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EXPLORING THE EFFECTS OF INTIMATE PARTNER VIOLENCE ON PREVENTION OF MOTHER-TO-CHILD TRANSMISSION SERVICE UPTAKE: A NESTED COHORT STUDY

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Doctor of Philosophy

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24 May 2017

DECLARATION

This thesis is submitted in the optional format, approved by the Faculty of Health Sciences, of published work with an encompassing introduction and conclusion.

I, Abigail M. Hatcher, student number 793922, declare that this thesis is my original work. It is being submitted for the degree of Doctor of Philosophy in Public Health in the Faculty of Health Sciences of the University of the Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any degree or examination at this or any other university.

I have read the sections on referencing and plagiarism in the WITS Plagiarism Policy. I am aware that the plagiarism is wrong and that the University of the Witwatersrand may take disciplinary action should plagiarism be found in this work. I have followed the required conventions in referencing the thoughts and ideas of others. I confirm that all of the work submitted in this thesis is my own unaided work except where I have explicitly indicated otherwise.

Signature: 
Name: Abigail M Hatcher
Date: 24 May 2017

DEDICATION

I dedicate this work to my husband, who continually supported my efforts and made it possible to complete the work in advance of our first child's arrival.

I also dedicate this doctoral research to my mother, for her tireless commitment to furthering herself academically and for serving as a touchstone throughout my own PhD journey.

And to the women in my life who have experienced intimate partner violence and found ways to navigate its ill effects: I salute your strength and believe that one day, perhaps even in our own lifetimes, this will be seen for the persistent but preventable challenge that it is.

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The Safe & Sound team has been integral to the entire development and implementation of this doctoral research. I thank Nataly Woollett for consistent support around the clinical, ethical, personal and often political challenges of conducting this type of research. I am grateful to Lele Aletta van Eck, Shirley Ramaite Mphahlele, Charlotte Checha, Zanele Mlambo, Pirilani Banda, Marcia Magkatle, Moleboheng Mokoatle, Tembeki Mnisi, Ahmed Goolam, Cleopas Hwinya, and Annah Mabundah for their contributions to the research and their support as colleagues. I thank Keneoue Mokoatle and Bulelwa Ngoma for their dedication to the initial formative research.

Wits Reproductive Health & HIV Institute was the home for the parent study, Safe & Sound Trial, and allowed me to access study data during my time of employment and afterwards.

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ABSTRACT

Introduction: Prevention of mother-to-child transmission (PMTCT) has potential to eliminate new HIV infections among infants. Yet, in many settings in sub-Saharan Africa, women are unable to adhere to PMTCT recommendations due to social constraints. One such factor may be intimate partner violence (IPV), or any actions taken by a relationship partner that cause physical, sexual, or psychological harm. Despite theoretical and empirical rationale for understanding the links between IPV and PMTCT adherence, few studies in the extant literature have explored this association.

Methods: This thesis draws upon four distinct studies that interface using an overall mixed method study design. The first study is a systematic review of the literature around women's experience of lifetime IPV and adherence to anti-retroviral treatment (ART). The second study is formative qualitative research with pregnant women, health workers, and other local stakeholders that explores how IPV may be related to PMTCT in the urban Johannesburg setting. The third study is a deeper qualitative examination of women living with both IPV and HIV, aiming to understand the mechanisms that link partner violence to PMTCT behaviors using a social constructionist lens. The final study is a quantitative cohort study nested within a randomized control trial testing an intervention for IPV in pregnancy. Using regression techniques and structural equation modeling, I aim to determine the association between IPV and ART adherence in pregnancy and postpartum and identify pathways that mediate the relationship between partner violence and PMTCT.

Results: This doctoral research contributes several new findings to the extant literature around PMTCT. I find that IPV is related to ART adherence among HIV-positive women in extant literature, with meta-analysis showing significantly worse odds of ART uptake, self-reported adherence, and viral suppression among women reporting lifetime IPV. In one of first of studies among women in sub-Saharan Africa, I learn that impact of IPV on ART adherence in pregnancy and postpartum is marked. I identify several mechanisms through which IPV influences PMTCT adherence. Mental health emerges as a robust pathway linking IPV to worse adherence in both qualitative and quantitative papers. Partner non-disclosure due to IPV can impede adherence, or women can navigate this challenge through hiding their HIV status or medication. Women experiencing IPV may attend fewer antenatal clinic visits, leading to worsened adherence. An unexpected finding was that women in our qualitative and quantitative studies were resilient and used strategies to adhere despite IPV. Motherhood seems to be a central feature of women who are resilient to the effects of IPV on adherence.

Conclusion: The findings of this research have implications for research, policy, and practice. Research should incorporate social factors, such as IPV, into future studies testing PMTCT adherence interventions. Clinical practice and HIV programs should recognize that partner-level dynamics such as IPV may drive persistent gaps in PMTCT coverage. HIV policy urgently needs to incorporate ethical and safety considerations for women who experience IPV around the time of pregnancy. Women living with recent or past IPV are highly resilient and often want to protect their own health and that of their children. Only by recognizing and addressing their experience within the context of HIV care can future PMTCT programs and studies ensure maternal and infant health.

