (WHO, 2012; Falnes et al., 2011) and fear stigmatization by other men (Reece et al., 2010; Falnes et al., 2011; Byamugisha et al., 2010).

Currently, there are no standardized measures of MPI, and its definition, meaning and the way it is understood may vary in different contexts. The most-common indicator used to define MPI is

"men attending antenatal care appointments with their pregnant partner" (Montgomery et al., 2006; Bhatta, 2013; Alusio et al., 2011). Furthermore, MPI is also defined as men taking part in their pregnant partner's birth plans, encouraging exclusive breastfeeding and immunization for their children, providing support during pregnancy and communicating with their partner about pregnancy-related health care (Montgomery et al., 2011; Alusio et al., 2011). It is, however, important to note that MPI cannot be comprehensively measured by a single indicator, hence some studies have used multiple indicators to form an index that captures a broader notion of MPI (Byamugisha et al., 2010; Tilahun & Mohammed, 2015; Ampt et al., 2015). These more-sophisticated and composite measures of MPI would thus include indicators that capture different aspects of maternal and infant health, such as "accompaniment to antenatal care appointments", "financial support" and "couple communication". For example, Byamugisha et al. (2010) used an MPI index using six indicators, namely, the "male partner accompanying his wife to antenatal care appointment", "knowing the antenatal care schedule", "discussing the antenatal care activities with female partner", "providing money for antenatal care fees", "knowledge of what happens at the antenatal care visit" and "condom use with the female partner during the current pregnancy".

Psychosocial and socio-demographic factors, as well as health facility-related factors, have been associated with MPI in maternal and infant health services in sub-Saharan Africa (Ditekemena et al., 2012). Male partner involvement is determined by psychosocial factors such as individual beliefs and attitudes, intra-spousal or partner communication, and health facility-related factors such as opening hours of services, staff attitudes and behavior, and the non-male-friendly space (Ditekemena et al., 2012). Furthermore, socio-demographic characteristics, such as age, level of education, relationship status and employment status were found to be significantly associated with MPI in PMTCT (Byamugisha et al., 2010; Ampt et al., 2015; Ditekemena et al., 2012; Manjate et al., 2015). Older age, higher educational attainment, being employed, cohabiting and monogamous marriages were found to be positively associated with MPI (Ditekemena et al., 2012; Manjate et al., 2015; Katz et al., 2009) as well as men's knowledge in maternal and infant health and the number of children (Tweheyo et al., 2010, Ampt et al., 2015). Other factors associated with men's involvement include awareness of personal serostatus and having heard about PMTCT (Byamugisha et al., 2010). Men who had heard about

PMTCT were two times more likely to become involved than those who had not. Male partners' reports of having previously discussed HIV testing with female partners was significantly associated with their attendance at the antenatal clinic (Byamugisha et al., 2010), whereas alcohol use by male partners and poor intra-spousal or partner communication was associated with poor MPI (Ditekemena et al., 2012).

In addition to the above-mentioned factors identified in the empirical literature, the social-support concept was used as a supporting theoretical framework to explain MPI in this study. Social support may have a positive influence on health, and is described as the help provided through social relationships and interactions (Holt-Lunstad & Uchino, 2015). Four types of social support are identified, that is, emotional support (provision of empathy, love, trust and caring), instrumental support (provision of tangible aid and services), informational support (advice, suggestions and information) and appraisal support (provision of feedback useful for self-reevaluation and affirmation). For example, a male partner could show support to a pregnant partner by providing tangible aid and services such as accompanying her to the antenatal care appointment and reducing household workload during pregnancy (instrumental and emotional support). Many other types of support are possible.

Determinants of MPI in maternal and infant health and PMTCT have been studied in some countries (Ampt et al., 2015; Amano & Musa, 2016; Abuhay et al., 2014). There is, however, a lack of information regarding factors associated with MPI in maternal and infant health, and PMTCT among South African men. The aim of this study is to utilize secondary cross-sectional data to report on the prevalence of MPI and its determinants among male partners of HIV-infected pregnant women visiting primary health care facilities in rural South Africa.

2. METHODS

Study Setting

This study utilized cross-sectional baseline data collected through the "Protect Your Family" (PYF) clinic-randomized controlled trial aimed at increasing the adherence and uptake of PMTCT protocols and increasing male partner involvement in antenatal and postnatal care. The study

was conducted in 12 community health centers (CHCs) based in Gert Sibande and Nkangala districts in Mpumalanga province, South Africa (Jones et al., 2014). The PYF trial protocol has been previously published (Jones et al., 2014) and is registered on clinicaltrials.gov, number NCT02085356.

Baseline data was collected among pregnant women and their male partners during the recruitment phase of the clinic-randomized trial from April 2015 to January 2017.

Participants and Procedures

Participants were 463 male partners who were recruited by virtue of being the partner of the HIV-infected pregnant woman and were systematically sampled (every consecutive patient after HIV post-test counseling). The "Protect Your Family" clinic-randomized controlled trial aimed to recruit 720 HIV-infected women together with their male partners. Of the 715 HIV-infected women who participated in the study, 174 of the male partners declined, and 78 had incomplete data resulting in a total sample of 463 male participants. To be eligible for participation in the study, women had to be six months or less pregnant, 18 years and older, HIV seropositive and have a male partner. Interested participants were given an appointment, and enrolled into the study after provision of informed consent. Once enrolled, all participants completed an assessment in their preferred language (English, isiZulu, or Sesotho) to enhance disclosure and accommodate different levels of literacy. Assessors were available at all times and always completed the demographic component of the assessment with the participant, to familiarize them with the software and enhance privacy during completion of the remainder of the assessment.

Measures

The data-collection instrument was developed through the Questionnaire Development System's (QDS) Audio Computer-Assisted Self-Interview (ACASI) software. It included sections regarding demographic information, condom use, intimate partner violence, externalized HIV stigma, MPI, HIV knowledge, as well as additional sections such as HIV medication adherence and family-planning assessment.

Socio-demographic information. Questions were asked to assess age, language, religion, level of education, employment status, relationship status, income and number of children (see Table 3.1) of the participants.

Male Partner Involvement (MPI). The main outcome variable of interest was male partner involvement, which was assessed using the MPI index adapted from a previous similar study (Byamugisha et al., 2010). The index comprised of 10 items related to the participants' participation in specific areas of antenatal care, including PMTCT. However, for the purposes of this paper, a nine-item scale was used. One item was omitted from the scale due to the fact that it had too many missing responses, which negatively affected the reliability of the scale. Some of the nine questions included were, "Do you attend antenatal care visits with your pregnant partner?", "Do you know your partner's antenatal appointment times?", "Have you discussed antenatal health care for your baby with your partner?", "Do you support your partner's antenatal visits financially?" and "Do you know what happens in the antenatal clinic?" Participants responded to each item as 1 "yes" or 0 "no". All items were summed up to form a scale or composite MPI variable, (scores range 0–9; Cronbach's alpha = 0.84), with higher scores indicating higher levels of MPI.

HIV and PMTCT knowledge. HIV and PMTCT knowledge was assessed using an adapted version of the AIDS-Related Knowledge Scale consisting of 18 items adapted from the Brief HIV PMTCT Knowledge questionnaire (Carey & Schroder, 2002; Peltzer et al., 2010). The first twelve items were questions or statements concerning modes of HIV transmission (e.g., Can a person get the AIDS virus through someone sneezing, like a cold or flu?), reinfection with resistant virus (e.g., If both partners are HIV positive it is okay to have unprotected sex) and condom use. The last six items were related specifically to PMTCT knowledge (e.g., Can an HIV positive mother infect her baby with HIV during pregnancy?). Responses to the scale items were categorized as "yes", "no" and "don't know", or "true", "false" and "don't know". All correct responses were scored as 1 while incorrect and "don't know" responses were scored as 0. The scores were summed to form two indexes, that is, HIV knowledge (score range 0–12; Cronbach's alpha = 0.78), and PMTCT knowledge (score range 0–6; Cronbach's alpha = 0.72).

Behavioral characteristics. HIV testing was assessed by asking two questions, "Have you been tested for HIV?", and "Are you HIV positive?" with either "yes" or "no" as responses to both questions. Condom use was assessed by asking the question "The last time you had sex, did you use a condom?" ("Yes" or "No"). Disclosure of HIV status was assessed by using an adapted version of the Disclosure scale (Kotze et al., 2013) which assesses disclosure among sexual partners and family members during pregnancy. Disclosure among sexual partners was considered for the purposes of this paper. Question asked was "is your spouse HIV positive?" with "0 = no, 1 = yes and 2 = I don't know" as response categories. The preceding question asked was "Has your partner tested for HIV?" and the response categories were "0 = no, 1 = yes and 2 = I don't know". Total adherence to antiretroviral (ARV) medication was assessed by asking participants for each of the past seven days, "How much of your HIV medication did you take?" Response options were "none of my medication", "half of my medication", "all of my medication". Self-rated adherence to ARV medication in the past four weeks was assessed by asking participants to rate their ability to take all their ARV medication as prescribed by the clinic staff. Response options were from 1,"very poor", to 6, "excellent".

Intimate partner violence (IPV). IPV was assessed using an adapted version of the Conflict Tactics Scale 18 (CTS-18) (Straus, 1979), which assesses reasoning, verbal aggression and mild and severe physical aggression through the use of different subscales. Respondents indicated the number of times in the past month their partner had engaged in specific behaviors using a scale of 0 (never) to 6 (more than 20 times). Scores on the summed scale ranged from 0 to 18, with higher scores indicating male partners experienced more violence. Cronbach's alpha for the full scale in this sample was 0.86.

Scores on the reasoning sub-scale ranged from 0 to 18, with higher scores indicating more use of reasoning skills by female partners. Higher scores on the verbal aggression sub-scale (range 0–42) indicated more use of verbal aggression by female partners. Higher scores on the physical aggression sub-scale (range 0–48) showed more use of physical aggression by female partners. Cronbach's alphas for the different subscales as used in the analysis are as follows: 0.73 for reasoning, 0.83 for verbal aggression, 0.91 for physical aggression (both mild and severe).

AIDS-related stigma. The AIDS-Related Stigma Scale (Kalitchman et al., 2005) is a nine-item subscale that measures externalized or public HIV stigma, for example, statements such as "People who have AIDS should be ashamed", which are rated dichotomously using either a score of 0 (disagree) or 1 (agree). Scores on this scale ranged from 0 to 9, where higher scores indicate greater levels of stigma. Cronbach's alpha in this sample was 0.67.

Family-planning assessment. Family planning was assessed by asking questions on family-planning attitudes and contraception practices. Questions and items regarding contraception practices assessed whether the pregnancy was planned or unplanned, whether a provider was consulted prior to pregnancy, current use of family planning and intentions to engage in family planning in the future. Overall, seven questions and/or items were used for the purposes of this paper, that is, (1) "Are you the biological father of your partner's baby?", (2) "Was your partner's pregnancy unplanned?", (3) "Are you planning to have more children in the future?", (4) "Are you currently using condoms to prevent HIV or sexually transmitted infections (STIs), how important the following things are when deciding to have a baby", (5) "Your family's desire for you to have a baby (or not)?", (6) "Your partner's desire to have a baby (or not)?", (7) "Your doctor or health-care provider's advice about whether you should have a baby or not?". Responses to the questions were either "yes", "no" or "not sure", and for the items, responses were categorized as 1 through to 10, 1 = "not important at all" and 10 = "very important".

Data Analysis

Statistical Package for Social Sciences (SPSS version 24.0, IBM, Armonk, NY, USA) was used to analyze the data. Frequency analyses were conducted to describe the socio-demographic and behavioral characteristics of the participants. To identify associations among the key study variables, Spearman or Pearson bivariate correlations were calculated; point-biserial correlations were used for dichotomous or categorical variables and phi coefficients for correlations between binary variables. Study variables that showed significant ($p < 0.05$) univariate associations with male partner involvement were included in a subsequent multiple linear-regression model to assess the amount of variance explained in male partner involvement. Then, to develop a final model, backward elimination was used to reduce the number of variables in the multiple linear-regression model; variables not significant at $p < 0.10$ were ultimately excluded. A number of

observations (n = 7) with outlying model residuals were excluded from the final models, repeating the analyses until no more outlying residuals were identified.

Ethical Considerations

Prior to study onset, approval was obtained from the Human Sciences Research Council (HSRC) Research Ethics Committee (protocol number REC 4/21/08/13), the University of Miami Institutional Review Board (Human Subjects Research Office, HSRO study number 20130238), and the Mpumalanga Department of Health and Welfare (provincial, district, sub-district and clinic levels). Written informed consent for participation was obtained from each participant.

3. RESULTS

Socio-Demographic and Behavioral Characteristics

The socio-demographic and behavioral characteristics of the sample as well as partner characteristics are shown in Table 3.1. The mean age of the 463 male partners was 33.04 years (SD = 7.24). Most of the male partners were unmarried and not living together (44.7%), were in a relationship for more than a year (82.5%) and had two or more children (48.2%).

Table 3.1. Socio-demographic, partner characteristics and behavioral characteristics of the male partners (*N* = 463)

Characteristic	*n* (%) Median (IQR)
Age (mean)	33.04 (SD = 7.24)
19–49 years	452 (97.6)
≥50 years	11 (2.4)
Relationship status	
Unmarried, living separate	207 (44.7)
Unmarried, living together	169 (36.5)
Married	87 (18.8)
Length of period in current relationship	
Less than 1 year	80 (17.5)
More than 1 year	376 (82.5)
Educational attainment	
Grade 0–11	278 (60.0)
Grade 12 or more	185 (40.0)
Employment status	
Not employed	188 (40.6)
Employed	275 (59.4)

Characteristic	*n* (%) Median (IQR)
Income (Rands)	
Less than 1000	123 (26.6)
1000 or more	340 (73.4)
Number of children	
0	110 (23.8)
1	130 (28.1)
2 or more	223 (48.2)
Tested for HIV	
No	137 (29.6)
Yes	326 (70.4)
HIV status, positive	
Yes	297 (64.1)
No	166 (35.9)
Total ARV adherence	7.00 (0.00)
Self-rated adherence	5.00 (1.00)
Disclosed HIV-status partner	
No	348 (75.2)
Yes	115 (24.8)
Partner tested for HIV	
No/don't know	85 (18.4)
Yes	378 (81.6)
Partner HIV positive	
No/don't know	152 (32.8)
Yes	311 (67.2)
Partner currently on ARV No/Do not know/HIV-Partner	173 (37.4)
Yes	290 (62.6)
Child HIV positive No/No Children	446 (96.3)
Yes	17 (3.7)
Condom use at last sex	
No	220 (47.5)
Yes	243 (52.5)
Alcohol use in the past month (>3 drinks)	
No	276 (59.6)
Yes	187 (40.4)
AIDS-Related Knowledge scores	
Knowledge score (range 0–12)	10.00 (3.00)
PMTCT knowledge score (range 0–6)	5.00 (3.00)
Kalichman Stigma Scale—9 items : Score (range 0–9)	1.00 (0.00)
Partner violence (Conflict Tactics Scale)	
Reasoning subscale	4.00 (7.00)
Verbal aggression subscale	1.00 (5.00)
Mild physical aggression subscale	0.00 (0.00)
Severe physical aggression subscale	0.00 (0.00)
Family planning assessment	
Biological father	432 (93.3)
Partner's pregnancy unplanned	211 (45.6)

Characteristic	*n* (%) Median (IQR)
Having talked with health care provider about trying to get pregnant	125 (27.0)
Planning to have more children in future	232 (50.1)
Currently using condoms to prevent HIV or STIs	324 (70.0)
Partner's desire to have baby (scores 0–10)	9.50 (9.00)
Health care provider's advice about whether to have baby or no (scores 0–10; 0 = not important at all, 10 = very important)	1.00 (9.00)

Most (70.4%) reported to have tested for HIV, with 64.1% reporting to be HIV negative. About 75.2% reported to having not disclosed their status to their partner. PMTCT programs include routine HIV testing of women, however, only 81.6% reported that their partner had tested for HIV, with 67.2% reporting that their partner was HIV positive. The majority (58.8%) of those who reported that their partner was HIV positive also reported that their partner was on antiretroviral treatment. Just over half (52.5%) reported condom use at last sex, having more than three drinks of alcohol in the past month (40.4%), and most reported low levels of HIV stigma (median = 1.00, IQR = 0.00).

HIV knowledge and PMTCT-specific knowledge among male participants were generally high. Overall, respondents had a median HIV knowledge score of 10.00 (IQR = 3.00) from 12 items. With regards to PMTCT-specific knowledge, male partners had a median score of 5.00 (IQR = 3.00) from the six items. On average, participants showed low levels of verbal reasoning (median = 4.00, IQR = 7.00), verbal aggression (median = 1.00, IQR = 5.00) and physical aggression (median = 0.00, IQR = 0.00).

With regards to family planning assessment among the male participants, the majority (93.2%) reported being the biological father of the unborn baby in the current pregnancy. Seventy percent reported that they were currently using condoms to prevent HIV or sexually transmitted infections (STIs). Over half (50.1%) reported that they were planning to have more children in the future, and 27% reported having talked with a health-care provider about trying to get pregnant. With regards to making a decision to have a baby, most participants felt that their partner's desire to have a baby was more important (median = 9.50, IQR = 9.00) than their health-care provider's advice about whether to have a baby or not (median = 1.00, IQR = 9.00).

Level of Male Partner Involvement among Male Partners

Table 3.2 shows the prevalence of MPI across the different activities and for the summed up activities. Over two thirds (63.7%) of the sample reported that they know their partner's antenatal appointment time, while just over a third (31.5%) reported that they visited the antenatal clinic with their partner. The majority of the male partners (84.7%) reported that they financially supported their partner's antenatal appointments. Almost half (49.7%) reported that they know what happens in the antenatal clinic, and 66.5% reported having discussed antenatal health care for their baby with their partner. Overall, participants obtained a median score of 6.00 (IQR = 4.00) for involvement in PMTCT. Only 10.6% reported to have participated in all specified activities (i.e., a highest MPI index score of 9).

Table 3.2. Male partner involvement in PMTCT (*N* = 463)

Characteristic	*n* (%) Median (IQR)
Attends antenatal care visits with partner	
No	317 (68.5)
Yes	146 (31.5)
Knows partner's antenatal appointment times	
No	168 (36.3)
Yes	295 (63.7)
Discussed baby antenatal health care with partner	
No	155 (33.5)
Yes	308 (66.5)
Supports partner's antenatal visits financially	
No	71 (15.3)
Yes	392 (84.7)
Knows what happens in the antenatal clinic	
No	233 (50.3)
Yes	230 (49.7)
Have you been asked to take an HIV test?	
No	78 (16.8)
Yes	59 (12.7)
Unknown	326 (70.4)
Has your partner discussed feeding options for the baby with you?	
No	146 (31.5)
Yes	317 (68.5)
Have you discussed the place of delivery for the baby with your partner?	
No	167 (36.1)
Yes	296 (63.9)
Have you discussed testing your baby for HIV with your partner?	
No	49 (10.6)
Yes	117 (25.3)
Unknown	297 (64.1)

Characteristic	*n* (%) Median (IQR)
Have you discussed condom use with your partner?	
No	90 (19.4)
Yes	373 (80.6)
MPI scores	
0	17 (3.7)
1	23 (5.0)
2	48 (10.4)
3	30 (6.5)
4	50 (10.8)
5	41 (8.9)
6	64 (13.8)
7	86 (18.6)
8	62 (13.4)
9	42 (9.4)
MPI (index)	
MPI score (range 0–9)	6.00 (IQR = 4.00)

Correlations with MPI

Correlations were computed between MPI and thirty-one (31) possible associated factors (see Appendix A). The results show that correlations were statistically significant for only seventeen (17) factors. A small effect is $r = 0.10–0.23$, a moderate effect is $r = 0.24–0.36$ and a large effect is $r \geq 0.37$ (Cohen et al., 2003).

Socio-demographic characteristics. Small positive associations with MPI were found for relationship status (specifically living together with partner) and number of children.

Behavioral characteristics. Moderate positive associations with MPI were found for having tested for HIV, own HIV status, disclosure of HIV status to partner, condom use at last sex, having talked to healthcare provider about trying to get pregnant in the future, planning to have more children, condom use to prevent HIV and STIs, importance of partner's desire to have children, importance of healthcare provider's advice about whether to get pregnant or not, and PMTCT knowledge. Furthermore, small negative associations with MPI were found for alcohol use.

Partner characteristics. Finally, moderate positive associations with MPI were found for awareness of female partner having tested for HIV and partner HIV status. Small positive associations were found with partner's use of reasoning skills to resolve conflict, while small negative association was found for partner's use of verbal aggression.

Factors Associated with Male Partner Involvement in PMTCT

The results of the multiple linear-regression analysis are shown in Table 3.3. Results of the unadjusted model are described. Relationship status (specifically living together with partner), awareness of female partner's positive HIV status, female partner's desire to have more children in the future, having talked to a healthcare provider about trying to get pregnant in the future, planning to have more children in the future, condom use to prevent HIV and STIs, and partner's reasoning skills, were significantly and positively associated with MPI. Partner's verbal aggression was inversely associated with MPI. Overall, this model accounted for 30.5% of the variance in MPI (R^2 = 0.305).

Table 3.3. Results of linear-regression model predicting MPI (*N* = 454)

Characteristics	Unstandardized Coefficients		Standardized Coefficients		*p*	95.0% Confidence Interval for *B*	
	B	SE	*B*	*t*		Lower Bound	Upper Bound
(Constant)	1.540	0.438		3.517	0.000	0.679	2.401
Relationship status: unmarried, living together (ref = unmarried, living separate)	0.594	0.229	0.113	2.595	**0.010**	0.144	1.044
Relationship status: married	0.081	0.287	0.012	0.282	0.778	−0.483	0.644
Number of children	0.125	0.132	0.040	0.946	0.344	−0.135	0.385
Tested for HIV (ref = not tested)	0.263	0.260	0.047	1.010	0.313	−0.249	0.775
Own HIV status (ref = negative)	0.356	0.328	0.067	1.087	0.278	−0.288	1.001
Female partner tested for HIV (ref = partner not tested)	0.534	0.364	0.082	1.467	0.143	−0.182	1.250
Female partner HIV positive (ref = no/don't know)	0.730	0.312	0.135	2.344	**0.019**	0.118	1.343
Alcohol use (3 or more drinks in a day in the past month vs not)	−0.137	0.214	−0.027	−0.642	0.521	−0.558	0.283
Condom use at last sex (ref = no)	0.036	0.246	0.007	0.147	0.883	−0.448	0.520
Discussed future pregnancy with provider (ref = no)	0.997	0.236	0.175	4.215	**<0.001**	0.532	1.462
Planning to have more children in the future (ref = no)	0.427	0.208	0.084	2.049	**0.041**	0.017	0.837
Currently using condoms to prevent HIV transmission (ref = no)	0.854	0.259	0.154	3.296	**0.001**	0.345	1.364
Your partner's desire to have a baby (or not)	0.094	0.029	0.147	3.215	**0.001**	0.037	0.152
Health care provider's advice about whether you should have a baby (or not)	0.012	0.028	0.018	0.414	0.679	−0.044	0.067
PMTCT knowledge	0.061	0.061	0.042	0.995	0.320	−0.059	0.181
CTS reasoning	0.068	0.025	0.118	2.767	**0.006**	0.020	0.116
CTS verbal aggression	−0.043	0.019	−0.096	−2.290	**0.022**	−0.080	−0.006
Disclosure to partner (ref = not disclosed)	0.277	0.349	0.045	0.793	0.428	−0.409	0.963

Note: CTS = Conflict Tactics Scale. *B* = Beta coefficient. SE = Standard Error. *t* = t-statistic. All significant p-values are in bold. R^2 = 0.305; $F(18,443) = 12.24$, $p < 0.001$.

Table 3.4 summarizes the final multiple linear-regression model. Participants who reported to be living together with their partner, own HIV status, awareness of female partner's positive HIV status, female partner's desire to have more children in the future, having talked to healthcare provider about trying to get pregnant in the future, condom use to prevent HIV and STIs, and partner's reasoning skills were more likely to participate in the specified male involvement activities. Participants who reported partner's verbal aggression were less likely to participate. Overall, the final model accounted for 31% of the variance in MPI (R^2 = 0.310).

Table 3.4. Results of reduced multiple linear-regression model predicting MPI (*N* = 454)

Characteristics	Unstandardized Coefficients		Standardized Coefficients		*p*	95.0% Confidence Interval for *B*	
	B	SE	*B*	*t*		Lower Bound	Upper Bound
(Constant)	1.906	0.317		6.010	0.000	1.283	2.529
Relationship status: unmarried, living together (ref = unmarried, living separate)	0.586	0.206	0.111	2.848	**0.005**	0.182	0.990
Own HIV status (ref = negative)	0.687	0.230	0.130	2.986	**0.003**	0.235	1.139
Female partner tested for HIV (ref = partner not tested)	0.636	0.352	0.097	1.807	0.071	−0.056	1.327
Female partner HIV positive (ref = no/don't know)	0.780	0.300	0.145	2.597	**0.010**	0.190	1.371
Discussed future pregnancy with provider (ref = no)	1.062	0.230	0.186	4.626	**<0.001**	0.611	1.513
Planning to have more children in the future (ref = no)	0.382	0.200	0.075	1.913	0.056	−0.010	0.775
Currently using condoms to prevent HIV transmission (ref = no)	0.918	0.229	0.166	4.018	**<0.001**	0.469	1.367
Your partner's desire to have a baby (or not)	0.106	0.026	0.164	4.087	**<0.001**	0.055	0.156
CTS reasoning	0.066	0.024	0.114	2.746	**0.006**	0.019	0.112
CTS verbal aggression	−0.045	0.018	−0.101	−2.452	**0.015**	−0.081	−0.009

Note: CTS = Conflict Tactics Scale. R^2 = 0.310; $F(10, 451) = 21.75$, $p < 0.001$.

4. DISCUSSION

This study reports on the prevalence of male partner involvement and highlights some important factors that influence male partner involvement in PMTCT programs in rural South Africa.

The results of this study indicated that 44.1% of male partners reported involvement in most or all MPI activities, that is, scores of 7 to 9. This figure is higher compared to what has been reported in similar studies (Abuhay et al., 2014; Amano & Musa, 2016). The prevalence of MPI in this study is being compared with only those in similar studies conducted in PMTCT contexts rather than generally in maternal and infant care. In north-west Ethiopia and Addis Ababa, 20.9% and 28.1% of men had high MPI (score of 4–6) in PMTCT (Abuhay et al., 2014; Amano & Musa, 2016). However, this figure is low compared to what has been reported from a most-recent similar study in southern Ethiopia where the level of MPI (score of 4–6) in a PMTCT program was 53% [16]. Low levels of male partner involvement in maternal and infant health and PMTCT are partly attributed to traditional gender norms prevalent in patriarchal societies, which make involvement by men in such issues a challenge (Van den Bergh et al., 2015; Kura et al., 2013; Matseke et al., 2017; Singh et al., 2014; Kinanee & Ezekiel-Hart, 2011).

In this study, 10.6% of men reported involvement in all the listed activities (see Table 3.2), while 3.7% reported no involvement in any of the activities. The theory of planned behavior (TPB) (Ajzen, 1988), one of the most commonly used frameworks to explain behavior, proposes that intention, the most important determinant of behavior, is determined by individuals' attitudes (positive or negative evaluation of performing a particular behavior), subjective norms (perceived social expectations) and perceived behavioral control (self-efficacy). MPI in PMTCT programs may be greatly influenced by community held traditional gender norms (subjective norms) where most men gave limited support to their HIV-positive pregnant partners as they believe that some of the activities are "women matters". However, some men still chose to fully support their partners regardless of these traditional gender norms (positive attitude and self-efficacy). Interventions should focus on changing men's negative attitudes towards involvement in maternal and infant-health care in PMTCT settings. On a larger scale, there is a need to explore a shift in gender norms. For example, this can be achieved through the adaptation and implementation of evidence-based gender-transformative programs with men, which has led to

positive changes in their behavior and attitudes related to maternal and infant health (WHO, 2012, Barker et al., 2010). The "Men as Partners" program among South African men, for example, manipulated gender norms ascribed to traditional partner relations and challenged male attitudes and behaviors that compromised the health of women (Peacock & Levack, 2004). The Ekialodor safe motherhood program in Nigeria conducted group health talks to improve male attitudes and practices regarding their involvement in prenatal care (Adeleye et al., 2011).

The finding that male partners living together with their partners were more likely to be involved is similar to the findings by other studies (Ditekemena et al., 2012; Amano & Musa, 2016). This is much to be expected, as cohabiting men and women may have more time to communicate and harmonize their time schedules (Ditekemena et al., 2012) to allow instrumental support to the pregnant partner. Matseke et al. (2017) used the concept of social support (Holt-Lunstad & Uchino, 2015) to describe MPI in antenatal/prenatal care. It makes sense that male partners not living with their partners may find it difficult to support their partners. However, whereas instrumental support may be difficult to achieve among non-cohabiting partners, other forms of support may be easier to achieve than others. For example, financial support is achievable amongst both non-cohabiting and cohabiting partners, while sharing of household workload may not be achievable among non-cohabiting partners. Accompaniment to health facilities maybe easier among cohabiting partners but not necessarily unachievable among non-cohabiting partners. As such, future interventions aimed at improving MPI should focus on exploring ways to harmonize time schedules among non-cohabiting partners to enable optimal involvement among men not living with their partners.

It is an interesting finding that male partners who were aware of their female partners' HIV-positive status were more likely to engage in MPI activities. A study in Ivory Coast showed that men played an active role in applying the advice they received when they became aware that their spouse is HIV positive and involved in the PMTCT program (Tijou Traore et al., 2009). According to the health belief model (Rosenstock, 1974), behavior is determined by threat perceptions and beliefs about the benefits of the recommended action and potential barriers for its implementation. This means that a male partner took a health-related action (i.e., involvement to support an HIV-positive pregnant partner) if he feels that by so doing, a negative health

condition (i.e., infant HIV infection) can be avoided. In this case, the fact that a male partner knew his partner's HIV positive status and therefore wanted to ensure that they give birth to a healthy baby may have served as motivation for male support. Mutual disclosure of HIV status among partners is important as it allows decision making regarding healthy antenatal and postnatal care choices. Disclosure for HIV-positive women can encourage their partners to make informed reproductive health options (Mucheto et al., 2011). In this study, just over a third (67.2%) of male partners knew their partner's HIV-positive status, while 78% did not tell their female partner about their status. Male partner involvement interventions that encourages mutual HIV testing and disclosure among both partners would thus be beneficial in this regard.

Although HIV knowledge and PMTCT-specific knowledge were generally high among male participants, it was not associated with MPI. This is not surprising, since behavioral scientists have shown that knowledge does not always directly translate into behavior change (Mcguire, 1985). Methods for successfully conveying information, as suggested by concepts of the theories of information processing (Kintch & van Dijk, 1978; Mayer, 1989), should be considered in the planning of male partner involvement interventions.

Male partners whose partners had used reasoning skills to settle couple differences were also more likely to engage in MPI activities. This finding suggests that when having differences regarding important issues, some couples resort to discussing issues calmly, or bringing in someone to help settle things.

It is not surprising that male partners who reported that their partner had used verbal aggression to resolve conflict were less to likely to be engaged in more MPI activities. This finding is similar to the results of a study among pregnant HIV-positive women, where both psychological and physical violence had been associated with poor male partner involvement in PMTCT in South Africa (Matseke et al., 2016). It makes sense that talking about HIV-related issues may bring some discomfort among some couples leading to less sufficient discussions, leaving some issues unsaid, amounting to poor communication. Poor communication between men and their female partners has been associated with poor MPI (Ditekemena et al., 2012). Male partner involvement interventions that promote good communication skills among partners are essential in having satisfying violence-free HIV-related and family-planning discussions.

Men can be involved in a variety of ways during and after pregnancy, not just in a single activity. Hence, this paper utilized a nine-item composite measure of MPI in PMTCT to capture a range of prenatal and postnatal activities that men could possibly engage in. Furthermore, composite measures in future studies should be adapted in the context of the area and population of interest. For example, in Matseke et al. (2017), rural South African men did not necessarily view attending antenatal visits as a form of MPI, but rather, accompaniment to the clinic that included behaviors such as holding a spot in the clinic queue. In addition, MPI was understood as giving instrumental support to female partners through financial help, helping out with physical tasks and giving emotional support.

This study highlights important information for future use by policy makers in the maternal, newborn and child health areas. However, this study has its limitations. Firstly, the results may not be generalizable to other areas and populations, as the study is limited to male partners of HIV-positive pregnant women who visited CHCs in a predominantly rural province. Secondly, the study relied on self-reporting of MPI not verified otherwise, and may be under- or over-reported. Thirdly, cross-sectional data was used and therefore causality and direction of results cannot be determined; longitudinal analysis may provide additional insight into MPI by clarifying temporal associations. Finally, this study utilized secondary data and therefore does not comprehensively investigate all factors that may be associated with MPI, and these should be included in future studies.

5. CONCLUSIONS

Male partner involvement in this study is low and can be improved. Future MPI interventions should focus on promoting men's positive attitudes towards involvement in maternal and infant health care. These interventions should focus more on non-cohabiting male partners, and encourage HIV testing among men and disclosure of HIV status to female partners. Good communication skills among partners are essential in enabling conflict-free HIV-related and family-planning discussions. Interventions aimed at improving MPI in PMTCT may be more beneficial, and should thus include a range of pregnancy- and infant-related activities, rather than a single activity.

4

CHAPTER 4.

Maternal health outcomes and male partner involvement among HIV infected women in rural South Africa

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1. INTRODUCTION

Over ninety-nine percent of maternal deaths occur in low and middle-income countries, with nearly half of these taking place in Sub-Saharan Africa (Africa Progress Panel, 2010). Women living in Sub-Saharan Africa have a higher risk of dying while giving birth than women in any other region of the world. An estimated 10 million women survive pregnancy each year, yet experience some type of severe negative maternal health consequence (Africa Progress Panel, 2010). Maternal health refers to the health of women during pregnancy, childbirth, and the postpartum period (WHO, 2017a). Motherhood is often a positive and fulfilling experience and yet is associated with suffering, ill-health, and even death for too many women (WHO, 2017a). The major direct causes of maternal morbidity and mortality include hemorrhage, infection, high blood pressure, unsafe abortion, and obstructed labour (WHO, 2017a).

Growing evidence has shown that male partner involvement promotes better maternal and newborn health outcomes (Yargawa & Leonardi-Bee, 2015; Msuya et al., 2008; Farquh et al., 2004). Positive maternal health outcomes may include the use of skilled health care during pregnancy, birth, and after birth, which encompasses the use of Skilled Birth Attendant (SBA) and health facility-based delivery. None experience of complications during pregnancy and birth, and surviving birth are also some of the positive maternal health outcomes. Furthermore, maternal health outcomes among pregnant HIV positive women include their immunological (i.e. CD4 count) and virological profiles (i.e. viral load).

Male partner involvement may be defined using a single activity such as men attending Antenatal Care (ANC) visits with their pregnant partners, and many other activities to support pregnant partners. For example, previous studies have defined male partner involvement in maternal health and related care as men taking part in their pregnant partners' birth plans, encouraging exclusive breastfeeding and immunization for their children, supporting their partners, and communicating about pregnancy-related health care (Bhatta, 2013; Montgomery et al., 2011). Other studies have defined male partner involvement as male partner participation in HIV testing solely during ANC (Byamugisha et al., 2011; Ditekemena et al., 2011; Msuya et al., 2008), while others defined it as male partner participation in couple counseling (Byamugisha et

al., 2010; Reece et al., 2010; Nkuoh et al., 2010). In most instances, male partner involvement has been defined as a man's physical presence in the antenatal or postnatal clinic with his female partner, which is the most commonly used measure of male partner involvement (Montgomery et al., 2011).

Male partner involvement may also be defined using an index to capture a broader notion of MPI that includes aspects such as, accompaniment to antenatal care appointments, couple communication, knowing the ANC schedule, discussing the ANC/PMTCT interventions with a female partner; supporting the ANC fees, knowing what happens at the ANC visit, and condom use with the female partner during current pregnancy (Ampt et al., 2015; Byamugisha et al., 2010; Matseke et al., 2017).

Studies have demonstrated that even though MPI is one of the most challenging aspects of the PMTCT protocol, it has led to improved health and PMTCT outcomes in women and infants (Msuya et al., 2008; Farquhar et al., 2004; Aguiar & Jennings, 2015). In a review of seven studies, to ANC by male partner positively impacted women's knowledge of danger signs, but did not affect birth preparedness, ANC utilization, or miscarriages (Aguiar & Jennings, 2015). Furthermore, during labor and delivery, men's presence at ANC was associated with increases in health facility-based delivery and SBA, but with no effect for birth-related outcomes (Aguiar & Jennings, 2015). Male partner accompaniment to ANC was associated with higher uptake of postnatal care services, but with mixed effects on breastfeeding and newborn survival (Aguiar & Jennings, 2015).

Another systematic review of 14 male partner involvement studies indicated that MPI was significantly associated with reduced odds of postpartum depression and decreased likelihood of childbirth complications (Yargawa & Leonardi-Bee, 2015). Other maternal health-related outcomes that have been associated with MPI were reduced maternal smoking, reduced risk of pre-term birth, and reduced infant mortality (Carter, 2002; Alio et al., 2013; Alio et al., 2011). Studies found an association between male partner attendance at ANC and delivery by a skilled birth attendant (Mangeni et al., 2013). Similarly, male partner attendance at ANC was associated with higher odds of women giving birth at a health facility (Kalembo et al., 2013;

Chattopadhyay, 2012; Tweheyo et al., 2010). In contrast, in Nepal, no significant differences were found in health facility-based delivery rates or birth attendance by a skilled provider between women randomized to receive antenatal education with their husbands compared to women receiving antenatal education alone (Mullany et al., 2007). Mode of delivery (i.e. birth by cesarean-section or vaginal birth) was not associated with male partner involvement among HIV positive women in Malawi (Kalembo et al., 2013). In South Africa, there was no statistically significant difference in stillbirths between women randomized to receive or not receive ANC counseling with their male partners (Kunene et al., 2004).

Mother-to-Child-Transmission of HIV (MTCT) is known to be also influenced by the virological profile of pregnant HIV positive women (Njom et al., 2011). Maternal viral load has been proven to be the strongest predictor of vertical transmission of HIV. Rates of MTCT has been estimated at 0.3% when a maternal viral load is <1000 copies/ml, at 3% between 1000–10000 copies /ml, and at 7% when a viral load is >10000 copies/ml (Njom et al., 2011; Mayaux et al., 1997; Fawzi et al., 2001). Furthermore, two consecutive measurements showing a viral load of fewer than 1000 copies/ml indicates HIV treatment success (WHO, 2017b). According to WHO (2017b), CD4 count is the best predictor for disease status and immediate risk of death and should be used to identify people with advanced HIV disease. People with a CD4 count of 200 or less are considered to be at risk of HIV related illness, while the risk is lower at a CD4 count of over 350 (Jung et al., 1998; Hughson, 2017).

Maternal body mass index (BMI) and weight gain during pregnancy are known to be associated with perinatal outcomes (Ota et al., 2011). Low BMI and suboptimal weight gain during pregnancy are long-recognized risk factors for the delivery of infants too small for gestational age (Ota et al., 2011). However, the impact of MPI on these factors has not been reported in South Africa and elsewhere.

The influence of male partner involvement on maternal Blood Pressure (BP) levels has not been documented. According to South African BP guidelines, normal or healthy BP is 139/89 mmHg or less, that is, a systolic BP of 139 mmHg or less and a diastolic BP of 89 mmHg or less (The Heart and Stroke Foundation South Africa, 2017). The BP measurements above 139/89

mmHg are considered to be high or hypertensive and therefore not normal. The American Heart Association (2019) adheres to slightly different BP guidelines, where BP measurements below 120/80 mmHg are considered to be normal while levels from 120/80 show elevated BP levels. Blood pressure measurements from 130/89 mmHg indicate the onset of hypertension according to the American Heart Association (2019).

Ample evidence has been documented on the effects of male partner involvement on maternal health outcomes during pregnancy, labour, delivery, and postnatal. However, an investigation on the influence of male partner involvement on maternal health outcomes in the context of PMTCT is also of importance. This study hypothesized that male partner involvement will be associated with better maternal health outcomes, that is, delivery by natural birth, normal systolic and diastolic BP, normal BMI, higher CD4 count, and lower viral load. Also, this study hypothesized that male partner participation in the main study (i.e. in the randomized controlled trial) will be associated with better maternal health outcomes (i.e., delivery by natural birth, normal systolic and diastolic BP, normal BMI, higher CD4 count, and lower viral load).