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Chapter 1. Introduction

Photo credit: Fhatawani Tshikororo, Local stakeholders introducing themselves during the Safe & Sound launch event.

A. Background

There is potential for antiretroviral treatment (ART) to improve maternal health and reduce HIV infection among infants to as low as 1% (Lehman et al., 2009; Mofenson, 2010b). However, new infant HIV infections continue to occur throughout sub-Saharan Africa (UNAIDS, 2016a). Successful prevention of mother-to-child HIV transmission (PMTCT) requires a complex series of health behaviors throughout pregnancy and after birth, and only a small portion of women complete what is called the "PMTCT cascade" (Padian et al., 2011).

There are many reasons for challenges in PMTCT adherence, including stigma (Turan & Nyblade, 2013; Watts et al., 2010), substance use (Nachega et al., 2012), poverty (Mepham et al., 2011), clinic waiting times and transport costs (Bwirire et al., 2008), and weak health systems (Luo et al., 2007; Pai & Klein, 2009). Another key driver of drop-offs in the PMTCT cascade may be fears and experiences of intimate partner violence (IPV). IPV is experienced by 30% of women globally, and poses immense cost to human rights, health, and economies across the world (Devries et al., 2013b).

B. Justification for the Research

Over the past two decades, research has shown increasingly strong links between IPV and HIV. Early on, researchers theorized that a similar risk environment heightens women's IPV risk and increases HIV acquisition (Maman et al., 2000). Empirical research has since shown that HIV-positive women have higher odds of experiencing IPV than HIV-negative counterparts (McDonnell et al., 2003; Ntaganira et al., 2008; Were et al., 2011). Even when adjusting for other key predictors, such as sexual behavior, women who report IPV are more likely to be HIV-positive (Dude, 2011; Dunkle et al., 2004b; Fonck et al., 2005; Kayibanda et al., 2012; Maman et al., 2002; Silverman et al., 2008). The robust cross-sectional associations between IPV and HIV are consistent in studies among pregnant women (Shamu et al., 2011). More importantly, the association has been confirmed in longitudinal studies that show IPV to be associated with incident HIV infection (Decker et al., 2009; Jewkes et al., 2010; Kouyoumdjian et al., 2013). In a systematic review of the literature, Li *et al.* pooled extant longitudinal data to show that women have 28% increased risk of incident HIV infection if they experienced IPV (2014).

Despite confirmation that IPV is related to incident HIV infection, much less is known about the effect of IPV on health of women already living with HIV. Preliminary evidence from exploratory studies suggests IPV leads to worse HIV-related health outcomes for women, including: lower CD-4 counts (Jewkes et al., 2015; Schafer et al., 2012), greater incidence of

opportunistic infection (Liebschutz et al., 2000; Nava et al., 2011), detectable viral loads (Nava et al., 2011; Schafer et al., 2012), and greater risk of mortality (Weber et al., 2012). Yet, most of these studies have been conducted with small samples in the United States (U.S.) and few have included pregnant women.

Understanding the relationship between IPV and HIV behaviors in South Africa is critical, given the high prevalence of both IPV and HIV in this setting. An estimated 25 – 35% of South African pregnant women report experiencing recent physical or sexual IPV (Groves et al., 2012; Hoque et al., 2009; Mbokota & Moodley, 2003). Similarly, antenatal HIV prevalence across South Africa is high, with estimates in Johannesburg reaching 29% (Wabiri et al., 2016).

C. Key Concepts

Intimate partner violence

The World Health Organization (2010, p.3) defines IPV as any "behavior within an intimate relationship that causes physical, sexual, or psychological harm, including acts of physical aggression, sexual coercion, psychological abuse and controlling behaviors". IPV is one type of "violence against women" which includes many forms of gender-based violence such as: non-partner sexual violence, forced sexual initiation, female genital mutilation, honor killings, and human trafficking (UN General Assembly, 2016). I use the term "IPV" instead of other terms used in the literature ("domestic violence," "family violence", "partner abuse", "wife beating", etc.) because it is a precise term that denotes the perpetrator and the cause of the health problem. IPV comprises multiple forms of violence caused by an intimate partner:

- *Physical IPV* is defined by the U.S. Centers for Disease Control as physical force by an intimate partner with the potential for causing death, disability, injury, or harm (Breiding et al., 2015). In practice, this includes forms of physical harm such as hitting, kicking, pushing, shoving, choking, pulling hair, or burning.
- *Sexual IPV* is defined by the WHO (2014) as any sexual act "using coercion… or rape, defined as the physically forced or otherwise coerced penetration of the vulva or anus with a penis, other body part or object".
- *Psychological IPV* includes incidents when a partner insults, belittles, intimidates, or humiliates a woman (Heise & Garcia Moreno, 2002). An important refinement of the understanding of psychological IPV is the addition of financial abuse, or the control of assets or economic earning potential as a strategy of power and control (Adams et al., 2008). Longitudinal research from the U.S. suggests that physical and psychological IPV is correlated with episodes of financial abuse (Postmus et al., 2012).