This study seeks to investigate the influence of male partner involvement on maternal health outcomes in HIV infected women attending PMTCT services in primary healthcare facilities in Mpumalanga, South Africa. The influence of male participation in the main study (i.e., actual co-enrollment of a male partner in the study as a participant together with their female HIV positive partner) on maternal health outcomes in the same sample was also investigated in this paper.

2. METHODS

Study setting

This study utilized secondary data collected cross-sectionally in the baseline phase of the "Protect Your Family (PYF)" clinic-randomized controlled trial aimed at increasing the adherence and uptake of PMTCT protocols and increase male partner involvement in ANC and postnatal care processes in twelve community health centers based in Gert Sibande and Nkangala districts

in Mpumalanga province, South Africa (Jones et al., 2014). The PYF clinic-randomized controlled trial protocol has been published (Jones et al., 2014) and is registered on clinicaltrials.gov, number NCT02085356. The baseline data were collected during the recruitment phase of the clinic randomized controlled trial from April 2015 to January 2017.

Participants and Procedures

Maternal health data for 686 HIV infected women was collected from clinic records. However, the data were available for 535 women while the rest was unavailable due to missing clinic records. To be eligible for participation in the study, women had to be 24 weeks (6 months) or less pregnant, 18 years and older, HIV seropositive, and have a male partner.

Interested participants were offered an appointment and enrolled after the provision of informed consent. Once enrolled, all participants completed an assessment in their preferred language (English, isiZulu, or Sesotho) to enhance disclosure and accommodate different levels of literacy. Assessors were available at all times and completed the demographic component of the questionnaire first with participants, as a way to familiarize the participants with the software program (see measures).

Measures

The cross-sectional data collection instrument was developed through the Questionnaire Development System's (QDS) Audio Computer-Assisted Self-Interview (ACASI) software. The data collection instrument included sections regarding demographic information, sexual diary, intimate partner violence, stigma, male partner involvement, HIV knowledge, and other additional sections such as HIV medication adherence and family planning assessment.

The section regarding socio-demographic information included questions in relation to participants' age, language, religion, level of education, employment status, relationship status, income, and number of children.

Male Partner Involvement (MPI) served as the primary dependent variable. The Male Partner Involvement Index was used as adapted from a previous similar studies (Jones et al., 2014; Byamugisha et al., 2010), and comprised of 11 items related to the male partners'

participation in specific areas of ANC, including PMTCT. Items included, "male partner attend antenatal care visits with you, male partner know your antenatal appointment time, discussed antenatal HIV prevention for your baby with your male partner, male partner support your antenatal visits financially, male partner know what happens in the antenatal clinic, after testing for HIV, partner asked to take an HIV test, told partner that you were told to take ARV drugs (HIV medication), discussed feeding options for your baby with your partner, discussed the place of delivery for the baby with your partner, discussed testing your baby for HIV with your partner, and discussed condom use with your partner". All items were summed up to form a scale or composite MPI variable, with scores from 0 to 11. Since there were only 28 women who had a total score of '0' on the scale, scores were then coded as "0" and "1". Code "1" indicated scores of 2 or more which included "male partner attends ANC visit with you", while "0" indicated a score of 1 or less and did not include "male partner attends ANC visit with you". This approach was motivated by the fact that previous studies showed that the most commonly used measure of male partner involvement in maternal health and related care was men attending ANC visits with their pregnant partners.

Male Partner Participation (MPP), the actual co-enrollment of the male partner with a female partner in the main study (i.e., in the "PYF" clinic-randomized controlled trial) was also considered as a dependent variable. Participation of a male partner has been coded as "0" for non-participation in the study and "1" for participation in the study. Male partners completed separate assessments, corresponding to female assessments, upon co-enrollment.

Maternal health outcome measures. Measures of maternal health outcomes, considered as the independent variables in this paper, were collected from women's (female partners) clinic records/forms during pregnancy and after delivery. A data collection form designed specifically for this purpose was used. Outcomes recorded at first ANC visit included BMI, weight, height, BP, and current illnesses while CD4 count and viral load were recorded at subsequent ANC visits upon availability of the results. Outcomes recorded after delivery included delivery mode, birth complications, and place of delivery. Data collectors indicated a "yes" or "no" for preterm birth, birth complications, alcohol use, and smoking.

Pregnancy BP. Both Systolic BP and Diastolic BP were assessed separately in this paper, with 'Normal BP (below 120/80 mmHg)' and 'Elevated BP (from 120/80 mmHg)' as categories for each. The cut-off points for the two BP categories were determined using the BP guidelines from the American Heart Association (2019). The South African BP guidelines could not be used, as was initially intended, since the cut-off points (i.e., 139/89 mmHg or less and above 139/89 mmHg) were too high and yielded a very low prevalence in one of the categories, making it impossible to run the analyses.

Pregnancy BMI. This outcome was recorded in some clinic forms. In clinic forms where the BMI was not recorded, it was calculated using the recorded "weight" and "height" of the women.

Pregnancy CD4 count. Pregnancy CD4 count was a once-off measurement as per the antenatal clinic form. The cut-off points for the two CD4 count categories were '< 350/mm3' and '≥ 350/mm3'.

Pregnancy Viral load. Although the antenatal clinic form allows recording of up to three viral load measurements, only one viral load measurement was recorded in all the women's forms. The cut-off points for the two viral load categories (<1000 copies/ml and ≥ 1000 copies/ml) were determined according to the possible lowest (0.3%) and high rates (3% to 7%) of MTCT as already documented in the literature above.

Birth complications. This outcome could not be part of the analyses as there were only three (3) women with birth complications out of a total of the twenty-three (23) recorded. This means that this outcome was not recorded for the majority of the women in the study.

Preterm birth. Clinic records indicated either "yes" where preterm birth occurred or "no" where preterm birth did not occur.

Delivery mode. This outcome comprised of "natural birth" or "C-section" as the mode of delivery/ birth.

Place of delivery. Clinic records indicated the place of birth/delivery as either "hospital" or "clinic". Similar to birth complications above, this outcome was not recorded for the majority of the women in the study and thus was dropped out of the analyses.

Alcohol use during pregnancy. Clinic records indicated “yes” for women who used alcohol and “no” for women who did not use alcohol during pregnancy. This measure was self-reported and was recorded once-off by clinic nurses during ANC.

Smoking during pregnancy. Clinic records indicated “yes” for women who smoked and “no” for women who did not smoke. Smoking was a self-reported measure recorded once-off by clinic nurses during ANC.

Ethical Considerations

Approval to conduct the study 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 (at provincial, district, sub-district and clinic levels). All study procedures were in accordance with the ethical standards of the institutional research committees and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent for participation was obtained from each study participant.

Data Analyses

Data analyses were conducted using SPSS version 24. Univariate analyses were utilized to describe the demographic and socioeconomic characteristics of the women in the study. T-tests and chi-square tests were used to estimate associations between independent variables and maternal health outcomes. Variables associated with maternal health outcomes were included in subsequent models as covariates to estimate the associations between male involvement, male participation, and maternal health outcomes. Then, a series of bivariate and multivariable logistic regression models were used to estimate unadjusted and adjusted associations between demographic and socioeconomic characteristics of the women, male involvement, and male participation in the study with maternal health outcomes (pregnancy BP, pregnancy CD4, and pregnancy viral load). A cutoff of $p < 0.050$ was used for statistical significance.

Delivery mode, preterm birth, place of delivery, alcohol use during pregnancy, and smoking during pregnancy were all dropped out the analyses due to low prevalence in one of the response categories, which prevented model estimation.

3. RESULTS

Sample characteristics

Socio-demographic characteristics

Table 4.1 indicates the characteristics of a sample of 535 HIV positive women in this study. The mean age of the women was 29.03 (SD = 5.89). The majority (66.0%) of the women had educational attainment of less than grade 12, were unemployed (75.8%), and had an income of less than R1000 (75.5%). Just above three-quarters (78.6%) of the women had at least one child. Over half (53.5%) of the women were living together with their male partners while 46.5% were living separately from their partners. An overwhelming majority of the women indicated not using alcohol (93.3%) and not smoking (96.1%).

Anthropometric measurements, immunological and virological profile of women

The mean pregnancy BMI of the women in this study was 26.55 (SD = 6.19), as indicated further down in Table 4.1. An overwhelming majority (90.5%) of the women had a natural birth. Over half (53.4%) of the women had a normal systolic BP while 46.6% had elevated systolic BP. Just above two-thirds (68.8%) of the women had a normal diastolic BP while 31.2% had elevated diastolic BP. About 82.3% of the women had a pregnancy viral load of fewer than 1000 copies/ml while 17.7% had had a pregnancy viral load of ≥1000 copies/ml. Over two-thirds (69.2%) of the women had a pregnancy CD4 count of more than 350/mm3 while 30.8% had a pregnancy CD4 count of less than 350/mm3.

Table 4.1. Maternal Factors Associated with Male Involvement in PMTCT (N = 535)

Characteristics	No male partner involvement	Male partner involvement	Total	t/X^2	p-value
Socio-demographic					
Age	29.03 (5.89)	28.27 (5.84)	28.78 (5.88)	1.39	0.380
Educational attainment					
Less than grade 12	215 (61.6%)	130 (74.7%)	345 (66.0%)	8.89	0.003
Grade 12 or more	134 (38.4%)	44 (25.3%)	178 (34.0%)		
Relationship status					
Living together	199 (57.0%)	81 (46.6%)	280 (53.5%)	5.12	0.024
Not living together	150 (43.0%)	93 (53.4%)	243 (46.5%)		
Number of children					
None	78 (22.3%)	34 (19.5%)	112 (21.4%)	0.55	0.46
One or more	271 (77.7%)	140 (80.5%)	411 (78.6%)		
Employment status					
Employed	249 (71.3%)	143 (82.2%)	392 (75.0%)	7.26	0.007
Not employed	100 (28.7%)	31 (17.8%)	131 (25.0%)		
Income					
R1000	251 (71.9%)	144 (82.2%)	395 (75.5%)	7.38	0.007
≥ R1000	98 (28.1%)	30 (17.2%)	128 (24.5%)		
Maternal Health Outcomes					
Delivery mode					
Natural	308 (90.9%)	166 (89.7%)	474 (90.5%)	0.18	0.675
C-section	31 (9.1%)	19 (10.3%)	50 (9.5%)		
Pregnancy Systolic Blood pressure					
Normal Blood Pressure	174 (51.6%)	98 (57.0%)	272 (53.4%)	1.31	0.253
Elevated Blood Pressure	163 (48.4%)	74 (43.0%)	237 (46.6%)		
Pregnancy Diastolic Blood pressure					
Normal Blood Pressure	222 (66.7%)	125 (73.1%)	347 (68.8%)	2.18	0.140
Elevated Blood Pressure	111 (33.3%)	46 (26.9%)	157 (31.2%)		
Pregnancy viral load (copies/ml)					
< 1000	261 (81.8%)	135 (83.3%)	396 (82.3%)		
≥ 1000	58 (18.2%)	27 (16.7%)	85 (17.7%)	0.53	0.768
Behavioural					
Alcohol use during pregnancy					
No	322 (92.5%)	177 (94.7%)	499 (93.3%)	0.87	0.350
Yes	26 (7.5%)	10 (5.3%)	36 (6.7%)		

Characteristics	No male partner involvement	Male partner involvement	Total	t/X^2	p-value
Smoking during pregnancy					
No	335 (96.5%)	178 (95.2%)	513 (96.1%)	0.59	0.442
Yes	12 (3.5%)	9 (4.8%)	21 (3.9%)		

Associations between male partner involvement and maternal health outcomes

Table 4.2a shows the results of the logistic regression analysis predicting pregnancy BP. Results of the bivariate analysis (unadjusted logistic regression model) indicated that pregnancy BP was not significantly associated with MPI, MPP, age, educational attainment, relationship status, employment status, income, and the number of children. Similarly, in the multivariate analysis (adjusted logistic regression model) pregnancy BP was not significantly associated with MPI, MPP, and any of the socio-demographic characteristics.

Table 4.2a Unadjusted and adjusted logistic regression models predicting blood pressure (N = 522)

Predictor	Unadjusted OR [95% CI]	p-values	Adjusted OR [95% CI]	p-values
Age	1.02 [0.99, 1.05]	0.302	1.02 [0.99, 1.06]	0.27
Educational Attainment (ref = less than grade 12)	1.03 [0.71, 1.48]	0.879	0.95 [0.65, 1.39]	0.79
Relationship status (ref = not living together)	0.92 [0.65, 1.30]	0.622	0.91 [0.62, 1.33]	0.63
Employment Status (ref = unemployed)	1.38 [0.92, 2.07]	0.116	1.31 [0.82, 2.1]	0.256
Income (ref = R1000)	1.11 [0.74, 1.66]	0.618	0.93 [0.57, 1.51]	0.769
Number of Children (ref = none)	0.90 [0.58, 1.39]	0.622	0.81 [0.49, 1.34]	0.414
Male partner involvement	0.80 [0.56, 1.16]	0.247	0.84 [0.57, 1.23]	0.364
Male partner participation	1.01 [0.67, 1.50]	0.978	1.14 [0.75, 1.74]	0.536

Table 4.2b shows the results of the logistic regression analysis predicting CD4 count. Bivariate analyses results showed that CD4 count was not significantly associated with male partner involvement and age, relationship status, employment status, income, and number of children. Results of the multivariate analysis indicated that there was no significant association between male partner involvement and CD4 count as hypothesized. No significant association was found between male partner participation in the study and CD4 count in both the bivariate and multivariate analysis. However, there was a significant association between educational attainment and CD4 count in both the bivariate and multivariate analysis.

Table 4.2b Unadjusted and adjusted logistic regression models predicting CD4 count (N = 522)

Predictor	Unadjusted OR [95% CI]	p-values	Adjusted OR [95% CI]	p-values
Age	0.98 [0.95, 1.01]	0.116	0.96 [0.95, 1.02]	0.416
Educational Attainment (ref = less than grade 12)	1.80 [1.20, 2.69]	0.005	1.84 [1.120, 2.83]	0.005
Relationship status (ref = not living together)	1.00 [0.70, 1.45]	0.987	1.04 [0.69, 1.57]	0.836
Employment Status (ref = unemployed)	0.75 [0.50, 1.13]	0.174	0.76 [0.47, 1.24]	0.273
Income (ref = R1000)	0.81 [0.54, 1.22]	0.316	0.93 [0.56, 1.54]	0.763
Number of Children (ref = none)	1.01 [0.64, 1.58]	0.979	1.21 [0.71, 2.05]	0.483
Male partner involvement	1.26 [0.84, 1.88]	0.264	1.29 [0.85, 1.96]	0.231
Male partner participation	1.05 [0.69, 1.61]	0.808	0.99 [0.63, 1.55]	0.963

Table 4.2c shows the results of the logistic regression analysis predicting viral load. Results of both the bivariate and multivariate analyses showed male partner involvement and age, educational attainment, relationship status, employment status, income, and number of children was not significantly associated with viral load. However, there was a significant association between higher viral load and male partner participation in the study in both the bivariate and multivariate analysis.

Table 4.2c Unadjusted and adjusted logistic regression models predicting viral load (N = 500)

Predictor	Unadjusted OR [95% CI]	p-values	Adjusted OR [95% CI]	p-values
Age	0.97 [0.93, 1.01]	0.117	0.98 [0.93, 1.02]	0.316
Educational Attainment (ref = less than grade 12)	0.66 [0.39, 1.10]	0.108	0.63 [0.37, 1.08]	0.095
Relationship status (ref = not living together)	0.83 [0.52, 1.33]	0.438	0.84 [0.49, 1.42]	0.505
Employment Status (ref = unemployed)	1.05 [0.62, 1.79]	0.865	1.24 [0.67, 2.29]	0.487
Income (ref = R1000)	0.74 [0.42, 1.30]	0.295	0.84 [0.43, 1.62]	0.593
Number of Children (ref = none)	0.71 [0.42, 1.22]	0.218	0.94 [0.49, 1.82]	0.864
Male partner involvement	0.89 [0.54, 1.47]	0.654	0.77 [0.46, 1.29]	0.320
Male partner participation	2.21 [1.16, 4.21]	0.016	2.59 [1.3, 5.14]	0.007

4. DISCUSSION

Motherhood is often associated with worse health outcomes, such as high blood pressure, hemorrhage, pregnancy complications, and birth complications. Despite the growing evidence that male partner involvement promotes better maternal health outcomes, the results of this study did not support this notion. Contrary to what has been hypothesized, the final results of this study indicated that there was no association between male partner involvement and any of the maternal health outcomes under investigation (i.e., delivery mode, pregnancy systolic and pregnancy diastolic blood pressure, pregnancy body mass index, pregnancy CD4 count and pregnancy viral load). Male partner participation in the study was, however, associated with higher pregnancy viral load of the women while pregnancy CD4 count and pregnancy BP were not.

Male partner involvement in ANC encompasses multiple activities and includes aspects such as accompaniment to ANC appointments, knowing the ANC schedule, and couple communication (Ampt et al., 2015; Byamugisha et al., 2010; Matseke et al., 2017). Prior research has demonstrated an association between couple communication and increased knowledge of maternal and reproductive health (Valente & Shaba, 2001; Mutombo et al., 2014). Informing men about the importance of healthy practices such as proper nutrition and delivery in a health facility implies that they may have been more likely to encourage the adoption of these behaviours by their partners (Aguiar & Jennings, 2015). The 'male partner involvement' measure in this study includes couple communication regarding ANC and PMTCT matters affecting both the women and unborn infants. Informing men regarding these matters means they might be more likely to encourage adoption of health-promoting behaviours such as non-alcohol use and non-smoking or smoking cessation among women in this study. The fact that an overwhelming majority of women in this study indicated not using alcohol (93.3%) and not smoking (96.1%) should be acknowledged. However, determination of the association between male partner involvement and alcohol use and smoking in this study has not been possible due to low prevalence issues which prevented statistical analyses.

The association between male partner participation in the study and higher pregnancy viral load among women may be difficult to explain. A high viral load is a risk for HIV progression,

usually indicates a low CD4 count which in turn is a sign of advanced HIV disease and illness. In this study, it might mean that women with higher viral loads in this study might have been experiencing more illnesses in their prenatal and postnatal periods and as a result, solicited all the support (including accompaniment to clinics) they could get from their male partners. Participation in the study by male partners of these women might have been easier due to their availability, by virtue of already being in the clinics with their female partners for antenatal and postnatal visits.

There may be other important factors, moderators, and mediators that are not assessed and that could have uncovered more complex relationships and pathways between male partner involvement and maternal health outcomes. Future studies could also expand on this research by including more maternal health outcomes (such as pregnancy and birth complications, place of delivery, and hemorrhage) for investigation.

5. LIMITATIONS

Although the results of this study provide important information for consideration by policymakers in the maternal and child health programs, certain limitations should be noted. Study limitations included the low prevalence of some of the maternal health outcomes which prevented some of the statistical analyses.

Also, although the original sample size was N = 686, 535 women had available data on maternal health outcomes. Although antenatal record forms allow recording of up to three viral load measurements, only one viral load measurement was recorded on all the forms.

In this study, male partner involvement was measured using a scale that quantifies MPI as participating in antenatal care. A more comprehensive measure of male involvement may be needed, particularly one that is specific to the South African context.

6. CONCLUSION

The results of this study showed no support for male partner involvement in improving maternal health outcomes (under investigation) of women in PMTCT in rural South Africa. Study results showed no significant association between male partner involvement and pregnancy blood pressure, pregnancy CD4 count, and pregnancy viral load. However, male partner participation in the study was associated with a higher pregnancy viral load among the women. Future studies should include additional maternal health outcomes for investigation as these may be useful for the planning and development of appropriate interventions.

5

CHAPTER 5.

Male partner involvement and development of HIV-exposed infants in rural South Africa

Under review:
Matseke, M. G., Ruiter, R. A. C., Rodriguez, V. J., Peltzer, K., Jones, D., & Sifunda, S.