- *Controlling behaviors* are related but distinct from these other forms of IPV. These can include isolating a woman from family or friends, monitoring movements, or limiting her access to health services (WHO, 2012).

New Child HIV Infections

In 2011, an estimated 330,000 children became newly infected globally, primarily due to vertical transmission (UNAIDS, 2012). When mothers are not given access to essential PMTCT services, the rate of HIV transmission to infants is estimated to be 25-40% (De Cock et al., 2000). In the absence of treatment, an infant infected through vertical transmission of HIV is unlikely to live past five months (Marston et al., 2011). HIV transmission can occur at multiple timepoints around the time of pregnancy, including during gestation, during delivery, or through breastfeeding in the postpartum phase (Fowler et al., 2010).

HIV has also been identified as a leading cause of maternal mortality in South Africa (Kruger & Bhagwanjee, 2003; Moodley et al., 2011; Moran & Moodley, 2012; Ramogale et al., 2007) and elsewhere (Abdool-Karim et al., 2010; Gorman, 2013; Graham & Newell, 1999). This extraordinary burden of disease led the Joint United Nations Programme on HIV/AIDS (UNAIDS) to call for a 90% reduction of mother-to-child transmission (MTCT) and a halving of maternal HIV-related deaths by 2015 (UNAIDS, 2011). Since the launch of the 2011 UNAIDS Global Plan, considerable progress has been made. In 21 priority countries over the 2009-2014 period, rates of new HIV infections among children declined by 48% (UNAIDS, 2016a). However, MTCT still occurs among 14% of mother-infant dyads, with the majority of new infections occurring during the breastfeeding phase (UNAIDS, 2016a). Of infants and children living with HIV, the majority (an estimated 94%) live in Sub-Saharan Africa (Mofenson, 2010a).

The PMTCT Cascade

Effective PMTCT requires women to access a number of steps (Fig. 1). Because only a proportion of women reach each subsequent step, this process is termed the "PMTCT cascade", with women dropping out along the pathway to full PMTCT coverage (Stringer et al., 2010).

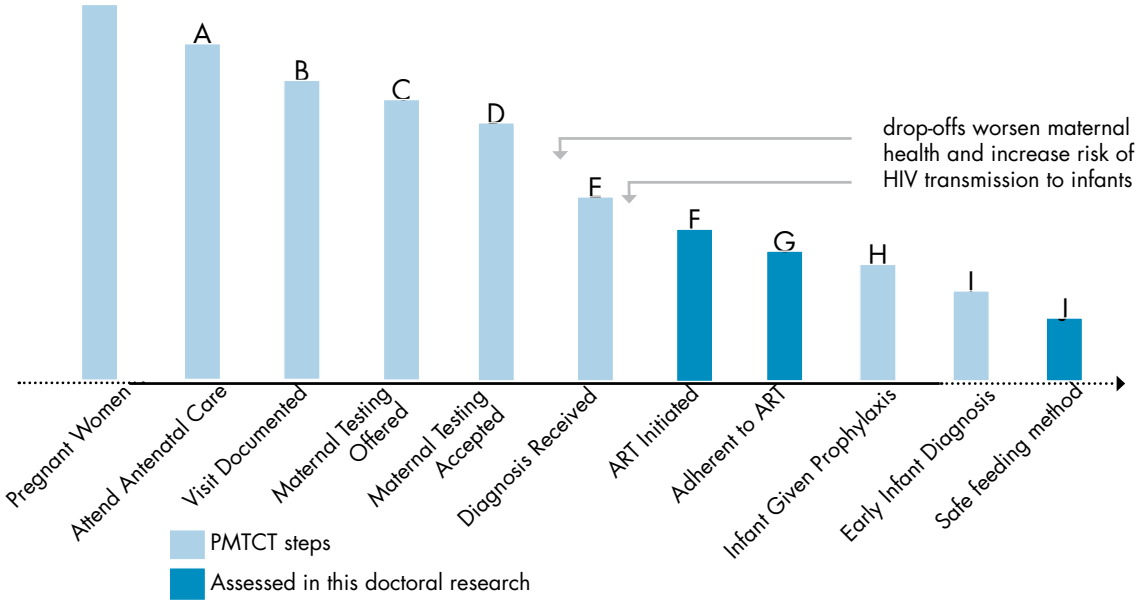


Figure 1 PMTCT Cascade

Navigating the PMTCT cascade begins with a woman attending antenatal care and accessing HIV testing. For those testing HIV-positive in the antenatal setting, initiation of ART must occur. To protect the fetus from vertical transmission, the woman must adhere to ART and use safe feeding practices until the time of cessation of breastfeed. To ensure her infant is able to obtain medication, in the case of infant HIV infection, the mother should access "early infant diagnosis" – a term for HIV testing that generally occurs at 6 weeks postpartum and at least once more after breastfeeding cessation. Missing any single step of the PMTCT cascade can lead to 8 to 20-fold increases in HIV transmission to the infant (Becquet et al., 2009; Brocklehurst, 2002; Watts et al., 2010).