1. INTRODUCTION

Male partner involvement during pregnancy, childbirth and after birth, has been promoted as an effective intervention to improve maternal and infant health outcomes. A beneficial effect of male partner involvement in infant development has been shown in previous studies. In a systematic review of literature, frequent, active paternal engagement, predicted a variety of positive infant outcomes, including enhanced cognitive development, as well as decreased rates of externalizing disorders later in life (Sarkadi et al., 2008). A review of infant studies has shown that father-child interactions from as early as 3 months of age may influence children's cognitive development at 24 months of age (Sethna et al., 2017). In comparison to single-parent children, dual-parent children tend to be more mobile, active and autonomous, and have a more elaborate sociality both in terms of competition and collaboration (Le Camus, de Léonardis, & Lescarret, 1989).

Fathers may play a direct role in their children's development through interaction with them in a variety of ways. They may also play an indirect role in their children's lives through the emotional and physical support given to their mothers (Yogman, 1994; Rosenberg, & Wilcox, 2006). This study focused on the latter type of role, where male partner involvement is reported by women in this study, but no data to show infant-father interaction has been collected. A pilot study among HIV infected pregnant women and their infants indicated an association between lack of prenatal male partner involvement and delays in infant cognitive functioning, gross motor development and receptive communication (Rodriguez et al., 2017). There is currently a dearth of research conducted on male partner involvement and infant development in South Africa. This study seeks to explore the relationship between male partner involvement (prenatal and postnatal) and developmental functioning in infants born to HIV infected mothers. Therefore, this study aimed to determine the influence of prenatal and postnatal male partner involvement on cognitive, communicative, fine and gross motor development in HIV exposed infants in rural South Africa.

2. METHODS

Prior to the inception of the study, ethical approval was obtained from the University of Miami, Miller School of Medicine, Human Sciences Research Council, and the Department of Health in Mpumalanga Province. Informed consent was obtained from the women prior to enrolment in the original study. In addition, informed consent was also obtained from the same women for enrolling infants for assessment using the Bayley Scales of Infant Development III (BSID-III) screening tests.

Study design

This study was retrospective and utilized already existing data of 160 HIV positive mothers who participated in a randomized controlled trial in South Africa, aimed at assessing the impact of prenatal and postnatal male partner involvement on adherence to antiretroviral medication and other PMTCT protocols (Jones et al., 2014). Infant assessments were conducted with 160 infants (of the same mothers) at 12 months of age. Both the datasets from the mothers and infants were merged for the purposes of this study.

Study procedures

In the randomized controlled trial, assessments with 160 HIV positive mothers were conducted at five (5) time points, including at baseline (during pregnancy) and 12 months after birth. For the purposes of this study, assessments at baseline (during pregnancy) and 12 months after birth were used. The assessments were computerized using the Audio Computer Assisted Self Interview (ACASI) system to obtain more accurate reporting of sensitive information in comparison with standard interviewing (Metzger et al., 2000). All materials for maternal assessments were provided in English and local languages (Sesotho, isiZulu) and assessments were approximately 60 minutes in duration.

Two assessors received a one-week training in the administration of the BSID-III (Bayley & Reuner, 2006) screening tests, by two clinical psychologists from the University of Miami, Miller School of Medicine. Training included role-playing and hands-on practice assessments with infants in the same age range as those in the study. The BSID-III screening test was administered

to infant participants in the presence of their mothers. Assessors were two trained fieldwork personnel and one Bachelor degree level research personnel who were fluent in English and the local languages spoken by the mothers (Sesotho and isiZulu). The three assessors had extensive assessment and data collection experience in this setting and had worked with the present sample for three years at the time of BSID-III administration. After training, the assessors administered additional practice tests; two licensed clinical psychologists in the US provided ongoing supervision. Two doctoral students in developmental and clinical psychology reviewed scoring for each of the individual assessments to ensure accuracy.

Measures

Sociodemographics. At first assessment (baseline), during pregnancy, HIV positive women were asked to report on their demographic information such as age, education level, income, relationship status including living arrangements with male partner, and number of children.

Prenatal male partner involvement. Prenatal male partner involvement was assessed using an adapted version of the Male Involvement Index [Jones et al., 2014], comprising of 11 items related to the participant's partner involvement in the antenatal period. Questions included "Does your male partner attend antenatal care visits with you?" and "Have you discussed antenatal HIV prevention for your baby with your male partner?" Participants responded to each item as 1 (Yes) or 0 (No). Total possible scores ranged from 0 to 11, with higher scores representing more male partner involvement. Cronbach's alpha was adequate at .83, at baseline.

Male partner involvement at 12 months postnatal comprised of 11 similar items related to the participant's partner involvement in the postnatal period. Questions included "Does your male partner attend infant care visits with you?" and "Does your male partner know your infant care appointment time?". Participants responded to each item by either Yes (1) or No (0), and scores ranged from 0 to 11. Cronbach's alpha was adequate at .82.

Disclosure of HIV serostatus to partner among others. HIV disclosure was assessed using an adapted version of the Disclosure Scale (Kotze et al., 2013), which assesses disclosure among sexual partners, family members, and friends during pregnancy and factors associated with

disclosure. Questions included were, 'Have you disclosed your HIV status to anyone?', 'Have you disclosed your HIV status to your family?', and 'Have you disclosed your HIV status to your spouse/partner?'. Acceptable response options were either 'Yes' or 'No'. This factor was measured at baseline (prenatal) and at 12 months postnatal. Only the postnatal measure was used as it yielded a stronger model in the multiple regression analysis.

Infant Development. The BSID-III (Bayley & Reuner, 2006) screening test was used to evaluate five domains of infant development at 12 months of age: cognitive, receptive communication, expressive communication, fine motor, and gross motor skills. The BSID-III has been previously used in South Africa to assess infants at 3, 6, 9, and 12 months of age (Rademeyer & Jacklin, 2013). An earlier version (second edition) of the BSID has also been used in children of a mean age = 15.8 months in South Africa (Ferguson & Jelsma, 2009), which was administered by a trained researcher fluent in English and a local language, as in this study. Raw scores were dichotomized into 'competent' and 'at emerging risk or at risk', using standard validated cut-offs (Bayley & Reuner, 2006) to 1) maximize predictive power given the small sample size, 2) use a standard metric across infants, and 3) identify infants who normally be classified to be at risk in clinical settings and in need of intervention. Neurodevelopmental testing guidelines recommend dichotomization and also advice against the use of 1-SD cut-offs (Marlow, 2013). This assessment has been previously used in South Africa to assess infants at 3, 6, 9, 12, and 16 months of age without adaptation (Ferguson & Jelsma, 2009). As in previous studies, adaptation or translation of the assessment was not deemed necessary due to the age of the infants and to maximize the generalizability of the findings (Whitehead et al., 2014; Hutchings & Potterton, 2014; Van Rie et al., 2008). An assessor was available to explain the procedures and translate instructions for the mother as necessary.

3. RESULTS

Demographic characteristics

Demographic characteristics of the sample are shown in Table 5.1. The mean age of women in this study was 28.96 years (SD = 5.58). Most (52.3%) of the women were not married and lived separately from the partners or fathers of their children, 68.4% had less that grade 12, and 68.4% had a monthly income of less than R1000. Half (50%) of the women had disclosed their HIV status to their male partner at 12 months postnatal.

Table 5.1. Demographic and psychosocial characteristics of infant-mother dyads participants (N = 160)

Characteristic	Mean(SD) n (%)
Mother	
Age	28.96 (5.58)
Educational attainment	
Grade 0 – 11	47 (68.4%)
Grade 12 or more	22 (31.6%)
Monthly household income (Rand)	
< 999 (~ $76)	47 (68.4%)
1000 or more	22 (31.6%)
Relationship Status	
Unmarried, living separately	81 (52.3%)
Unmarried, living together	45 (29.0%)
Married	29 (18.7%)
Months since HIV diagnosis	26.2 (38.12)
Disclosure of serostatus (at 12 months postnatal)	
No	60 (50.0%)
Yes	60 (50.0%)
Male involvement, baseline (index)	7.08 (3.02)
Male involvement, at 12 months (index)	6.38 (3.46)
Infants	
Age	13.94 (3.01)
Infant development (Bayley's scale) scores	

Characteristic	Mean(SD) n (%)
Cognitive	2.45 (0.69)
Receptive communication	2.46 (0.76)
Expressive communication	2.28 (0.76)
Fine motor	2.38 (0.70)
Gross motor	2.23 (077)

Prevalence of male partner involvement, status disclosure, and risk of delays for infant development

Table 5.2 shows the prevalence of prenatal and postnatal male partner involvement in the sample of mothers, and the prevalence of risk for developmental delays in the sample of infants.

The mean age of infants was 13.94 months (SD = 3.01). About 11.3% of the infants were at risk of delay for cognitive development and 32.5% at emerging risk thereof. With regards to receptive communication, 18.2% and 35.2% were at risk and at emerging risk of developmental delay, respectively. Twelve point six percent (12.6%) were at risk and 37.1% at emerging risk of developmental delay with regards to expressive communication. About 12.6% of the infants were at risk of delay for fine motor developmental, while 37.1% were at emerging risk. Twenty point nine percent (20.9%) were at risk and 35.4% at emerging risk of delays for gross motor development.

Table 5.2. Male involvement and infant developmental functioning at 12 months (N = 160)

Items	N (%)
Infant development	
Cognitive	
At risk	18 (11.3)
Emerging risk	52 (32.5)
Competent	90 (56.3)
Receptive communication	
At risk	29 (18.2)
Emerging risk	56 (35.2)
Competent	74 (46.5)
Expressive communication	
At risk	20 (12.6)
Emerging risk	59 (37.1)
Competent	80 (50.3)
Fine motor development	
At risk	20 (12.6)
Emerging risk	59 (37.1)
Competent	80 (50.3)
Gross motor development	
At risk	33 (20.9)
Emerging risk	56 (35.4)
Competent	69 (43.7)
Male involvement items (prenatal)	
Male partner attends antenatal care visits with you	42 (27.1)
Male partner knows your antenatal appointment time	115 (74.2)
Discussed antenatal HIV prevention for your baby with your male partner?	103 (66.5)
Male partner supports your antenatal visits financially	131 (84.5)
Male partner knows what happens in the antenatal clinic	92 (59.4)
After testing for HIV, partner asked to take an HIV test	108 (69.7)
Told partner that you were told to take ARV drugs (HIV medication)	104 (67.1)
Discussed feeding options for your baby with your partner	107 (70.3)
Discussed the place of delivery for the baby with your partner	96 (61.9)
Discussed testing your baby for HIV with your partner	82 (52.9)
Discussed condom use with your partner	116 (74.8)

Items	N (%)
Male involvement (postnatal)	
Male partner attends infant care visits with you	70 (44.3)
Male partner knows your infant care appointment time	113 (71.5)
Discussed HIV prevention for your baby with your male partner	99 (62.7)
Male partner supports your infant care visits financially	125 (79.1)
Male partner knows what happens in the infant care clinic	84 (53.2)
After tested for HIV, partner was asked to take an HIV test	96 (60.8)
Told partner that you were told to take ARV drugs (HIV medication)	110 (69.6)
Did you discuss feeding options for your baby with your partner	100 (63.3)
Discussed testing your baby for HIV with your partner	100 (63.3)
Discussed condom use with your partner	111 (70.3)

Bivariate associations with risk of delays for cognitive, expressive communication, receptive communication, fine and gross motor development development among infants

Table 5.3 shows the results of the unadjusted logistic regression analysis between study variables. Not living together with partner and decreased/lack of male partner involvement at 12 months were significantly associated with delayed cognitive development. Both male partner involvement at baseline (during pregnancy) and at 12 months postnatal were significantly associated with delayed gross motor development among the infants. Receptive communication, expressive communication, and fine motor development were not significantly associated with any of the independent variables.

Table 5.3. Unadjusted logistic regression models predicting risk of delays for cognitive, expressive communication, receptive communication, and fine and gross motor development (N = 160)

Predictor	Cognitive OR [95% CI]	Receptive Communication OR [95% CI]	Expressive Communication OR [95% CI]	Fine Motor OR [95% CI]	Gross Motor OR [95% CI]
Unmarried, not living together (ref = Married or unmarried, living together)	2.01 [1.06, 3.80]*	1.11 [0.58, 2.10]	1.27 [0.68, 2.39]	1.19 [0.64, 2.23]	1.21 [0.64, 2.39]
Household income (ref = below the poverty level, < 600)	0.93 [0.49, 1.74]	1.24 [0.65, 2.36]	1.70 [0.90, 3.20]	0.80 [0.43, 1.50]	1.07 [0.57, 2.01]
Number of Children (ref = No children)	0.70 [0.31, 1.58]	1.83 [0.82, 4.07]	1.65 [0.73, 3.74]	1.67 [0.75, 3.75]	1.60 [0.69, 3.71]
Disclosure to Partner at Baseline (ref = Not disclosed)	1.44 [0.75, 2.75]	0.97 [0.50, 1.89]	1.11 [0.58, 2.13]	1.37 [0.72, 2.64]	1.86 [0.95, 3.65]
Disclosure to Partner at 12-months (ref = Not disclosed)	0.58 [0.28, 1.20]	0.93 [0.45, 1.93]	0.90 [0.43, 1.86]	0.84 [0.41, 1.73]	0.70 [0.34, 1.47]
Baseline Male Involvement	0.96 [0.87, 1.07]	0.97 [0.87, 1.08]	0.97 [0.88, 1.08]	1.08 [0.97, 1.20]	1.13 [1.01, 1.26]*
12-month Male Involvement	0.88 [0.80, 0.97]*	0.94 [0.85, 1.03]	1.07 [0.98, 1.17]	1.05 [0.96, 1.15]	1.19 [1.07, 1.31]**

Note. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Multivariate associations with risks of delays for cognitive, expressive communication, receptive communication, fine and gross motor development among infants

As indicated in Table 5.4, decreased male partner involvement during pregnancy (at baseline) and at 12 months postnatal associated with delayed cognitive among HIV exposed infants. However, this association was significant only for decreased male partner involvement at 12 months postnatal. On the other hand, male partner involvement during pregnancy (at baseline) and at 12 months postnatal was associated with delayed gross motor functioning in HIV exposed infants. This association was significant only for male partner involvement at 12 months postnatal. Both prenatal and postnatal male partner involvement were not significantly associated with delays in communicative and fine motor development in HIV exposed infants. Non-disclosure of HIV status at 12 months postnatal was significantly associated with delayed gross motor development in HIV exposed infants.

Table 5.4. Adjusted logistic regression models predicting risk of delays for cognitive, expressive communication, receptive communication, fine and gross motor development among infants (N = 160)

Predictor	Cognitive[a] OR [95% CI]	Receptive Communication[b] OR [95% CI]	Expressive Communication[c] OR [95% CI]	Fine Motor[d] OR [95% CI]	Gross Motor[e] OR [95% CI]
Unmarried, not living together (ref = Married or unmarried, living together)	0.61 [0.26, 1.45]	0.91 [0.39, 2.11]	0.68 [0.29, 1.63]	0.58 [0.25, 1.37]	0.58 [0.23, 1.50]
Household income (ref = below the poverty level, < 600)	0.89 [0.39, 2.00]	0.92 [0.42, 2.01]	1.92 [0.86, 4.30]	0.79 [0.36, 1.74]	0.87 [0.36, 2.10]
Number of Children (ref = No children)	0.68 [0.24, 1.92]	1.23 [0.47, 3.20]	1.31 [0.50, 3.49]	1.68 [0.62, 4.52]	1.58 [0.52, 4.80]
Disclosure to Partner at Baseline (ref = Not disclosed)	2.53 [0.95, 6.75]	1.03 [0.41, 2.58]	1.35 [0.53, 3.47]	0.99 [0.40, 2.49]	1.24 [0.45, 3.34]
Disclosure to Partner at 12-months (ref = Not disclosed)	1.04 [0.41, 2.61]	1.39 [0.57, 3.39]	0.63 [0.25, 1.56]	0.64 [0.26, 1.60]	0.21 [0.07, 0.61]**
Baseline Male Involvement	0.95 [0.81, 1.11]	0.96 [0.82, 1.12]	0.96 [0.82, 1.12]	1.04 [0.89, 1.21]	1.08 [0.91, 1.29]
12-month Male Involvement	0.85 [0.75, 0.98]*	0.93 [0.82, 1.05]	1.12 [0.98, 1.27]	1.10 [0.97, 1.24]	1.30 [1.12, 1.50]**

Note. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

[a]Hosmer and Lemeshow $\chi^2 = 6.48$, $p = 0.594$; Nagelkerke $R^2 = 0.162$
[b]Hosmer and Lemeshow $\chi^2 = 14.50$, $p = 0.070$; Nagelkerke $R^2 = 0.032$
[c]Hosmer and Lemeshow $\chi^2 = 13.25$, $p = 0.104$; Nagelkerke $R^2 = 0.071$
[d]Hosmer and Lemeshow $\chi^2 = 5.93$, $p = 0.655$; Nagelkerke $R^2 = 0.053$
[e]Hosmer and Lemeshow $\chi^2 = 6.00$, $p = 0.647$; Nagelkerke $R^2 = 0.214$

4. DISCUSSION

This study examined the influence of male partner involvement during and after pregnancy on cognitive, communicative, fine and gross motor development in infants born to HIV seropositive mothers attending Prevention of Mother-to-Child Transmission of HIV (PMTCT) services in rural South Africa. The prevalence of male partner involvement (during and after pregnancy) reported by women in this study was just above average while the prevalence of risk and emerging risk of developmental delays (cognitive, communicative, motor) among infants in this study was hypothetically high.

All infants in this study were exposed to HIV which partly accounts for the hypothetically high prevalence of developmental delays (Dobrova-Krol et al., 2010). Reasons for developmental delays among HIV exposed infants are multifactorial, but the result of this study provides evidence that infants of mothers who received less or no male partner involvement during pregnancy or during the postnatal period were more likely to have delays in cognitive and gross motor development.

In the final analysis, lack of postnatal male partner involvement and not living together with male partners were associated with risk of delayed cognitive development among the HIV exposed infants. This suggests that infants' whose mothers did not share a home with male partners were more likely to have delayed cognitive development. This suggestion makes sense since sharing a home with a male partner is likely to give opportunity to frequent paternal engagement with infants which in turn enhances their cognitive development. Previous literature has shown that frequent, active and regular paternal engagement with the child from infancy has been associated with enhanced infant cognitive development among other positive outcomes (Sethna et al., 2017; Sarkadi et al., 2008). Also, Rodriguez et al. (2017) has shown an association between not living together with male partners during pregnancy and delays in infant cognitive functioning, gross motor development and receptive communication in infants born from HIV infected women.

Contrarily, postnatal male partner involvement was associated with risk for delayed gross motor development among the HIV exposed infants. This finding was unexpected due to the already stated view that provided justification for the association between male partner involvement and cognitive development in infants. This issue warrants further investigation.

Furthermore, non-disclosure of HIV status at 12 months postnatal was significantly associated with risk for delayed gross motor development in HIV exposed infants. This finding supports notions that non-disclosure of HIV status by pregnant women to male partners will less likely lead to adoption of safer sexual behaviours and risk of re-infection if both partners are infected (Shiyoleni, 2013). As such, adopting safer sexual behaviours will minimise the risk of HIV transmission to unborn babies during pregnancy and to infants after birth. Findings and deliberations by previous studies have stated the importance of HIV status disclosure by pregnant women to their male partners (Ramlagan et al., 2013). It is crucial for pregnant women to disclose their HIV status to sexual partners to enable adoption of safer sexual behaviours and to minimise the risk of HIV transmission to the unborn babies and after birth (Shiyoleni, 2013).

This study provides evidence that male partners (fathers) can indirectly influence infants' developmental functioning through positive involvement in the life of the mother during and after pregnancy. According to Rosenberg and Wilcox (2006) fathers can have an indirect influence on their children through the quality of their relationship with the mother of their children. Fathers who have good relationships with the mother of their children are more likely to be involved and to spend time with their children and as a result have children who are psychologically and emotionally healthier (Rosenberg & Wilcox, 2006). Similarly, mothers who feel affirmed by the fathers of their children and enjoys the benefits of happy relationships are more likely to be better mothers, leading to positive infant development outcomes.

For pregnant mothers, living together with male partners will more likely create an enabling environment for positive interaction that is likely to be conducive in-utero, ultimately enhancing positive infant development. However, pregnant mothers living separately from their male partners may also receive different types of available support such as financial and emotional support (Matseke et al., 2017) that will enhance positive developmental outcomes after birth.