An important shift in global PMTCT policy has been the move towards a programmatic approach called Option B+. This clinical protocol advises that HIV programmes immediately start lifelong ART treatment for mothers testing HIV-positive during antenatal care. It was initiated by Malawi as a strategy to ensure rapid ART initiation without the need for timely CD-4 testing (Schouten et al., 2011). In essence, most settings had an extra PMTCT step that lay between E and F in Figure 1 – requiring women to CD-4 test in advance of starting ART, with only those women with a low CD-4 count ($\leq$ 350 cells/µL) eligible to start treatment. In a systematic review, this single CD-4 testing step was associated with losses to follow-up for one-third of PMTCT patients (Wettstein et al., 2012), creating considerable pragmatic rationale for skipping it altogether. There are also important benefits in starting lifelong treatment regardless of CD-4 count, as the woman's morbidity and mortality declines and a discordant male partner is less likely to contract HIV during the perinatal phase (Cohen et al., 2011; Hargrove et al., 2010).

The PMTCT Cascade in South Africa

South Africa has made significant strides towards reducing mother-to-child transmission from 14% in 2009 to an estimated 4.3% in 2016 (Goga et al., 2016). However, these numbers underestimate HIV transmission because they exclude those infants who die before 6 weeks. A stronger estimate is "MTCT or death", or the idea that an infant either acquires HIV or dies, a joint measure estimated to be 6.2% (Goga et al., 2016). Indeed, few studies accurately measure utilization of PMTCT interventions because program data is often comprised of simple tallies rather than following mother-infant pairs throughout the cascade (Mate et al., 2009; Stringer et al., 2008). In one four-country study following 27 938 women through the entire cascade, an estimated 54% of South African pregnant women complete all steps (Stringer et al., 2010). Only 13.6% of 446 mother-infant pairs in South Africa received all recommended PMTCT interventions (Dramowski et al., 2011).

National program data suggests that an estimated 83% of eligible South African pregnant women are receiving ART for their own health (WHO et al., 2013). Yet, studies using routine clinic data present a more pessimistic picture. In Johannesburg clinics, for example, only 65% of 300 pregnant women eligible for ART actually initiated treatment before delivery (Clouse et al., 2013b). In another Johannesburg clinical sample, only 21% of 72 eligible women initiated ART within 60 days of learning their HIV serostatus (Schnippel et al., 2015). After giving birth, 49% of 358 Cape Town patients initiating ART in pregnancy were lost to follow-up or missed a postpartum ART visit (Phillips et al., 2014). Moreover, only 25% of infants in a Johannesburg study of 289 mother-infant pairs received adequate protection during breastfeeding (Technau et al., 2014), a phase when absence of maternal ART or infant prophylaxis results in considerable risk of MTCT (Bulterys et al., 2010). Early infant diagnosis is crucial for ensuring infants with HIV access immediate treatment. While national program data suggests the current coverage of early infant diagnosis across South Africa may be as high as 88% (WHO et al., 2013), only 55% of HIV-exposed infants in a national representative South Africa study of 9 803 infants had HIV testing documented on their clinic record (Woldesenbet et al., 2015).

These numbers suggest an urgent need to better understand the PMTCT cascade and to identify important drivers of HIV-positive women's ability to adhere to ART around the perinatal phase.

D. Overall Aim and Specific Objectives

The overall aim of the doctoral research is: **To explore how IPV influences adherence to prevention of mother-to-child (PMTCT) services.** I studied ART adherence in HIV-positive, pregnant and postpartum women who were and were not experiencing IPV by nesting research within an ongoing trial around IPV in pregnancy. The mixed method research was designed to achieve the following specific objectives:

Objective 1. To investigate the effect of IPV on ART adherence in the extant literature.
Objective 2. To explore mechanisms through which IPV may impact ART adherence in pregnancy and postpartum.
Objective 3. To determine the association between IPV and self-reported ART adherence in pregnancy and postpartum.

Together, the PhD aimed to bolster the evidence base with additional data around IPV and ART adherence among HIV-positive pregnant and postpartum women. The long-term goal of this doctoral work is to influence HIV programs to address IPV, particularly when targeting pregnant women in resource-constrained settings.

E. Organization of the Thesis

Following this introduction in **Chapter 1, Chapter 2** presents a conceptual framework for understanding PMTCT within a broader social and structural context. I examine evidence around IPV prevalence and health impacts. Next, I detail the extant knowledge around how IPV is related to HIV and explore what is known about how IPV may impact PMTCT behaviors specifically. Lastly, I highlight gaps in the literature to set the stage for how this doctoral research can inform the field.

Chapter 3 describes the methodology for this doctoral research. In particular, four papers presented in this thesis are described. Since the thesis is a mixed method study, I demonstrate how the qualitative and quantitative components of the study interacted to create a cohesive answer to a single area of research inquiry.

Chapters 4-8 comprise three peer-reviewed publications and a final manuscript for future submission that serve as the results section of the thesis:

Chapter 4 is a systematic review of 13 studies that examine the relationship between IPV and ART adherence and related health behaviors among women. Along with PhD Supervisors and a Masters Student that I mentored, we show a robust association between women's lifetime

experience of IPV and worse HIV treatment adherence. Meta-analytic techniques allow us to compare association between IPV and HIV outcomes across studies. Meta-analysis suggests that IPV worsens ART uptake, adherence, and viral suppression.

Chapter 5 contains a manuscript exploring the relationship between IPV and HIV outcomes in a formative, qualitative study of pregnant women and key informants, such as health workers and representatives of non-governmental organizations. We identify multiple pathways that appear to link women's experience of IPV with HIV behaviors and HIV-related health. These pathways include mental health, relationship control, and partner disclosure. However, because the sample comprises only five women living with IPV, this paper formed only a preliminary understanding of these phenomena.

Chapter 6 is a deeper qualitative exploration of how IPV intersects with PMTCT in the lives of pregnant and postpartum women. We interviewed 32 women living with HIV and experiencing recent or lifetime IPV. Women expressed how IPV worsened mental health and partner disclosure, both of which inhibited their ability to adhere to treatment and recommended PMTCT care. However, there were also many women who stayed committed to PMTCT despite experiencing IPV, suggesting that resilience strategies like focusing on the motherhood identity can be protective.

Chapter 7 examines quantitative data from a cohort of 265 women recruited during their antenatal care and followed up to 24 weeks postpartum. We learn that a large proportion of women with and without IPV are adherent to ART, but that IPV intensity predicts lower odds of adherence. The negative relationship between IPV and adherence seems to hold in both pregnancy and postpartum. Using structural equation modeling, we learn that mental health is a key mechanism through which IPV worsens ART adherence.

Chapter 8 synthesizes the key findings of the doctoral research in light of extant literature. Using a mixed method approach, findings from across the four papers are integrated in this interpretive step. I also point out specific ways the research can inform future interventions and suggest potential policy implications. I consider how these data contribute to theory and note next steps for research.

Chapter 9 summarizes key recommendations for policy, research, clinical practice, and theory. These recommendations are based on the evidence gaps filled by this thesis. In this chapter, I conclude by reiterating the challenges to infant and maternal health in settings where women are unable to safely adhere to PMTCT. I summarize how IPV may influence women's efforts to adhere to PMTCT steps and call for IPV to be better incorporated in HIV health services.



Chapter 2. Literature Review

Photo credit: Abigail Hatcher, Queue for receiving antenatal care at a Safe & Sound clinic.

This literature review will synthesize current knowledge around PMTCT and IPV in pregnancy. Prevalence data are presented from a global perspective and then from sub-Saharan African literature. Next, I present the growing evidence base around the links between IPV and HIV acquisition and treatment outcomes. I then review the existing knowledge around how IPV may influence PMTCT uptake – examining quantitative and qualitative studies, theoretical associations, and plausible pathways. Lastly, I highlight gaps in the evidence base and suggest how this doctoral research may answer research questions that remain unaddressed in extant literature.

A. Conceptual Framework

Theoretical Perspectives on PMTCT

PMTCT literature to date has largely been informed by biomedical research paradigms that position health behaviors as individual actions by passive healthcare recipients (Betancourt et al., 2010). Because PMTCT research often draws from individual-level theory, it often fails to embrace key social and structural factors that effect women's health choices (Busza et al., 2012; Hampanda, 2012; Phillips & Pirkle, 2011).

In order to overcome this gap in theory around PMTCT, my research synthesizes several existing theories from the health care. One underlying theory is Andersen's Behavioral Model of Health Services Utilization (Andersen, 1995). The Behavioral Model posits that health care utilization is framed by multiple aspects of an individual's life: the initial predisposition for people to uptake health care, factors that enable or hinder health care uptake, and a person's perceived need for care (Andersen, 1995). Gelberg and Andersen adapted the Behavioral Model for vulnerable populations to understand the use of health services and health outcomes among marginalized groups (Gelberg et al., 2000). The main insight of the Behavioral Model for Vulnerable Populations is that individuals who are marginalized (such as homeless, poor, substance users, or mentally ill) may have different needs and access to resources than the general population (Stein et al., 2007). A potential shortcoming of the Behavioral Model for Vulnerable Populations is that it lumps all considerations around health care utilization into the broad categories of "predisposing" and "enabling" factors. This 'long-list' approach limits our ability to tease out various important constructs or to understand how drivers work together to inhibit health care utilization.