The influence of male partner involvement on receptive communication, expressive communication, fine and gross motor development in HIV exposed infants should be further explored in future studies.

5. LIMITATIONS

The results of this study provides important information for consideration by policy makers in the maternal and child health programs. However, this study has its limitations. Infants who participated in this study were all exposed to HIV (i.e. born from HIV infected mothers) and as such, were all at risk for developmental delays, which may account for the high prevalence of developmental delays in this sample. This study relied on self-reported male partner involvement by mothers rather than self-reports from fathers. As such there was no proof of direct father-child interaction or involvement in this study. Future studies should therefore explore the effect of direct father-child interaction or involvement on the different domains of infant development. There may be other important factors, moderators, and mediators influencing infant development that are not assessed and that could have uncovered more complex relationships and pathways between male partner involvement and infant development.

6. CONCLUSION

The high levels of risk for delayed cognitive, communicative, fine and gross motor development among infants in this study are of great concern and thus warrants appropriate interventions. The low levels of male partner involvement reported by women need to be improved. Increased male partner involvement can have beneficial effects on infant development as suggested by the results of this study. Interventions in PMTCT should therefore promote increased prenatal and postnatal male partner involvement with the aim of improving cognitive, communicative, fine and gross motor development in HIV exposed infants.

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CHAPTER 6.

Prevalence of prenatal and postnatal intimate partner violence and associated factors among HIV infected women in rural South Africa: A longitudinal study

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1. INTRODUCTION

Violence by an intimate partner has long been recognized as a risk factor for as well as a consequence of HIV infection among women. Women Living with HIV (WLHIV) are at increased risk of different forms of violence, predominantly physical, sexual, and emotional violence (Hale, & Vazquez, 2011; Aryal et al., 2012). The prevalence of IPV is notably higher in HIV-infected women compared to HIV-negative women, making them more vulnerable to negative mental and physical health consequences (Fonck et al., 2005; Maman et al., 2002; Shamu et al., 2011; Silverman et al., 2006).

As a result, IPV has been identified as a marker for poorer HIV-related care outcomes in HIV-positive women (Hampanda, 2016; Hatcher et al., 2014; Jewkes, & Morrell, 2010). Thus, IPV in HIV-positive women has been linked to lower self-reported antiretroviral (ARV) adherence, decreased viral load suppression, and greater risk of death (Hatcher et al., 2015; Nassali et al., 2009). While rates of vertical transmissions in South Africa have decreased due to more widely available PMTCT initiatives, estimates have found that only 54% to 65% of South African HIV-positive pregnant women complete all the PMTCT protocol steps (Hatcher et al., 2016; Technau et al., 2014).

Decreased adherence to PMTCT protocols among women who experienced IPV has been reported both during pregnancy and in the postnatal period (Hampanda, 2016; Hatcher et al., 2016; Nassali et al., 2009). A study conducted in Zambia among 320 HIV-positive postnatal women, found that IPV was associated with decreased adherence to all PMTCT medications during and after pregnancy, except for single-dose Nevirapine during childbirth (Hampanda, 2016). Furthermore, the study found that sexual and emotional IPV experienced in the previous 12 months had a more pronounced negative effect on HIV-positive women's HIV medication adherence and linkage to care than past 12-months physical IPV, and greater IPV frequency in the past 12 months is associated with reduced odds of adherence (Hampanda, 2016).

Depression related to IPV has also been reported to lead to interruptions in adherence to PMTCT protocols where the importance of adherence is overshadowed by the stress of the IPV event (Hatcher et al., 2014). Also, alcohol use among HIV-infected people has been

associated with non-adherence to HIV medication (Hendershot et al., 2009; Kim et al., 2009). In a South African study, HIV-positive mothers were more likely to drink alcohol compared to HIV-negative mothers prior to pregnancy discovery and at five years post-birth (Davis et al., 2017).

Lack of HIV status disclosure to partners by HIV-positive women has also been cited as a challenge in adhering to PMTCT protocols (Jones et al., 2014). Reasons for non-disclosure of HIV status to partners by women in PMTCT programs were reported to be fear of IPV or expected IPV (Ezechi et al., 2009). Women who have not disclosed their HIV status to partners do not always adhere to necessary PMTCT protocols since taking PMTCT medication or seeking related health care services might unintentionally make male partners aware of their HIV status (Hatcher et al., 2014). This idea was also expressed in relation to fear of community AIDS-related stigma because following PMTCT protocols such as stopping breastfeeding at 6 months or use of supplemental formulas could serve as potential markers of their HIV status (Chinkonde et al., 2009; Hatcher et al., 2014; Hatcher et al., 2016).

A substantive proportion of literature exploring the prevalence of IPV and its related factors in relation to women do not include women who are both HIV-positive and pregnant. To our knowledge, there has been no study investigating IPV in prenatal and postnatal HIV-positive women longitudinally. Despite the accumulation of data that supports the adverse outcomes of IPV in relation to the mental and physical health of women in general, there continues to be an absence of understanding the pattern of IPV prevalence among HIV-positive women at the various points during and following pregnancy. The aim of this paper is to report on the prevalence of IPV and its correlates at different time-points in prenatal and postnatal HIV-positive women in primary healthcare facilities in rural Mpumalanga, South Africa.

This longitudinal study is of importance because the assessment of the prevalence of IPV and its related factors among HIV-positive women as they move through pregnancy stages will provide a means to characterize how HIV seropositivity, pregnancy, and womanhood intersect and how that impacts the experience of IPV. Such an understanding is imperative for thinking about improving engagement and adherence to PMTCT and the development of

protocols that allow for the introduction of male partners in ways that will at the very least not further increase the IPV burden women face and at the very best help decrease it.

2. METHODS

Study design

This study was drawn from the first phase (women only) of a longitudinal PMTCT clinic-randomized controlled trial with two assessments occurring prenatally (8-24 weeks and 32 weeks pregnant) and two assessments at 6 and 12 months postnatally. Data from assessments in both the intervention and control groups were utilized. Trial data were collected over a period of 12 months from April 2014 to March 2016. The trial was aimed at increasing the uptake of PMTCT protocols in the antenatal and postnatal processes and was conducted in 12 community health centers in Gert Sibande and Nkangala districts in Mpumalanga Province, South Africa (see Jones et al., 2014 for protocol details).

Sample and procedure

Eligible women were HIV-seropositive pregnant women between 8 and 24 weeks pregnant, the typical time of first antenatal care visit, and aged 18 years or older, with male partners. However, the first phase of the study did not enrol their male partners. Women agreeing to participate were enrolled following the provision of written informed consent. There were no exclusions based on literacy as all assessments were administered using an Audio Computer- Assisted Self-Interview (ACASI) system.

After enrollment, all women were assessed in their preferred language (English, isiZulu, or Sesotho) using ACASI to enhance disclosure of sensitive information, accommodate all levels of literacy, and reduce interviewer bias. To familiarize participants with the computer system, assessors completed the demographic section of the questionnaire with participants. Participants completed the rest of the components of the assessment, with the on-site assessor available to assist with queries where necessary.

Ethical approval was granted by the Human Sciences Research Council Research Ethics Committee, protocol approval number REC4/21/08/13. Study approval was also obtained from the Department of Health and Welfare, Mpumalanga Provincial Government in South Africa, and the University of Miami Miller School of Medicine Institutional Review Board (IRB

ID: 20130238). The study was registered as a clinical trial on clinicaltrials.gov, number NCT02085356.

Intervention condition

Participants in the intervention group received the PMTCT standard of care plus three prenatal two-hour weekly group sessions (between five and seven participants) followed by one prenatal individual counselling session and two postnatal individual counselling sessions led by study-trained clinic staff. The 'Protect Your Family' intervention is a manualized, closed, structured behavioural risk-reduction program. The intervention targeted prevention of vertical transmission, adherence to PMTCT and medication use, HIV testing of family members, prevention of HIV transmission and AIDS-related stigma, HIV serostatus disclosure to partner, partner communication, prevention of IPV, safe infant feeding, safer conception, family planning and dual method sexual barrier use. Intervention elements have been described previously (Jones et al., 2014).

Control condition

Standard of care control condition participants received the PMTCT standard of care plus a time-equivalent, group-administered video presentation on childhood disease prevention (e.g., measles, diarrhoea management, dysentery and dehydration, and immunizations and vaccinations) in three group sessions, followed by one prenatal individual and two postnatal individual women's sessions on disease prevention. More details on the intervention conditions are explained in the published research protocol (Jones et al., 2014).

Measures

Time-invariant predictors of IPV, measured at baseline, included socio-demographic factors, alcohol use, and AIDS-related stigma given that they were not measured at all the four time points. To assess alcohol use, women were asked to report if they had drunk two or more alcoholic beverages on at least one occasion in the month preceding the assessment. Alcohol use was assessed only at baseline due to the high risk of related negative effects on fetal and infant health during pregnancy (Bhuvaneswar et al., 2007; Ornoy & Ergaz, 2010).

Variables measured at all the four time points were modeled as time-variant covariates and these included male involvement in the antenatal and postnatal care of his

partner, HIV status disclosure to partner, ARV adherence, consistent condom use in the past week, condom use at last sex, and depression. The other time points for assessments were at 32-weeks prenatal, 6-months postpartum, and 12-months postpartum.

The dependent variable, IPV, was assessed using an adapted 18-item version of the CTS. (Straus, 1979). This scale assessed the extent to which the current or previous partner responded to conflict using negotiation or reasoning, verbal aggression, and violence. The scale included a 9-item partner psychological victimization subscale (Cronbach's alpha (α) were .76, .66, .83, and .83 at baseline, 32 weeks, 6 months, and 12 months respectively), and 9-item partner physical violence subscale (Cronbach's alpha (α) were .92, .89, .94, and .94 respectively at the four assessment points). Respondents indicated if their partner responded to conflict by utilizing the listed conflict resolution items in the past 6 months at baseline, and the number of times he had engaged in specific violent behaviours. Response options ranged from 0 (Never) to 6 (More than 20 times). At time points following the baseline assessment, participants were asked to respond to queries referencing the past month. The reference periods for the follow-up assessments were made shorter to avoid possible overlap with the previous assessment. Responses were dichotomized into scores of '0' if participants reported no psychological/physical aggression, and '1' if they reported any form of psychological/ physical aggression. The revised CTS has generally been found to be a reliable and valid instrument to measure IPV across different populations and cultures in various countries including South Africa (Straus, 2008). The scale was found to be a reliable and valid instrument to measure IPV among male and female university students in 32 nations (Straus, 2008). Also, it has frequently been administered to clinical populations, including pregnant and postpartum women (Hellmuth et al., 2013; Netwon et al., 2001). However, more research is needed to ascertain the validity and reliability of the revised CTS in varied clinical settings. Similarly, the validity and reliability of the CTS-18 in the same settings needs to be ascertained.

Socio-demographic factors assessed included age, education, employment status, income, and alcohol use. Reproductive factors assessed included the current number of children and the planning of the current pregnancy. The assessed HIV-specific items included a date of HIV diagnosis, months since ART initiation, and HIV status of children. Partner-specific factors assessed disclosure of HIV status to partner, HIV status of partner, and condom use.

Male involvement in antenatal care of his partner was assessed using an adapted version of the Male Involvement Index (Jones et al., 2014), comprising of 11 items related to the participant's partner involvement in the antenatal period. Questions included "Does your male partner attend antenatal care visits with you?" and "Have you discussed antenatal HIV prevention for your baby with your male partner?". Male involvement in postnatal care of his partner comprised of 11 similar items related to the participant's partner involvement in the postnatal period. Questions included "Does your male partner attend infant care visits with you?" and "Does your male partner know your infant care appointment time?". Participants responded to each item by indicating either a "Yes" (1) or a "No" (0). Scores for the Male Involvement Index ranged from 0 to 11. Cronbach's alphas (α) were adequate at .83, .82, .84 and .82, respectively, at the two prenatal and two postnatal assessment points.

HIV status disclosure to partner was assessed at the four assessments by asking the question "Have you disclosed your HIV status to your spouse/partner?" Response options were either a "Yes" or a "No". This question is one of the items of the adapted version of the Disclosure Scale (Visser et al., 2008).

Consistent condom use in the past week and condom use at last sex were assessed using a 16-item scale adapted from the Sexual Risk Behavior Assessment Schedule (Meyer-Bahlburg et al., 1990) that assessed the number of unprotected sexual intercourse occasions (i.e., with or without male or female condom use) for 7 days prior to each assessment, using timeline-follow back type cues for recall. Questions asked included, "The last time you had sex, did you use a condom?", "Did you have sex on Monday?", "How many times did you have sex on Monday?", "If you used a male condom, indicate how many times you used a male condom?", "If you used a female condom, indicate how many times you used a female condom?". The same pattern of questions was repeated for every day of the week, i.e., Tuesday, Wednesday, Thursday, Friday, Saturday, and Sunday. The Sexual Risk Behavior Assessment Schedule was previously found to be reliable in the same setting among couples during pregnancy in rural South Africa, that is, Cronbach α for this scale for women was 0.71 and for men 0.68 in that sample (Peltzer et al., 2013b).

AIDS-related stigma was assessed using the nine-item AIDS-Related Stigma Scale (Kalichman et al., 2005). Items included statements such as, "People who have AIDS should be ashamed", which are rated dichotomously using either a score of 0 (Disagree) or 1 (Agree).

Therefore, scores on this scale range from 0 to 9, where higher scores indicate higher levels of AIDS-related stigma. The reversed coded item for this scale ("It is safe for people who have AIDS to work with children") was excluded given the scale's poor internal reliability (α = 0.58) with its inclusion. Excluding the item, reliability was adequate (α = .74 and .70) at the two assessment points. All '0' scores were coded '0' while scores from 1 to 8 were coded '1'. Research conducted in five South African communities found the scale to be internally consistent, α = 0.75 and time stable over 3 months, r = 0.67. The scale was also reliable in three different languages, that is, English, Xhosa, and Afrikaans (Kalichman et al., 2005).

Adherence to ARVs was assessed by the number of self-reported ARV medication doses skipped in the past week. Participants' responses were dichotomized into a score of '0' for not skipped medication in the past week, and '1' for skipped medication in the past week.

Depression was assessed using The Edinburgh Postnatal Depression Scale 10 (EPDS-10) adapted for perinatal depression (Cox, Holden, & Sagovsky, 1987). The EPDS-10 is a 10-item instrument in which participants rate how often they have experienced symptoms associated with depression in the past 7 days. Scores range from '0' through '30'. The EPDS-10 is the most widely used instrument in postpartum depression studies and for population-based screening, and has been validated among diverse cultures resulting in varying sensitivity and specificity values due to methodological variations such as such as population selection criteria, diagnostic criteria, cut-off values, and study timeframe (Dennis, 2003). The validated cut-off score for South African populations is 12 (Lawrie et al., 1998). Cronbach's alphas (α) for the EDPS-10 scale ranged from .73 at baseline, .73 at 6 weeks, and .80 at 6 months and .79 at 12 months postnatal.

Data analysis

Descriptive analyses (such as means, standard deviations, frequencies, and percentages) were conducted. T-tests or its non-parametric alternative, Mann-Whitney tests were used for median comparison of groups and chi-square tests for differences in proportions. Logistic regression models were conducted to assess independent associations between IPV and variables of interest. Multinomial logistic regression was used by comparing prenatal physical and psychological IPV with 12 months postnatal physical and psychological IPV. Variables found to be associated with IPV in the bivariate analyses, at $p < 0.10$, were

included in subsequent multivariable analyses. The dependent variable was defined as four separate categories of women: 1) women reporting no prenatal and no postnatal physical and psychological IPV at baseline and 12 months (reference category), 2) women reporting prenatal and postnatal physical and psychological IPV at baseline and 12 months, 3) women who began reporting physical and psychological IPV from baseline to 12 months, and 4) women who stopped reporting prenatal physical and psychological IPV at baseline to no longer reporting postnatal physical and psychological IPV at 12 months follow-up. Multilevel logistic regression analyses were conducted with physical and psychological IPV at four assessment points from prenatal (8-24 and 32 weeks) to postnatal (6 and 12 months) period as the dependent variable. Two separate models were estimated for time-varying and time-invariant predictors of change in physical and psychological IPV. The models are estimated separately because they are different and are dependent on the fact that the underlying equations are not subject or subject to the influence of time. Odds ratios were estimated as effect sizes for each of the physical and psychological IPV outcomes (Allen, & Le, 2008). Estimated effects are reported with 95% confidence intervals.

All data analyses were conducted using Mplus version 7.4 (Muthén, & Muthén, 2014). Missing data were handled using multiple imputation technique in multilevel logistic regression models (Asparouhov, & Muthén, 2010), specifying ten imputed datasets. Multiple imputation in Mplus uses Bayesian estimation using information from the variables included in the models. Categorical variables are specified as such in the imputation procedure and are also imputed. Models were estimated for all missing values using maximum likelihood estimators and averaged across datasets. Standard errors in Mplus were calculated using the Rubin formula (Asparouhov, & Muthén, 2010). Maximum likelihood robust estimators were used in all models to take into account the non-normality of the outcome variables.

3. RESULTS

Sample characteristics at baseline

A total of 681 HIV seropositive women completed baseline assessments during pregnancy (from 8-24 weeks gestation). Almost two thirds (61.7%) completed assessments at 32 weeks prenatal, 47.6% of the sample completed assessments at 6 weeks postnatal, 50.6% at 6 months postnatal, and 59.5% at 12 months postnatal.

Women's ages ranged from 18 to 46 years, with an average age of 28.5 (SD = 5.8) years. Three-fourths (78.3%) had at least 10 years of education, 82.5% were unemployed, 68.1% had a monthly income of less than 974 South African Rands which was consistent with South Africa's threshold of poverty, and 40.9% were married or cohabiting. The majority of women (79.6%) had one or more children, and for more than half (53.0%) the current pregnancy was not planned.

Slightly more than half of women (53.9%) were diagnosed with HIV in their current pregnancy, and 59.0% reported having disclosed their HIV status to their partner. Among women who reported having children, 5.4% knew that they had an HIV-infected child. Just above two-thirds of women (67.1%) reported that they had not skipped any of their medication in the week preceding assessment. Nearly half of the women (48.9%) reported that they had not used a condom at last sex, and 13.8% reported that they had drunk two or more alcoholic beverages on at least one occasion in the month preceding assessment (Table 6.1).

In bivariate analyses, as summarized in Table 6.1 below, at baseline physical IPV was significantly associated with unplanned pregnancy, lack of male partner involvement in the prenatal and postnatal care of his partner, higher levels of depression, alcohol use, low levels of AIDS-related stigma, and non-adherence to ARV medication ($p < 0.05$). There was also a significantly greater proportion of women reporting physical IPV in the enhanced intervention condition at baseline ($X2 = 9.29$; $p = 0.002$). Psychological IPV was similarly associated with unplanned pregnancy, lack of male involvement in the antenatal and postnatal care of his partner, higher levels of depression, low levels of AIDS-related stigma, increase in alcohol use, non-adherence to ARV medication, and increase in consistent condom use in the past week ($p < 0.05$). As with physical IPV, there was a significantly greater proportion of women reporting psychological IPV in the enhanced intervention condition at baseline ($X2 = 12.04$; $p = 0.001$).