To address this shortcoming, I adapted the Behavioral Model using the Socio-Ecological Framework (Figure 2). The socio-ecological framework is an organizing principle that is often

used to denote various levels of factors that influence health: structural, institutional, relationship, and individual. A socio-ecological approach acknowledges factors outside the individual patient influence HIV-related health (Montgomery et al., 2012), and is widely used in IPV research because it incorporates many complex factors that influence partner violence (Heise & Fulu, 2014; WHO, 2010). Similarly, scholars have framed PMTCT using a socio-ecological model, in recognition that PMTCT health behaviors can be influenced at multiple "levels" of the individual, their family, and their society (Busza et al., 2012; Gourlay et al., 2013b; Wingood et al., 2013b). The socio-ecological model suggests that "individual" factors are the personal characteristics or behaviors that impact one's health. "Relationship" factors are the dyadic partnership issues that frame health outcomes. "Institutional" factors include the clinic characteristics that either facilitate or hinder health care utilization. "Structural" refers to the broader social or community factors that impact on health. This lens recognises that similar structural factors underpin both IPV and HIV (Maman et al., 2000) and that broader social and societal factors shape how women are able to adhere to ART (Hirsch, 2007).

The dyadic nature of our adapted framework extends beyond a traditional socio-ecological model to detail particular relationship contexts that frame IPV experiences and, ultimately, HIV outcomes (Montgomery et al., 2012). Based on extant literature, I theorize that intimate relationships in particular frame the ways that IPV may impact PMTCT uptake among pregnant and postpartum women. Literature suggests that partner dynamics influence HIV prevention and treatment adherence (Burton et al., 2010; Higgins et al., 2014), as well as experience of IPV (Conroy, 2014). Given the strong bidirectional links between IPV and HIV (Colombini et al., 2016; Gielen et al., 1997; Jewkes et al., 2010; Kouyoumdjian et al., 2013; Maman et al., 2016; Mulrenan et al., 2015b; Shamu et al., 2014), it is appropriate to view both conditions as mutually-reinforcing, dyadic drivers of PMTCT.

One theory that underpins this dyadic view of PMTCT is the theory of gender and power (Connell, 1985), which postulates that unequal power dynamics limit the ability of women to exercise personal control in relationships (Amaro & Raj, 2000). The theory highlights that gender power inequities in society limit women's ability to enact safe and equitable forms of sexuality (Connell, 1987; Wingood & DiClemente, 2000b). For understanding PMTCT, this means that women may have less control over choices like whether to use condoms, where to give birth, or how to adhere to HIV medications (Hampanda, 2012). Empirically, this has been demonstrated through the Sexual Relationship Power Scale (SRPS), a validated measure based on the theory of gender and power (Pulerwitz et al., 2000). Women who have less power in relationships as assessed by SRPS have higher rates of HIV (Bermudez et al., 2010; Dunkle et al., 2004a; Hahm

et al., 2012; Wingood & DiClemente, 2000a; Wingood et al., 2000) and IPV (Filson et al., 2010), but this measure has yet to be applied to PMTCT.

Because HIV in pregnancy has health implications for the infant, my theoretical model also incorporates the intergenerational aspects of IPV and HIV. When women are unable to adhere to PMTCT, the risk of transmission of HIV to the infant is increased (Cooper et al., 2002). Infants born to mothers who report IPV in pregnancy are more likely to have low birth weight, frequent illness, or not survive (Alio et al., 2009b; Hill et al., 2016; Karamagi et al., 2007a). In order to achieve global goals to improve maternal and child health, programs should account for IPV as a cause of morbidity and mortality among women and their infants.