Table 6.1. Physical and psychological intimate partner violence (IPV) by socioeconomic, reproductive, HIV, partner and mental health characteristics prenatal at baseline (N = 681)

Characteristic	All	Physical IPV		X^2, *p*	Psychological IPV		X^2, *p*
		No Physical IPV (n=545)	Physical IPV (n=136)		No IPV (n=303)	IPV (n=378)	
	Mean(SD) n (%)	Mean(SD) n (%)	Mean(SD) n (%)		Mean(SD) n (%)	Mean(SD) n (%)	
Socioeconomic status							
Age	28.47 (5.75)	28.57 (5.74)	27.72 (5.57)	-1.54, 0.124[1]	28.85 (5.77)	28.03 (5.64)	-1.91, 0.057[1]
Education							
Grade 0-9	148 (21.7%)	113 (20.7%)	35 (25.7%)		63 (20.8%)	85 (22.5%)	
Grade 10-11	339 (49.8%)	271 (49.7%)	68 (50.0%)		160 (52.8%)	179 (47.4%)	
Grade 12 or more	194 (28.5%)	161 (29.5%)	33 (24.3%)	2.32, 0.314	80 (26.4%)	114 (30.2%)	2.06, 0.357
Employed							
No	562 (82.5%)	450 (82.6%)	112 (82.4%)		249 (82.2%)	313 (82.8%)	
Yes	119 (17.5%)	95 (17.4%)	24 (17.6%)	0.00, 0.953	54 (17.8%)	65 (17.2%)	0.05, 0.831
Monthly household income (South African Rand)							
< 974 (~ $73)	464 (68.1%)	376 (69.0%)	88 (64.7%)		201 (66.3%)	263 (69.6%)	
≥974	217 (31.9%)	169 (31.0%)	48 (35.3%)	0.92, 0.337	102 (33.7%)	115 (30.4%)	0.81, 0.367
Relationship Status							
Unmarried, living separate	403 (59.2%)	324 (59.4%)	79 (58.1%)		173 (57.1%)	230 (60.8%)	
Unmarried, living together	153 (22.5%)	115 (21.1%)	38 (27.9%)		66 (21.8%)	87 (23.0%)	
Married	125 (18.4%)	106 (19.4%)	19 (14.0%)	4.08, 0.130	64 (21.1%)	61 (16.1%)	2.79, 0.248
Reproductive issues							
Number of children							
None	139 (20.4%)	119 (21.8%)	20 (14.7%)		69 (22.8%)	70 (18.5%)	
One or more	542 (79.6%)	426 (78.2%)	115 (85.3%)	3.41, 0.065	234 (77.2%)	308 (81.5%)	1.87, 0.171
Pregnancy unplanned							
No	320 (47.0%)	267 (49.0%)	53 (39.0%)		156 (51.5%)	164 (43.4%)	
Yes	361 (53.0%)	278 (51.0%)	83 (61.0%)	**4.39, 0.036**	147 (48.5%)	214 (56.6%)	**4.43, 0.035**

		Physical IPV			Psychological IPV		
HIV issues							
Diagnosed during this pregnancy							
No	314 (46.1%)	242 (44.4%)	72 (52.9%)		134 (44.2%)	180 (47.6%)	
Yes	367 (53.9%)	303 (55.6%)	64 (47.1%)	3.19, 0.074	169 (55.8%)	198 (52.4%)	0.78, 0.377
Months since ART initiation	13.27 (24.35)	12.58 (23.10)	16.04 (28.76)	-0.58, 0.559[1]	13.13 (24.41)	13.39 (24.34)	-0.81, 0.421[1]
HIV serostatus of children							
Negative/Do not know	513 (94.6%)	406 (95.3%)	107 (92.2%)		224 (95.7%)	289 (93.8%)	
Yes	29 (5.4%)	20 (4.7%)	9 (7.8%)	1.69, 0.194	10 (4.3%)	19 (6.2%)	0.94, 0.219
Partner issues							
Disclosure of serostatus (to partner)							
No	279 (41.0%)	216 (39.6%)	63 (46.3%)	2.02, 0.156	124 (40.9%)	155 (41.0%)	
Yes	402 (59.0%)	329 (60.4%)	73 (53.7%)		179 (59.1%)	223 (59.0%)	0.00, 0.983
HIV serostatus of spouse/partner							
Negative/Do not know	510 (74.9%)	411 (75.4%)	99 (72.8%)	0.50, 0.529	222 (73.3%)	288 (76.2%)	
Positive	171 (25.1%)	134 (24.6%)	37 (27.2%)		81 (26.7%)	90 (23.8%)	0.76, 0.382
Male Involvement	7.11 (3.07)	7.29 (3.03)	6.35 (3.12)	**-3.24, 0.001**[1]	7.40 (3.18)	6.87 (2.96)	**-2.94, 0.003**[1]
Depression (EPDS > 12)							
No	349 (51.2%)	301 (55.2%)	48 (35.3%)	**17.31, <**	188 (62.0%)	161 (42.6%)	
Yes	332 (48.8%)	244 (44.8%)	88 (65.7%)	**0.001**	115 (38.0%)	217 (57.4%)	**25.48, <0.001**
Alcohol use, stigma, adherence, and sexual risk behaviors							
Alcohol (>2 drinks last month)							
No	587 (86.2%)	479 (87.9%)	108 (79.4%)		217 (89.4%)	316 (83.6%)	
Yes	94 (13.8%)	66 (12.1%)	23 (20.6%)	**6.58, 0.010**	32 (10.6%)	62 (16.4%)	**4.82, 0.028**
Stigma	1.33 (1.37)	1.23 (1.23)	1.72 (1.79)	**-2.96, 0.003**[1]	1.08 (1.20)	1.53 (1.47)	**-4.96, <0.001**[1]
Adherent to ARVs							
No	224 (32.9%)	164 (30.1%)	60 (44.1%)	**9.70, 0.002**	85 (28.1%)	139 (36.8%)	
Yes	457 (67.1%)	381 (69.9%)	76 (55.9%)		218 (71.9%)	239 (63.2%)	**5.79, 0.016**

		Physical IPV			Psychological IPV		
Consistent condom use (past week)							
No	388 (57.0%)	317 (58.2%)	71 (52.2%)		194 (64.0%)	194 (51.3%)	
Yes	293 (43.0%)	228 (41.8%)	65 (47.8%)	1.58, 0.209	109 (36.0%)	184 (48.7%)	**11.07, 0.001**
Non-condom use at last sex							
No	327 (48.9%)	258 (47.3%)	69 (50.7%)		136 (44.9%)	191 (50.5%)	
Yes	354 (52.0%)	287 (52.7)	67 (49.3%)	0.50, 0.478	167 (55.1%)	187 (49.5%)	2.15, 0.143
Study condition							
Standard of care	345 (50.7%)	292 (53.6%)	53 (39.0%)		176 (58.1%)	169 (44.7%)	
Enhanced intervention	336 (49.3%)	253 (46.4%)	83 (61.0%)	**9.29, 0.002**	127 (41.9%)	209 (55.3%)	**12.04, 0.001**

[1]Mann-Whitney tests were used for median comparison of groups and chi-square tests for differences in proportions. **Bold indicates significant at p < 0.05**

Attrition Analyses

Of the 681 women, n = 196 (28.8%) completed all study assessments, n = 137 (20.1%) completed four, n = 100 (14.7%) completed three, n = 101 (14.8%) completed two, and n = 147 (21.6%) women completed only the baseline visit. To predict dropout participants after baseline, multivariate logistic regression analyses were conducted to compare the key characteristics of the participants in the current study with participants that dropped out after baseline.

Attrition analyses showed that participants with more education, those with children, and those who reported having an HIV-infected infant (OR = .64, $p < .10$) were less likely to drop out of the study, and these three variables were included as covariates in all analyses. Participants' age, monthly income, having an HIV-infected partner, disclosure of HIV serostatus to partner, depressive symptoms, IPV experience, and relationship status were not associated with attrition.

Prenatal and postnatal physical and psychological IPV

Prenatally, the prevalence of physical IPV was 20.0% at baseline and 13.0% at 32 weeks. Postnatally, the prevalence of physical IPV was 20.3% at 6 months and 21.2% at 12 months. Of those who experienced prenatal physical IPV, 30 (7.4%) continued to report postnatal physical IPV at 12 months, 56 (13.9%) began experiencing physical IPV, and 49 (12.2%) who had experienced physical IPV reported that physical IPV had stopped postnatally, and 66.5% (n = 268) did not report physical IPV at either time point.

In multinomial logistic regression analyses, continued physical IPV (stable physical IPV) at 12 months was associated with higher depression levels (AOR = 1.04, 95% CI [1.00, 1.08]). The incidence of physical IPV at 12 months (change to physical IPV) was significantly associated with having an HIV-infected partner (AOR = 2.08, 95% CI [1.16, 3.74]) and increased alcohol use (AOR = 2.26, 95% CI [1.12, 4.55]). Change to no longer reporting physical IPV (change to no physical IPV) at 12 months was significantly associated with decreased male involvement in the antenatal and postnatal care of his partner (AOR = 0.91, 95% CI [0.84, 0.98]) in Table 6.2a. Change to no longer reporting physical IPV (change to no physical IPV) at 12 months was associated with a significant intervention effect in the unadjusted effects (AOR

= 2.07, 95% CI [1.11, 3.83]). However, in the adjusted effects change to no longer reporting physical IPV at 12 months was associated with no significant intervention effect.

Table 6.2a. Multinomial logistic regressions with "Stable no physical intimate partner violence (IPV)" (prenatal and 12 months postnatal) as reference group (n = 268)

	Stable physical IPV (n = 30)		Change to physical IPV (n = 56)		Change to No physical IPV (n = 49)	
	OR [95% CI]	AOR [95% CI]	OR [95% CI]	AOR [95% CI]	OR [95% CI]	AOR [95% CI]
Fixed Effects						
Intervention	1.11 [0.53, 2.33]	1.04 [0.68, 1.50]	0.62 [0.35, 1.10]	1.13 [0.74, 1.71]	2.07 [1.11, 3.83]*	1.31 [0.85, 2.01]
Covariates (Baseline)						
Age	0.99 [0.93, 1.06]	--	1.04 [0.99, 1.09]	--	0.96 [0.90, 1.01]	--
Educational Attainment (ref = up to 10 years)				--		
10 to 11 years	0.62 [0.26, 1.50]	0.73 [0.43, 1.12]	0.71 [0.36, 1.40]	0.74 [0.44, 1.26]	0.90 [0.41, 2.00]	0.79 [0.47, 1.31]
12 years or more	0.53 [0.19, 1.49]	0.68 [0.38, 1.10]	0.44 [0.19, 1.01]	0.70 [0.39, 1.27]	1.26 [0.55, 2.91]	0.83 [0.46, 1.51]
Monthly Income	1.23 [0.59, 2.60]	--	0.82 [0.47, 1.46]	--	1.19 [0.66, 2.17]	--
Relationship Status						
Unmarried, living together	1.53 [0.63, 3.71]	--	0.82 [0.39, 1.74]	--	0.81 [0.37, 1.78]	--
Married	1.34 [0.50, 3.56]	--	1.12 [0.54, 2.33]	--	0.86 [0.38, 1.95]	--
Children	2.04 [0.60, 6.93]	1.75 [0.95, 2.92]	1.36 [0.61, 3.01]	0.70 [0.92, 3.17]	2.05 [0.79, 5.38]	1.80 [0.98, 3.32]
Pregnancy Unplanned	0.87 [0.41, 1.82]	--	0.73 [0.41, 1.28]	--	1.76 [0.94, 3.28]	--
Diagnosed during this pregnancy	0.46 [0.21, 1.01]	--	0.70 [0.39, 1.23]	--	0.93 [0.51, 1.69]	--
Months Since ART Initiation	1.01 [0.99, 1.02]	--	1.01 [0.99, 1.02]	--	0.99 [0.99, 1.01]	--
HIV Positive Children	1.99 [0.55, 7.22]	1.41 [0.56, 3.05]	0.98 [0.28, 3.47]	1.30 [0.52, 3.27]	1.09 [0.31, 3.88]	1.16 [0.50, 2.72]
HIV Positive Partner	2.18 [1.02, 4.65]*	--	2.08 [1.16, 3.74]*	1.61 [1.04, 2.49]*	0.75 [0.37, 1.52]	--
Alcohol Use	1.32 [0.48, 3.62]	--	2.26 [1.12, 4.55]*	1.74 [1.04, 2.93]*	1.31 [0.58, 2.96]	--

Stigma	1.12 [0.87, 1.44]	--	0.83 [0.63, 1.09]	--	1.26 [1.04, 1.52]*	1.10 [0.91, 1.33]
Disclosure of HIV Status to Partner	1.38 [0.63, 3.02]	--	1.14 [0.64, 2.04]	--	0.50 [0.28, 0.92]*	0.99 [0.59, 1.65]
Male Involvement	0.92 [0.82, 1.03]	--	0.99 [0.90, 1.08]	--	0.88 [0.81, 0.97]**	0.91 [0.84, 0.98]*
Depression	1.08 [1.01, 1.15]*	1.04 [1.00, 1.08]*	1.02 [0.97, 1.07]	--	1.04 [0.98, 1.09]	--
Adherence to ARVs	0.51 [0.24, 1.08]	--	0.90 [0.50, 1.64]	--	0.87 [0.46, 1.64]	--
Sexually Active in Past Week	1.93 [0.81, 4.61]	--	1.22 [0.67, 2.23]	--	1.07 [0.57, 1.20]	--
Model Fit						
-2LL (Deviance)	-765.72		-5152.85		-781.50	
Number of Parameters	10		10		10	
AIC/BIC	783.73/819.72		5176.85/5231.14		803.50/847.49	

Note. AOR = Adjusted Odds Ratio. Bold font indicates significant at $p < 0.05$. [1]Random effects indicates the estimated variances from random effects logistic regression model.

***P<0.001, **P<0.01, *P<0.05

Prenatally, the prevalence of psychological IPV was 55.5% at baseline and 49.9% at 32 weeks. The prevalence of psychological IPV was 51.1% at 6 months and 46.6% at 12 months postnatal. Of those who experienced antenatal psychological IPV, 122 (30.3%) continued to report postnatal psychological IPV at 12 months, and 100 (24.8%) who had experienced psychological IPV reported that psychological IPV had stopped postnatal; among those with no antenatal psychological IPV experience 66 (16.4%) began experiencing psychological IPV; 28.5% (n = 115) did not report psychological IPV at either time point. In multinomial logistic regression analyses, being in the intervention group was associated with a change to experiencing psychological IPV (change to psychological IPV) at 12 months postnatal among those who did not experience IPV prenatal (AOR = 1.56, CI [1.09, 2.22]). Similarly, being in the intervention group was associated with a change to not experiencing psychological IPV (change to no psychological IPV) at 12 months postnatal among those who experienced IPV prenatal (AOR = 1.51, CI [1.06, 2.15]). Low levels of AIDS-related stigma was also associated with a change to no longer experiencing psychological IPV (change to no psychological IPV) at 12 months in Table 6.2b (AOR = 1.18, CI [1.02, 1.36]).

Table 6.2b. Multinomial logistic regressions with "Stable no psychological intimate partner violence (IPV)" (prenatal and 12 months postnatal) as reference group (n = 115)

	Stable psychological IPV (n = 122)		Change to psychological IPV (Incident IPV) (n = 66)		Change to No psychological IPV (n = 100)	
	OR [95% CI]	AOR [95% CI]	OR [95% CI]	AOR [95% CI]	OR [95% CI]	AOR [95% CI]
Fixed Effects						
Intervention	1.15 [0.75, 1.75]	1.50 [1.05, 2.01]	0.78 [0.46, 1.32]	1.56 [1.09, 2.22]*	1.65 [1.05, 2.60]*	1.51 [1.06, 2.15]*
Covariates (Baseline)						
Age	0.98 [0.94, 1.02]	--	1.08 [1.03, 1.13]**	1.01 [0.97, 1.04]	0.98 [0.94, 1.03]	--
Educational Attainment (ref = up to 10 years)						
10 to 11 years	0.75 [0.43, 1.31]	0.93 [0.59, 1.37]	1.05 [0.53, 2.07]	0.94 [0.59, 1.48]	0.95 [0.53, 1.70]	0.94 [0.59, 1.49]
12 years or more	1.18 [0.65, 2.14]	0.97 [0.51, 1.46]	0.85 [0.39, 1.84]	0.97 [0.60, 1.56]	0.85 [0.44, 1.62]	0.99 [0.61, 1.61]
Monthly Income	0.75 [0.49, 1.15]	--	1.36 [0.80, 2.30]	--	1.16 [0.74, 1.83]	--
Relationship Status						
Unmarried, living together	0.94 [0.55, 1.61]	--	0.92 [0.46, 1.86]	--	0.63 [0.35, 1.15]	--
Married	0.87 [0.49, 1.56]	--	1.61 [0.84, 3.10]	--	0.51 [0.26, 1.00]	--
Children	1.26 [0.71, 2.24]	1.11 [0.67, 1.69]	1.26 [0.61, 2.61]	1.26 [0.65, 2.43]	0.99 [0.55, 1.78]	1.09 [0.66, 1.66]
Pregnancy Unplanned	0.91 [0.59, 1.39]		1.06 [0.62, 1.80]	--	1.79 [1.12, 2.85]*	--
Diagnosed during this pregnancy	0.80 [0.52, 1.22]	--	1.21 [0.71, 2.05]	--	1.08 [0.69, 1.69]	--
Months Since ART Initiation	1.01 [0.99, 1.91]	--	1.00 [0.99, 1.01]	--	0.99 [0.99, 1.01]	--
HIV Positive Children	0.68 [0.24, 1.90]	1.55 [0.68, 3.12]	0.50 [0.11, 2.21]	1.56 [0.62, 2.43]	2.44 [0.99, 6.01]	1.63 [0.76, 3.53]
HIV Positive Partner	1.31 [0.82, 2.10]	--	0.91 [0.50, 1.66]	--	0.64 [0.37, 1.10]	--

Alcohol Use	2.45 [1.37, 4.39]**	0.78 [0.51, 1.10]	1.03 [0.47, 2.21]	--	0.41 [0.18, 0.94]*	0.79 [0.52, 1.20]
Stigma	1.10 [0.94, 1.29]	--	0.82 [0.63, 1.06]	--	1.22 [1.04, 1.44]*	1.18 [1.02, 1.36]*
Disclosure of HIV Status to Partner	0.95 [0.62, 1.47]	--	1.12 [0.65, 1.93]	--	1.01 [0.64, 1.60]	--
Male Involvement	0.95 [0.88, 1.01]	--	1.05 [0.96, 1.15]	--	1.00 [0.93, 1.08]	--
Depression	1.11 [1.06, 1.15]***	1.01 [0.98, 1.04]	0.98 [0.94, 1.03]	--	0.98 [0.95, 1.02]	--
Adherence to ARVs	0.81 [0.52, 1.27]	--	0.93 [0.53, 1.63]	--	0.79 [0.49, 1.27]	--
Sexually Active in Past Week	1.51 [0.96, 2.39]	--	0.67 [0.39, 1.14]	--	1.52 [0.93, 2.48]	--
Model Fit						
-2LL (Deviance)	-1085.60		-1087.16		-1082.70	
Number of Parameters	10		10		10	
AIC/BIC	1105.51/1145.58		1105.16/1141.15		1102.71/1142.70	

Note. AOR = Adjusted Odds Ratio. [1]Random effects indicates the estimated variances from random effects logistic regression model.
***P<0.001, **P<0.01, *P<0.05

Using multilevel logistic regression models, in Model 1, which assessed time-invariant predictors of physical IPV, age (AOR = 1.004, CI [1.000, 1.008]), cohabiting (AOR = 0.938, CI [0.900, 0.978]), having an HIV-positive partner (AOR = 1.049, CI [1.007, 1.093]) and low levels of AIDS-related stigma (AOR =0.984, CI [0.970, 0.997]) were significantly associated with physical IPV. In Model 2, which included time-varying covariates assessed at the four time points, decreased male involvement in the antenatal and postnatal care of his partner (AOR = 0.901, CI [0.849, 0.956]), higher depression levels (AOR = 2.639, CI [1.961, 3.551]), adherence to ARVs (AOR = 2.639, CI [1.961, 3.551]), and consistent condom use in the past week (AOR = 1.407, CI [1.022, 1.938]) were associated with physical IPV (Table 6.3).

In multilevel logistic regression models for psychological IPV, in Model 1, which modelled time-invariant predictors, older age (AOR = 1.004, CI [1.001, 1.007]) and alcohol use (AOR = 1.049, CI [1.002, 1.100]) were associated with psychological IPV longitudinally. In Model 2, which evaluated time-varying variables predicting psychological IPV, decreased male involvement in the antenatal and postnatal care of his partner (AOR = 0.898, CI [0.846, 0.952]), higher depression levels (AOR = 2.489, CI [1.770, 3.498]), consistent condom use in the past week (AOR = 1.664, CI [1.259, 2.199]), and condom use at last sex (AOR = 0.710, [0.507, 0.994]) were associated with psychological IPV (see Table 6.3).