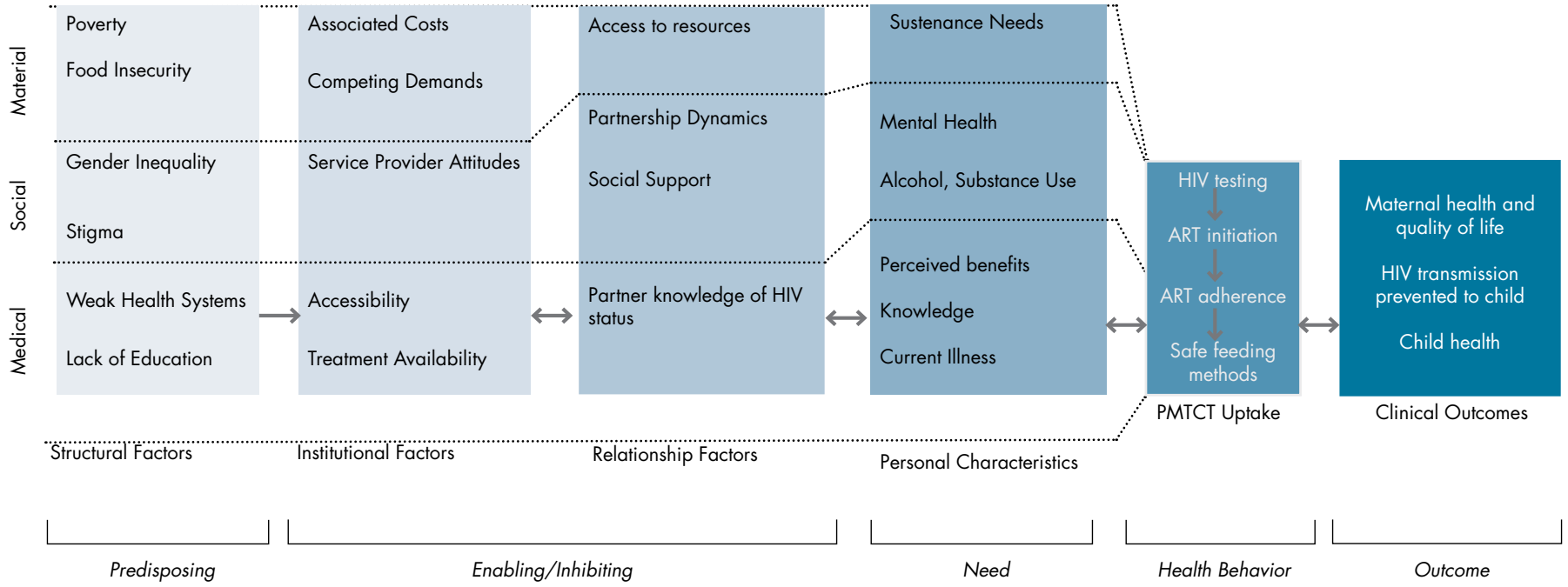


Figure 2. Conceptual Framework (adapted from Andersen's Behavioral Model of Health Care Utilization)

Factors Associated with PMTCT Uptake and Retention/adherence

There may be many reasons that women find it challenging to maintain PMTCT. Drawing upon sub-Saharan African literature on PMTCT uptake and adherence, I argue that health care utilization for an HIV-positive woman in the perinatal phase is influenced by multiple socio-ecological considerations.

Structural Factors

Structural factors include those broader societal conditions that frame health care utilization. Structural drivers of health care are defined in different ways, but most scholars agree that this category comprises policy, social, and cultural conditions. In the case of PMTCT behaviors, structural drivers include material constraints that make it challenging for women to adhere to medication and clinic visits. For example, PMTCT seems to be influenced by poverty (Jones et al., 2005; Mepham et al., 2011) and food insecurity (Awiti Ujiji et al., 2011; Kirsten et al., 2011) since women have competing demands that may take precedence over PMTCT behaviors. Gender inequality frames women's access to PMTCT services, either because women have disproportionately less education around PMTCT or because they cannot access permission or financial resources required to attend clinic (Ghanotakis et al., 2012; Lubega et al., 2013; Maman et al., 2001; Ngarina et al., 2015). HIV-related stigma is a structural factor that has increasingly been noted to influence PMTCT in multiple sub-Saharan African settings (Bond et al., 2002; Bwirire et al., 2008; Mepham et al., 2011; Turan et al., 2011; Turan & Nyblade, 2013; Watts et al., 2010). Weak health systems, particularly in resource-constrained settings, also drive PMTCT behaviors (Barker et al., 2011; Luo et al., 2007; Pai & Klein, 2009). Lack of education has been noted as a barrier to PMTCT in some settings (Ayuo et al., 2013; Delvaux et al., 2009; Kuonza et al., 2010), although it is generally examined at the level of the individual woman rather than at the structure level.

Institutional Factors

Much of the PMTCT literature to date has focused on understanding and ameliorating institutional factors, or the clinic-level considerations around health care utilization. For example, negative attitudes on the part of health service providers has been noted as a barrier to PMTCT both during pregnancy and postpartum (Duff et al., 2010; Stinson & Myer, 2012; Varga & Brookes, 2008). This can include direct verbal abuse from health providers or patient perceptions that health workers may not maintain confidentiality (Chinkonde et al., 2009; O'Gorman et al.,

2010). Related, but distinct, from provider attitudes is the skill required to communicate complex health messages. Provider ability to clearly communicate the steps required in PMTCT – especially as global guidelines are rapidly shifting – is a barrier to patient engagement (Ferguson et al., 2012; Kirsten et al., 2011; Watson-Jones et al., 2012).

Competing demands frame the economic concerns around attending the health facility at the time of PMTCT. Although many countries offer PMTCT services at no charge, transport costs to the facility can reduce adherence and retention in care (Bwirire et al., 2008; Duff et al., 2010; Kirsten et al., 2011). Distance to the clinic can also serve as an institutional barrier to PMTCT (Chinkonde et al., 2009; Duff et al., 2010; Kiarie et al., 2003; Painter et al., 2004). Stock outs and missing test kits can preclude staff from offering HIV testing (Kinuthia et al., 2011). When clinics are few or far apart, this can also be viewed as a structural barrier to PMTCT, since it indicates a weak health system with inadequate geographical coverage. Long clinic waiting times are another barrier (Chinkonde et al., 2009; Duff et al., 2010; Painter et al., 2004; Theilgaard et al., 2011; Winestone et al., 2012), which similarly may be driven by weak health systems.