Table 6.3. Physical and psychological intimate partner violence: longitudinal outcome (N = 681)

	Physical IPV	**Psychological IPV**
Variable	AOR (95% CI)	AOR (95% CI)
Model 1: Baseline characteristics (time-invariant)		
Fixed Effects		
Intervention		
Standard of care	1 (Reference)	1 (Reference)
Enhanced intervention	0.968 [0.929, 1.010]	1.002 [0.983, 1.022]
Age	1.004 [1.000, 1.008]*	1.004 [1.001, 1.007]**
Education		
0-Grade 9	1 (Reference)	1 (Reference)
Grade 10-11	0.984 [0.946, 1.024]	0.999 [0.963, 1.037]
Grade 12 or more	0.977 [0.930, 1.028]	0.996 [0.955, 1.040]]
Employed		
No	1 (Reference)	1 (Reference)
Yes	0.995 [0.948, 1.045]	1.028 [0.984, 1.075]
Income		
< 974 (~ $73)	1 (Reference)	1 (Reference)
≥974	0.983 [0.945, 1.023]	0.977 [0.936, 1.020]
Relationship status		
Unmarried, living separate	1 (Reference)	1 (Reference)
Unmarried, living together	0.938 [0.900, 0.978]**	0.976 [0.941, 1.013
Married	1.027 [0.976, 1.081]	1.014 [0.970, 1.060]
Number of children		
None	1 (Reference)	1 (Reference)
One or more	0.972 [0.917, 1.031]	0.996 [0.960, 1.035]
Diagnosed during this pregnancy		
No	1 (Reference)	1 (Reference)
Yes	0.993 [0.952, 1.036]	1.009 [0.969, 1.050]
Months since ART initiation	1.000 [0.999, 1.000]	1.000 [0.999, 1.001]

	Physical IPV	Psychological IPV
HIV positive children		
No	1 (Reference)	1 (Reference)
Yes	0.984 [0.917, 1.055]	0.935 [0.873, 1.002]
HIV serostatus of spouse/partner		
Negative/Do not know	1 (Reference)	1 (Reference)
Positive	1.049 [1.007, 1.093]*	1.036 [0.997, 1.075]
Alcohol (>2 drinks last month)		
No	1 (Reference)	1 (Reference)
Yes	1.004 [0.954, 1.057]	1.049 [1.002, 1.100]*
Stigma	0.984 [0.970, 0.997]*	0.993 [0.980, 1.007]
Random Effects[1]		
Intercept (baseline)	4.394 [-4.180, 23.968]	2.411 [-1.285, 6.107]
Physical Intimate Partner Violence	0.005 [-0.002, 0.011]	0.007 [0.001, 0.012]
Model 2: Variables assessed at four assessments (time-varying)		
Disclosure of HIV Status to Partner	1.200 [0.863, 1.668]	1.191 [0.853, 1.662]
Male Involvement	0.901 [0.849, 0.956]**	0.898 [0.846, 0.952]***
Depression	2.639 [1.961, 3.551]***	2.489 [1.770, 3.498]***
Adherence to ARVs	0.511 [0.347, 0.751]**	0.738 [0.524, 1.038]
Consistent condom use (past week)	1.407 [1.022, 1.938]*	1.664 [1.259, 2.199]***
Non-condom use at last sex	0.723 [0.518, 0.994]	0.710 [0.507, 0.994]*
Random Effects[1]		
Intercept (baseline)	0.403 [-1.967, 2.772]	0.963 [0.060, 1.865]*
Physical Intimate Partner Violence	0.003 [-0.003, 0.009]	0.001 [0.000, 0.003]*

AOR=Adjusted Odds Ratio, CI=Confidence Interval

[1]Random effects indicates the estimated variances from random effects logistic regression model.

***P<0.001, **P<0.01, *P<0.05

4. DISCUSSION

This study examined the prevalence of prenatal and postnatal physical IPV as well as psychological IPV and associated time-invariant and time-varying predictors among HIV-positive women participating in a randomized controlled trial to improve adherence to PMTCT protocols. To our knowledge this is the first longitudinal study assessing IPV among HIV-infected women during prenatal and postnatal periods. The results of this study highlight the high levels of IPV experienced by HIV-infected women during pregnancy and in the first year after childbirth. Previous studies in Sub-Saharan Africa among HIV-infected women have reported similar levels of prenatal physical IPV (Ezeanochie et al., 2011; Matseke et al., 2016) and postnatal IPV (Peltzer et al., 2013a). Ezechi et al. (2009) has reported even higher levels (65.8%) of prenatal IPV among HIV-positive women in Nigeria. In four states of the United States of America women more commonly reported higher levels of either physical or sexual IPV during pregnancy compared to after pregnancy (Koenig et al., 2006). Sexual violence rarely occurred in the absence of physical violence in Koenig et al. (2006).

In this study, levels of prenatal psychological IPV among HIV-positive women are higher compared to postnatal psychological IPV. Also, unintended pregnancy was significantly associated with IPV in univariate analysis in this study. This finding makes sense since pregnancy may increase IPV owing to the increased economic and/or psychosocial stressors introduced by unintended pregnancy as reported in a South African study (Koen et al., 2014). Furthermore, participation in an enhanced intervention that included conflict management information and a protocol for reporting IPV was associated with a reduction in the reported prevalence of psychological IPV after giving birth among those with prenatal IPV experience. However, even though the enhanced intervention showed an association with a reduction in the reported prevalence of physical IPV, this effect was not significant. Although adequate to have a significant effect on psychological IPV reduction, it is possible that the conflict management intervention session was too short to have a significant effect on physical IPV reduction.

On the contrary, participation in an enhanced intervention was also associated with onset of psychological IPV at 12 months postnatal among those with no prenatal IPV experience. This is explained by the fact that, as previously stated in the results, among those with no prenatal psychological IPV experience 66 women (16.4%) began experiencing psychological IPV. Also, the enhanced intervention addressed and promoted 'HIV serostatus

disclosure to partner' amongst other issues and thus might have provoked a lot of issues including IPV in this regard. HIV serostatus disclosure to partner has been associated with the onset of or increase in IPV wherein HIV-positive women in south-west Nigeria have reported post-disclosure IPV (Ezebuka, et al., 2015). This calls for the development and implementation of interventions specifically tailored to prevent both psychological and physical IPV among HIV-infected women and their partners.

Time-invariant predictors of IPV

In this study, we noted that baseline (time-invariant) predictors of physical IPV were cohabiting, having an HIV-positive partner and low levels of AIDS-related stigma. Cohabiting has previously been associated with IPV in Nigeria and Spain (Ezebuka et al., 2015; Manning et al., 2016). The commitment theory (Stanley & Markman, 1992) has previously been used to explain this association, where the sharing of a common residence by cohabiting partners creates greater potential for both positive and negative interaction, and greater opportunity for violence where negative interaction is not well handled (Manning, et al., 2016). According to a study in the United States of America, cohabiting partners may quarrel over the typical topics of commitment and friends as well as the additional areas of conflict related to co-residence such as household chores and money (Rhoades et al., 2010). Interventions aimed at promoting good communication, enabling violent-free interaction, among cohabiting partners, would thus be beneficial in this regard.

The fact that having an HIV-positive partner was associated with physical IPV among women in this study is to be expected. A review of studies in international settings (Campbell et al., 2008) and a South African study (Jewkes et al., 2009) have shown that male perpetrators of IPV engage in risky behaviour, thus putting their partners at greater risk for HIV, and are more likely to be HIV-positive. Furthermore, most HIV-positive women have reported post-disclosure IPV compared to pre-exposure IPV (Ezebuka, et al., 2015). In a previous study, having an HIV-positive partner has been associated with post-disclosure IPV among HIV-positive women (Rhoades et al., 2010).

The fact that low levels of AIDS-related stigma were associated with physical IPV in this study is an unexpected finding and is difficult to explain. There is limited literature on the association between AIDS-related stigma and IPV. A South African study among HIV-positive women in the same setting indicated that higher levels of AIDS-related stigma were

associated with IPV (both psychological and physical, separately and combined) (Matseke et al., 2016). However, it is important to note that a different modelling strategy was used during data analysis. It is important to explore and investigate this area in further studies.

Research in the United States of America has noted alcohol use to be prevalent among HIV-infected individuals (Chander et al., 2008; Samet et al., 2007) and may cause more rapid disease progression and HIV-related complications (Neblett et al., 2010). This study has also shown that the incidence of psychological IPV at 12 months was associated with alcohol use among women. Also, women exposed to abuse were more likely to use alcohol at some point in their lives (Campbell et al. 2008; Jewkes et al., 2009). There is a need for prenatal and postnatal alcohol screening among HIV-infected women to enable appropriate alcohol reduction interventions.

Time-variant predictors of IPV

We noted that as physical IPV fluctuated over time so did male partner involvement, depression, ARV adherence, and consistent condom use in the past week. In addition, as psychological IPV fluctuated over time so did male partner involvement, depression, non-condom use at last sex, and consistent condom use in the past week.

As reported in previous studies in Africa including Kenya, abusive male partners are less likely to participate in PMTCT services (Auvinen et al., 2010; Kiarie et al., 2006). The fact that there was a decrease in male partner's involvement in the current study is of great concern and highlights the importance of preventing IPV, as the current PMTCT guidelines promote male partner involvement in antenatal care to enhance maternal adherence and retention in care. Similarly, greater male involvement during the antenatal period increases the potential for the uptake of safer conception strategies and long-term contraception methods (Matseke et al. 2016).

Over time, both physical and psychological IPV were associated with higher depression levels in this study. Similarly, other studies found an association between IPV and adverse mental health outcomes such as depression (Han, & Stewart, 2014; Hartley et al., 2011; Peltzer et al., 2013a; Shannon et al., 2015). The combination of IPV, HIV infection, and poor living conditions may put an additional burden on the lives of pregnant women leading to poor mental health status.

Adherence to antiretroviral drugs was associated with physical IPV over time in this study. This finding is expected and is consistent with findings in other studies (Hampanda, 2016; Mlambo, 2015; Nassali et al., 2009). Qualitative research in South Africa has reported HIV-positive women's fear of violence from a male partner as a barrier to adherence to PMTCT protocols, which includes ARV adherence. Regular clinic visits for constant refills of ARV prescriptions and daily consumption of ARV drugs may be difficult to conceal from a partner who has no knowledge of the woman's HIV status.

The finding that consistent condom use in the past week was a time-varying predictor of both physical and psychological IPV was not expected. On the other hand, the fact that non-condom use was a time-varying predictor for psychological IPV was much expected. This means that increased consistent condom use in the past week is associated with increased IPV and not using condoms at last sex is associated with decreased IPV. Similarly, in a study by Peasant et al. (2017) specific forms of psychological IPV were related to less condom use among young women. A sensible interpretation of this finding is that men may be more likely to psychologically abuse their partner when women insist on using condoms, but less likely to do so when they do not. As suggested by previous research women in violent relationships are less likely to negotiate or use condoms for fear of being verbally or physically abused (World Health Organization, 2004). This inability to negotiate or insist on condom use is embedded in the traditional gender norms that perpetuate gender inequality (Abramsky et al., 2014).

HIV-positive pregnant women in South Africa reported experiencing multiple forms of IPV including sexual IPV (Bernstein et al., 2016). However, sexual IPV data was not collected in this study and thus more research in this area is warranted. Similarly, since condom use might be associated with sexual IPV, this opens up an avenue for research in this area.

Implications for the design of IPV prevention interventions for women living with HIV and their partners

The results of this study reflect the low socio-economic status (82.5% unemployed; 68.1% monthly income of < 974 ZAR) of the majority of women in rural South Africa, also known to perpetuate IPV among these women. Over two-thirds (71.5%) of women in this study had lower educational attainment (i.e. less than grade 12), much similar to the majority of women in rural South Africa. In addition, gender inequality has been cited as an underlying

factor in both women's risk of IPV and HIV, and the associations between them (UNAIDS, 2012). Women living with HIV are faced with violence when they insist on matters related to their health such as ARV adherence and condom use. In this study, adherence to ARVs, and consistent condom use in the past week were associated with physical IPV while condom use at last sex was associated with psychological IPV.

Multidimensional interventions that can empower and protect women living with HIV, during pregnancy, and after birth, are essential to deal with all the multidimensional issues experienced by these women. Furthermore, interventions that address the attitudes and behaviours of the partners of WLHIV are essential in this regard. For example, Matseke et al. (2017) highlighted the Men As Partners Program is South Africa by Peacock and Levack (2004) that manipulated gender norms ascribed to traditional partner relations and challenged male attitudes and behaviours that compromised the health of women.

5. STUDY LIMITATIONS

This study has its limitations. Firstly, the results may not be generalizable to women not infected with HIV as the inclusion criteria for the study participants were limited to HIV-infected women. Secondly, follow-up rates were lower than the original target, and as such results may have been influenced by self-selection among women who were followed to 12 months postnatal. The study relied on self-reports of IPV that were not verified by a diagnostic interview, and women may have under/over reported IPV. The reliability coefficients across time points varied, which may have been related to the varying sample sizes at some of the time points, or potential heterogeneity in the sample.

The study analyses did not control for gender norms/gender inequality perceptions. This might be an important factor to consider, especially regarding how condom use relates to IPV. Additionally, prior studies on IPV among Women Living with HIV in sub-Saharan Africa have found a direct relationship between IPV and gender inequality and women empowerment perceptions (Kouyoumdjian et al., 2013; Ogbonnaya et al., 2020; Kim et al., 2009).

The fact that sexual IPV data was not collected in this study is a limitation given that sexual IPV has also been associated with condom use. Thus, more research is warranted in this area. Another limitation is that alcohol use was measured as a time-invariant variable (i.e.

only at baseline) given that it would have been ideal to measure alcohol use at all time-points to make sure all alcohol use incidences are covered.

The way in which IPV was measured at other time points following the baseline time-point, wherein participants were asked to respond to queries referencing the past month, is also a limitation due to the possibility that other IPV incidences might have been missed. Lastly, condom use has also been associated with sexual IPV even though sexual IPV data was not collected in this study. Thus, more research is warranted in this area.

6. CONCLUSION

Evidence-based interventions are needed to deal with the high levels of prenatal and postnatal IPV experienced by women living with HIV as highlighted in this study. Interventions should promote screening for IPV among women and access to appropriate interventions. Interventions aimed at preventing IPV should be accessible for the male partners of women living with HIV. Furthermore, these interventions should incorporate elements to improve partner support/male partner involvement during the prenatal period and condom use, and address depression, alcohol use, and the role of IPV and depression in non-adherence. Finally, IPV resulting from condom use negotiation needs special attention if condom use is to be improved.

CHAPTER 7.

General Discussion

Programs for PMTCT in rural South Africa face multiple challenges and have thus been less effective compared to PMTCT programs in urban areas. Literature has shown that the positive involvement of male partners in PMTCT during prenatal and postnatal phases has been associated with positive PMTCT outcomes. As such, positive male partner involvement in PMTCT in rural South Africa is vital as it could improve the effectiveness of the PMTCT program in rural South Africa. It is therefore essential to systematically explore male partner involvement in PMTCT programs in rural South Africa.

The objective of this thesis is to understand the perceptions of male partner involvement in maternal health and related issues (including PMTCT) among men in rural South Africa, as well as to report on the prevalence levels of male partner involvement in PMTCT programs in rural South Africa and associated factors thereof. In addition, this thesis reports on the influence that male partner involvement in PMTCT has on maternal health outcomes of HIV positive mothers and development outcomes of HIV-exposed infants in PMTCT programs. Furthermore, the thesis reports on the prevalence of prenatal and postnatal intimate partner violence and its predictors (male partner involvement as one of the predictors) among HIV infected women attending PMTCT services in rural South Africa. This information is vital for future use by policymakers and health care providers working in the maternal, newborn and child health areas, particularly in PMTCT programs in rural South Africa. Besides putting the main findings from our research into perspective, this chapter reflects on methodological issues while also making recommendations for future research. Implications for the development of interventions aimed at improving male partner involvement are also outlined in this chapter.

Levels of male partner involvement and contributing factors

As reported in Chapter Three, the level of male partner involvement in PMTCT programs in rural South Africa is low, at 44.1%, and can be improved. Reasons for this low level of male partner involvement includes negative community attitudes and beliefs related to culturally defined traditional gender norms about men's and women's roles in families, the different perceptions and or understanding of male partner involvement in maternal health and related issues, negative experiences by men when visiting health facilities, and partner violence (specifically verbal aggression towards men).

Culturally defined traditional gender norms

Findings in Chapter Two stated the cultural level challenges that limit men's involvement in maternal health care and related issues. Previous studies have shown that factors contributing to the low levels of male partner involvement in rural areas are partly attributed to the culturally defined traditional gender norms prevalent in such areas. Mpumalanga Province is a predominantly rural area with communities that are mainly patriarchal and traditional in many of its social beliefs and practices, such as the belief that maternal health care and related issues are meant for women and health care providers. These kinds of beliefs make involvement by men in PMTCT programs a challenge wherein men from such communities give limited prenatal and postnatal support to their HIV-positive female partners as they believe that these are 'women matters'. Similar findings have been reported in several other studies (van den Bergh et al., 2015; Kura et al., 2013; Singh et al., 2014; Kinanee et al., 2011).

It is thus typical of most men in patriarchal societies to harbor negative attitudes towards involvement in maternal health and related matters that are perpetuated by the culturally defined traditional gender norms held in these societies. Thus, the negative attitudes held by some men in Mpumalanga, as reported in Chapter Two, towards male partner involvement in prenatal and postnatal maternal health care has been highlighted as a barrier also contributing to the low levels of involvement in PMTCT. Similar findings were observed in Tanzania where there was a widespread opinion that female reproductive health is not the responsibility of males (Kalembo et al., 2012). On the contrary, some studies have shown men's positive attitudes through their willingness to be involved in the care of their female partners during pregnancy, at birth, and after birth (Bhatta, 2013; Daumbaugh et al., 2014; Kaye et al., 2014; Vermeulen et al., 2016).

Interventions to improve the levels of male partner involvement in rural South Africa should thus focus on changing men's negative attitudes towards involvement in prenatal and postnatal maternal and infant health in PMTCT settings. Evidently, there is a need for a community-level intervention aimed at the normalization of male partner involvement during and following pregnancy in PMTCT programs. For example, a group talk intervention (that incorporated local culture and gender norms) was implemented among males in the community of Ekiadolor in Nigeria to improve their attitudes and practices regarding their involvement in prenatal care was shown to be effective (Adeleye, et al., 2011). On a larger

scale, there is a need to explore a shift in gender norms, for example through the adaptation and implementation of evidence-based gender-transformative programs with men that have led to positive changes in their behavior and attitudes towards maternal and infant health (WHO, 2012; Barker et al., 2010). In South Africa, the 'Men as Partners' program manipulated gender norms ascribed to traditional partner relations and challenged male attitudes and behaviors that compromised the health of women (Peacock & Levack, 2004). The program, as explained by Peacock and Levack (2004), was carried out through a partnership of civil society organizations collaborating with governmental and academic institutions and sought to transform men's attitudes and behaviours to promote their constructive role in sexual and reproductive health, including HIV/AIDS.

Different meanings attached to male partner involvement

It is also very important to note that the reported low levels of male partner involvement in PMTCT in this thesis may also partly be due to the different ways of understanding of their roles and meaning attached to male partner involvement by men in Mpumalanga, South Africa. In Chapter Three, a male involvement index adapted from previous studies was used to measure male partner involvement in PMTCT. The index comprised of ten items related to the men's participation in specific areas of antenatal care, including PMTCT. Questions included were, 'Do you attend antenatal care visits with your pregnant partner?', 'Do you know your partner's antenatal appointment times?', 'Have you discussed antenatal health care for your baby with your partner?', 'Do you support your partner's antenatal visits financially?', 'Do you know what happens in the antenatal clinic?', 'Has your partner discussed feeding options for the baby with you?', 'Have you discussed the place of delivery for the baby with your partner?', and 'Have you discussed testing your baby for HIV with your partner?'.

However, as reported in Chapter Two men in Mpumalanga do not necessarily share the same definition and understanding of male partner involvement, as reflected in the aforementioned index. This view is supported by the findings from focus group discussions held with men visiting primary health care clinics in the different areas of Mpumalanga in Chapter Two. According to men in the focus group discussions, male partner involvement was understood and defined as giving instrumental support to female partners through

financial help, helping out with physical tasks, providing emotional support, accompaniment to the clinic and not necessarily to the antenatal visit was also viewed as a form of partner support. Forms of support included behaviors such as holding a spot for female partners in the clinic queues. From the ten indicators used in the male involvement index, only 'financial help' as reflected in the men's definitions is observed from the qualitative findings in Chapter Two.

In addition, the most commonly used indicator of male partner involvement in most studies is 'a man's physical presence in the antenatal or postnatal clinic with his female partner' (Montgomery et al., 2011). However, most men in rural South Africa, as reflected in Chapter Two, may 'accompany their female partners to antenatal clinics' rather than 'attend antenatal clinic visits' with them. This qualitative finding is corroborated by the finding in Chapter Three, where more than two thirds (68.5%) of men reported that they do not 'attend antenatal care visit with partner'. This calls for a contextualized definition of male partner involvement in rural South Africa to enable accurate measurement and the planning and development of appropriate interventions.

Men can be involved/support the partners in a variety of ways during and after pregnancy, and not just in a single activity. Hence, the use of a composite measure of male partner involvement in PMTCT is necessary that captures a range of prenatal and postnatal activities that men could engage in. As such the attendance of antenatal care visits by men is also important and more men should be encouraged to do this. Antenatal care visits are opportune moments for expectant couples to receive vital health information related to PMTCT, healthy nutrition during pregnancy, infant feeding options, risks during pregnancy and childbirth, and also receive important information to enable them to better prepare for the facility delivery.

Negative experiences by men in health care facilities

According to findings in Chapter Two men have mentioned negative experiences in health care facilities which have deterred them from attending antenatal care visits with female partners. They have reported unwelcoming clinic staff attitudes, clinic services that were not male-friendly, felt that the clinic space could not accommodate them, and noted stringent rules regarding male presence in some clinic spaces. Similar results were reported in other countries with health care delivery systems that fail to welcome men and further limit men's participation to culturally defined traditional gender roles (Maluka & Peneza, 2018; Dunlap et

al., 2014; Auvinen et al., 2013; Morfaw et al., 2013; Chikonde et al., 2009; Tadesse, Muula, & Misiri, 2004). Future interventions should focus on making health care facilities to be male-friendly and antenatal care services more responsive and acceptable to male partners. This can be achieved, for example, by engaging maternal, neonatal and child health or antenatal care staff as agents in transforming facilities into gender-sensitive spaces, where women and men are welcomed as clients (van den Berg et al., 2015).

Furthermore, staff members in health care facilities need to be equipped with skills to recognize and sensitively discuss with clients how gender-inequitable beliefs and behaviors adversely affect health. In addition, the transformation of the physical infrastructures of the health facilities is needed to create environments that will enable male involvement in antenatal and postnatal care services, including delivery services, while providing sufficient privacy for other women attending the clinic.

High levels of prenatal and postnatal intimate partner violence

Another contributing factor to the low levels of male partner involvement in PMTCT is the high levels of prenatal and postnatal intimate partner violence experienced by women living with HIV in rural South Africa. Chapter Six reports on the high levels of physical and intimate partner violence at different time-periods during and following pregnancy. Chapter Six further reported that decreased prenatal and postnatal male partner involvement were each associated with both physical and psychological intimate partner violence. Interventions aimed at improving male partner involvement should thus promote screening and prevention of intimate partner violence and access to appropriate interventions for women living with HIV, and also target their male partners.

Empirical evidence has demonstrated that behavioural interventions carried out with men can play a role in reducing the perpetration of intimate partner violence. For example, the evaluation of the Stepping Stones program implemented in rural South Africa, in Eastern Cape, showed significant changes in men's attitudes and practices, wherein men who participated in the intervention reported less perpetration of intimate partner violence as one of the risk behaviours (Peacock et al., 2009; Jewkes et al., 2008). The Stepping Stones was a 50-hour program aimed at improving sexual health by using participatory learning approaches to build knowledge, risk awareness, and communication skills and to stimulate critical reflection (Jewkes et al., 2008).

Determinants of male partner involvement

Despite the low levels of male partner involvement in PMTCT programs reported in this thesis, men still reported involvement in PMTCT. In Chapter Three, the positive predictors of male partner involvement included male partners living together with their female partners, male partner's own HIV status, awareness of female partner's positive HIV status, female partner's desire to have more children, having family planning discussions with health care providers, condom use to prevent HIV and sexually transmitted infections (STIs), and partner reasoning skills. Negative predictors included the use of verbal aggression by the female partner to resolve conflict.

One of the most critical determinants of male partner involvement is the fact that male partners who were aware of their female partners' HIV-positive status were more likely to be involved in PMTCT programs. From the perspective of the Health Belief Model (Rosenstock, 1974), it is most likely that male partners became involved in PMTCT programs as they believed that this will avoid HIV transmission to expected infants. This finding suggests that prior safe disclosure of HIV status to partners by HIV positive pregnant women is important as this can serve as motivation for partners to be involved in PMTCT programs. A similar view was shared by Mucheto et al. (2009) as he mentioned that disclosure of HIV status to partners in HIV-positive women in PMTCT programs is important and should be encouraged as it allows for informed decision making of reproductive health options. In fact, mutual disclosure of HIV status among partners is also important as it allows for decision making regarding healthy antenatal and postnatal care choices. Interventions aimed at increasing male partner involvement in PMTCT programs in rural South Africa should not only encourage HIV status disclosure to partner by women but also encourage mutual HIV testing and disclosure among both partners. For example, prior communication between partners about HIV testing and referral of individuals to psychosocial support groups have proven to be key to HIV status disclosure (Mucheto et al., 2010). Deribe et al. (2010) stated that HIV status disclosure was associated with prior discussions about HIV testing between partners. Also, as cited in Mucheto et al. (2010), referral of individuals to psychosocial support groups (where support groups offer post-test counseling, health education, and support mechanisms for disclosure of HIV) by health workers and participation in groups activities is also important for disclosure of HIV status.

The influence of male partner involvement on maternal and infant health outcomes

The influence of male partner involvement in maternal and infant health outcomes was investigated in the studies reported in Chapter Four and Chapter Five. Chapter Four indicated that despite the growing evidence that male partner involvement promotes better maternal health outcomes, study results did not support this notion. Study results indicated no significant support for male partner involvement in improving maternal health outcomes (under investigation) among women in PMTCT in rural South Africa. Maternal health outcomes under investigation were delivery mode, systolic and diastolic blood pressure, body mass index, CD4 count, and viral load.

In Chapter Five lack of male partner involvement was shown to be associated with risk for delayed cognitive development among HIV exposed infants. Furthermore, Chapter Five indicated that the high levels of delayed cognitive, communicative, fine and gross motor development among the HIV-exposed infants are of great concern and calls for immediate attention. Interventions in PMTCT programs should promote increased prenatal and postnatal male partner involvement and father-infant interactions to enhance infant development across all its domains. For example, according to Sethna et al. (2017), father–infant interactions from as young as three months of age may influence children's cognitive development. Father–infant interactions at three months took place at home in a floor-mat setting, in which fathers were asked to talk to and play with their infants, for three minutes, as they would normally, without the use of toys. At twenty-four months of age, free play and book sessions were applied as father-child interactions. A more positive paternal engagement was associated with higher mental development index of the Bayley Scales of Infant Development. In another example, at three years of age, father-child communication significantly predicted advanced language development in the child (Pancsofar & Vernon-Feagans, 2006). Health care providers have an opportunity, during antenatal and postnatal visits, to encourage fathers to interact with their infants more.

Additional maternal health and infant health outcomes need to be investigated as this information is important for use in the planning and development of appropriate interventions. Maternal health outcomes may include the use of skilled health care during

pregnancy, birth, and after birth, which encompasses the use of skilled birth attendants and health facility-based delivery, no pregnancy and birth complications, reduced maternal smoking, reduced risk of pre-term birth, and infant mortality. Available literature has shown that male partner involvement has been significantly associated with decreased likelihoods of postpartum depression and childbirth complications (Yargawa & Leonardi-Bee, 2015), reduced maternal smoking, reduced risk of pre-term birth and infant mortality (Carter, 2002; Alio et al., 2013; Alio et al., 2011), delivery by a skilled birth attendant (Mangeni et al., 2013), and health facility-based delivery (Kalembo et al., 2013; Chattopadhyay, 2012; Tweheyo et al., 2010).

Methodological issues and recommendations for future research

The findings reported in this thesis are important for policymakers and health care workers working in the maternal, neonatal, and child health areas, particularly in the planning and development of interventions aimed at increasing the levels of male partner involvement in PMTCT programs in rural South Africa. However, there are some shortcomings as discussed below.

Firstly, the data utilized in this thesis was collected in a predominantly rural Mpumalanga province of South Africa. As such the findings may not necessarily be generalizable to other rural areas in other provinces of South Africa. This is mainly due to the cultural differences among the different ethnic groups in rural areas in the other provinces which could yield different results. For example, men in rural areas in the Eastern Cape or the North-West provinces might have different perceptions of male partner involvement in maternal health and related issues including PMTCT. Future studies should thus explore perceptions of male partner involvement in rural areas in other provinces.

Secondly, the quantitative data utilized in this thesis was collected from HIV positive women, and their male partners, who attended PMTCT services in public primary health care facilities in the Mpumalanga province of South Africa. As such, the quantitative results may not be generalizable to all HIV positive men and women in PMTCT programs elsewhere in South Africa.

Thirdly, the fact that secondary data was used in all the studies presented in this thesis has led to reliance only on what the data had to offer. The use of primary data would have been beneficial as a lot more factors (variables) that are relevant in these studies could have been investigated. For example, the data used in Chapter Four had some limitations and could not allow for statistical analyses for other important variables (delivery mode, place of delivery, alcohol use, and smoking) that the study aimed to investigate. In this regard, future studies should consider other important variables for investigation. In addition, other relevant variables such as pregnancy complications, birth complications, and place of delivery could have enriched the study had they been investigated.

Another methodological issue is the fact that men in the qualitative study in Chapter Two were not male partners of the HIV positive women in the other studies. That is, it would have been ideal to also explore the views of the male partners of HIV positive women in PMTCT programs. Still, the data gathered from men in this study was rich and the analyses yielded important information for use in the planning and development of interventions aimed at increasing the levels of male partner involvement in maternal health care (including PMTCT) programs in rural South Africa. Future studies should consider exploring the views of the male partners of HIV positive women.

Other methodological issues are accounted for in each of the individual studies reported in the Chapters, Two, Three, Four, Five, and Six.

Implications for the development of male partner involvement interventions in PMTCT programs

Men and women studied in this thesis lived in a predominantly rural area where they experience multi-dimensional issues in their everyday lives. Evidence-based interventions that deal with multi-dimensional issues faced by women and men in rural South Africa are thus required in this regard. The following range of issues needs to be considered in the planning and development of interventions aimed at increasing male partner involvement in PMTCT programs in rural South Africa:

(a) Promotion of positive attitudes towards male partner involvement in maternal and infant health care and PMTCT in the communities in rural Mpumalanga. This is even

more necessary among men and, to be specific, the male partners of HIV positive women.

(b) Particular focus should be on making PMTCT services in public health facilities to be more inviting and responsive to male partners by improving male partner accessibility and presence in health care facilities. This can be achieved through intervening at the health system level, including health care providers, as discussed in the discussion above.

(c) Male partner involvement should not be regarded as a single activity but rather as a set of activities that are culturally relevant to the setting. As a result, a composite measure or index of male partner involvement which also includes the meanings that men in rural South Africa identify with should be considered. For example, 'accompanying female partners to the clinic' was perceived to be another form of partner support by most men, even though they did not necessarily 'attend the antenatal care appointment'. The use of an index that only includes 'attend the antenatal care appointment' easily leaves out all those men who made an effort by 'accompanying their partners to the clinic' but could not 'attend the antenatal appointment' for different reasons. Male partner involvement intervention should thus encourage male partners to be involved in a variety of ways in PMTCT programs and not in a single activity.

(d) Male partner involvement interventions targeting couples in PMTCT programs should encourage mutual HIV testing and mutual disclosure of HIV status. Referral of HIV positive men and women to psychosocial support groups by healthcare providers can facilitate HIV status disclosure.

(e) Male partner involvement interventions should encourage good communication skills among intimate partners as a way that will also prevent partner violence or at least lead to reduced incidents of partner violence.

(f) Male partner involvement interventions should also be tailor-made to encourage positive maternal health outcomes, such as the use of skilled health care during pregnancy, birth, and after birth, which encompasses the use of skilled birth attendants and health facility-based delivery.

(g) To ensure that positive infant development outcomes are achieved, male partner involvement interventions should include encouragement of positive father-infant interactions/engagement by mothers and health-care providers.

Concluding remarks

Male partner involvement in PMTCT programs in rural South Africa is low due to various reasons and can be improved through appropriate interventions as suggested in the general discussion. For improved effectiveness of the PMTCT program, male partner involvement interventions should be developed taking into consideration all the other important information already mentioned above.

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Summary

Summary

Programs for prevention of mother-to-child transmission of HIV (PMTCT) in rural South Africa face multiple challenges and have thus been less effective compared to PMTCT programs in urban areas. Positive involvement of male partners in maternal and child health has been associated with positive maternal health and child health outcomes. In particular, positive involvement of male partners in PMTCT has been associated with positive PMTCT outcomes such as improved adherence to HIV medication, antenatal care visits and postpartum infant care visits. Male partner involvement in PMTCT during antenatal and postnatal care plays a significant role in the effectiveness of programs for PMTCT and as such has been promoted as one of the strategies to improve adherence to PMTCT interventions in South Africa. It has thus been essential to systematically explore male partner involvement in PMTCT programs during prenatal and postnatal phases in rural South Africa.

Chapter One provides a general introduction to the thesis. Literature has been reviewed with regards to the different aspects of male partner involvement in maternal health, infant health, and PMTCT. That is, the background and importance of male partner involvement, ways in which it has been defined and measured, its determinants, barriers, and the theories that served as helpful frameworks in understanding and explaining male partner involvement in the thesis have been reviewed. An outline of all the studies reported in the thesis is given.

Chapter Two presents a study that explored the perceptions of male partner involvement among men in rural South Africa. Findings indicated that perceptions of male roles during and after pregnancy differed among men. Male involvement was understood as giving instrumental support to female partners through financial help, helping out with physical tasks, and providing emotional support. Accompanying female partners to the clinic was also viewed as partner support, including behaviors such as holding a spot for her in the clinic queues. Community attitudes, traditional beliefs, and negative experiences in health facilities were barriers for male partner involvement. This study provides support for concerted efforts to work with both men and women within the cultural context to explore the important roles of all members of the family in working together to provide the best possible health outcomes for mothers and infants. In particular, future interventions should

focus on making antenatal care services more responsive to male partners, and improving male partner accessibility in health care facilities.

Chapter Three describes a study that investigated the prevalence and determinants of male partner involvement in PMTCT in a sample of male partners to HIV-infected pregnant women in rural South Africa. Results indicated that 44.1% of male partners reported involvement in most or all specified PMTCT activities. Descriptive, correlation and multiple linear-regression analyses were conducted. Positive predictors of male partner involvement included relationship status, own HIV status, awareness of female partner's positive HIV status, female partner's desire to have more children, having family planning discussions with provider, condom use to prevent HIV and sexually transmitted infections, and partner reasoning skills. Negative predictors included partner verbal aggression. The study highlighted the low levels of male partner involvement in rural South Africa and also underlines important information that could be used to enhance interventions aimed at improving maternal and infant health in PMTCT programs in South Africa.

Chapter Four presents a study aimed at investigating the association between male partner involvement, as well as male partner participation (MPP = actual co-enrolment of male partner with female partner in the main study) and maternal health outcomes among women attending PMTCT services in rural South Africa. Maternal health outcome data (delivery mode, systolic and diastolic blood pressure, body mass index, CD4 count and viral load) were collected. Results from bivariate and multivariable logistic regression models indicated no significant associations between male partner involvement and any of the maternal health outcomes contrary to what was hypothesized. Both the bivariate and multivariate analysis indicated a significant association between MPP and higher viral load. Insignificant association was found between MPP and CD4 count and, MPP and blood pressure. The only significant association between maternal health outcomes and socio-demographic characteristics, was between educational attainment and higher CD4 count in both the bivariate and multivariate analysis. In conclusion, the study showed no significant support for male partner involvement in improving maternal health outcomes (under investigation) of women in PMTCT in rural South Africa, and calls for future studies to include more other maternal health outcomes for investigation.

Chapter Five presents a study that examined the influence of male partner involvement during and after pregnancy on cognitive, communicative, fine and gross motor development in infants born to HIV seropositive mothers attending PMTCT services in rural South Africa. Results indicated that the prevalence of prenatal and postnatal male partner involvement reported by women in this study was just above average while the prevalence of risk and emerging risk of developmental delays among infants in this study was hypothetically high. Furthermore, lack of postnatal male partner involvement was significantly associated with risk for delayed cognitive development in HIV exposed infants, while postnatal male partner involvement was associated with delayed gross motor development. Not living together with a male partner was significantly associated with risk for delayed cognitive development in in HIV exposed infants. This study provides evidence that increased male partner involvement can have positive influence on cognitive infant development. This study draws special attention to the fact that interventions in PMTCT programs should promote increased prenatal and postnatal male partner involvement with the aim of improving cognitive development in HIV exposed infants.

Chapter Six presents a study that aimed to assess the prevalence of prenatal and postnatal intimate partner violence (IPV), and its time-invariant and time-varying predictors, among women attending PMTCT services in rural South Africa. This study utilized data collected in a randomized-controlled trial. Intimate Partner Violence (IPV) was assessed at four time-points using the Conflict Tactics Scale. The results of this study highlights the high levels of IPV experienced by HIV infected women during pregnancy and in the first year after childbirth. Time-invariant predictors and time-varying predictors of physical IPV and psychological IPV were individual, social, and behavioural factors. The study demonstrates that multi-dimensional evidence-based interventions are needed to deal with the high levels of prenatal and postnatal IPV experienced by women living with HIV in rural South Africa. These interventions should promote screening for IPV among women living with HIV and access to appropriate interventions and also target their male partners.

Chapter Seven, a concluding chapter, rounds up the main findings by putting them into perspective. This thesis provides insights for improved effectiveness of PMTCT programs in rural South Africa through positive male partner involvement in PMTCT. This chapter reflects on methodological issues while also making recommendations for future research. Implications

for the development of interventions aimed at improving male partner involvement are also outlined.

Valorisation

Valorisation

Positive male partner involvement in maternal and child health and prevention of mother-to-child transmission of HIV (PMTCT) has an important social value as it promotes healthy families ultimately contributing to healthy families and a healthy society. The work in this thesis provides support for concerted efforts to work with both men and women within the South African context, to explore the important roles of all members of the family, in working together to provide the best possible health outcomes for mothers and infants.

Furthermore, while this thesis emphasises the importance and benefits of positive male partner involvement in maternal and infant health including PMTCT, it also highlights the influences of male partner involvement on the health of mothers and infants in PMTCT programs. The opportunities for involving men in this regard are also highlighted. This information is vital for future use by policymakers and health care providers working in the maternal, new-born and child health areas, particularly in PMTCT programs in rural South Africa.

Future interventions aimed at promoting positive male partner involvement in the health of mothers and infants in PMTCT programs should involve health care providers, mothers, and most importantly men as the agents. While health care providers have an opportunity during clinic visits to encourage positive involvement of fathers in maternal and infant health, mothers have many opportunities to do this.

Men as agents in promoting positive involvement of male partners in maternal, infant, and child health is vital and may be approached in different ways. Initiatives to engage men in community and clinic settings, and also engage boys and men of all ages should be identified. Initiatives may build on the already existing initiatives in South Africa such as the 'Take a boy child to work' initiative that was established as a campaign against the neglect of young men in society, and the previous 'Men as Partners' program in South Africa which aimed to promote men's constructive role in sexual and reproductive health, including HIV/AIDS.

A range of issues needs to be considered in the planning and development of interventions aimed at increasing male partner involvement in PMTCT programs in rural South Africa.

Firstly, promotion of positive attitudes towards male partner involvement in maternal and infant health and PMTCT in the communities in rural South Africa. This is even more necessary among men and, to be specific, the male partners of HIV positive women. Particular focus should be on making PMTCT services in public health facilities to be more inviting and responsive to male partners and improving male partner accessibility to these facilities. Male partner involvement interventions should encourage good communication skills among intimate partners. To achieve positive maternal and infant health outcomes male partner involvement interventions should also be tailor-made to achieve these.

The active engagement of men in the health of mothers and infants in PMTCT programs is thus important due to its contribution to healthy families, healthy communities, and a healthy society.

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About the Author

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