Relationship Factors

Relationship factors have begun to receive attention in the PMTCT literature. These are conceptualized as including relationships with partners, extended family, and with children. Gender inequalities around accessing household resources can make women's PMTCT decisions dependent on family dynamics (O'Gorman et al., 2010).

Partnership dynamics are a newer addition to PMTCT literature, but multiple aspects of intimate partnerships seem to influence health behaviors. Women who do not have a partner seem to have more control over PMTCT decisions (Eide et al., 2006). While the involvement of the male partner may increase the chance of successful PMTCT (Farquhar et al., 2004a; Kiarie et al., 2003; Nassali et al., 2009a; Peltzer et al., 2010b), it is plausible that studies showing male involvement are simply measuring a proxy for higher-quality, equitable relationships. Interventions are starting to be tested to improve male partner support. A Kenyan study reported a 2-fold increase in male partner HIV testing among those taking part in a home-based couples testing intervention (Krakowiak et al., 2016). While the intervention did not show an effect on facility delivery or breastfeeding, it is nevertheless encouraging that a randomized control trial was able to increase male testing – an important element of male partner support.

Fears of stigma and discrimination from male partners can reduce women's uptake and adherence to PMTCT services during pregnancy (Kirsten et al., 2011; Turan et al., 2011; Turan et al., 2012) and postpartum phases (Jones et al., 2005; Nassali et al., 2009b; Oladokun et al., 2006).

Women anticipating a poor reaction from partners may strategically choose non- disclosure (Spangler et al., 2014). A systematic review of qualitative and quantitative literature found that many women have a "legitimate fear of disclosing one's status" to a partner and need to hide HIV in order to stay safe (hIarlaithe et al., 2014:S522).

Social support from others beyond the male partner is important for PMTCT and is associated with maternal adherence to ART in South African cross-sectional research (Peltzer et al., 2011). Lack of social support also seems to impact on women's adherence to PMTCT postpartum in other African settings (Chinkonde et al., 2009; Kasenga et al., 2010). Conversely, pressure from family members limits how HIV-positive women are able to choose safe breastfeeding methods (Falnes et al., 2011).

Personal Characteristics

Individual characteristics occur at the level of the women herself. Mental health is one important factor driving women's individual PMTCT behaviors. A prospective cohort of 103 women in South Africa found that depression predicted treatment failure among postpartum, HIV-positive women in bivariate analysis (Hoffmann et al., 2016). Depression was associated with worsened adherence in cross-sectional study of 167 HIV-positive pregnant women in South Africa (Psaros et al., 2014). In qualitative research in Zambia, depression and hopelessness emerged as a major barrier to women's ART uptake – with much of this mental health-adherence relationship due to partner concerns around violence (Murray et al., 2009). Qualitative research from Malawi, Kenya, and Tanzania reveals that mental health can pose a barrier to women's uptake of PMTCT services (Chinkonde et al., 2009; Delva et al., 2010b; Theilgaard et al., 2011). It is important to note that while this dissertation examines mental health at the individual level, others have theorized its importance at the social or structural levels of women's lives (Aneshensel et al., 1991).

When women use active coping strategies, instead of avoidant ones, their mental health outcomes improve (Kotze et al., 2013). Alcohol and substance use may serve as a type of avoidant coping, and both have been linked to PMTCT use (Kreitchmann et al., 2012; Mellins et al., 2008). It is important to note that no association between alcohol and PMTCT has been observed in sub-Saharan African settings.

Personal beliefs and knowledge can also frame PMTCT uptake and adherence. A mother's desire to protect the infant's health can facilitate PMTCT adherence (Myer et al., 2012; Stinson & Myer, 2012; Theilgaard et al., 2011). On the other hand, many women view PMTCT as being only for the infant, which can make it challenging for ongoing adherence postpartum

(Colvin et al., 2014). Not all women believe that ART can truly protect her infant from infection, leading to worsened PMTCT adherence (Duff et al., 2010; Kiarie et al., 2003; Levy, 2009; Painter et al., 2004). In a more extreme version, beliefs that ART could cause the infant harm or increase HIV transmission rates further reduce PMTCT use (Stinson & Myer, 2012; Towle & Lende, 2008).

PMTCT Wrap-up

The socio-ecological version of Health Care Utilization Theory helps characterize the current literature around PMTCT. However, one factor that has been poorly explored to date is women's experience of IPV. This relationship-level factor forms a core hypothesis of this doctoral research, namely that IPV around the time of pregnancy may have a negative impact on women's ability to adhere to HIV treatment.

B. Intimate Partner Violence

Prevalence of Intimate Partner Violence

IPV is prevalent in many settings throughout the globe, and in the past two decades, researchers have made strides in its measurement and identifying its health effects on the lives of women.

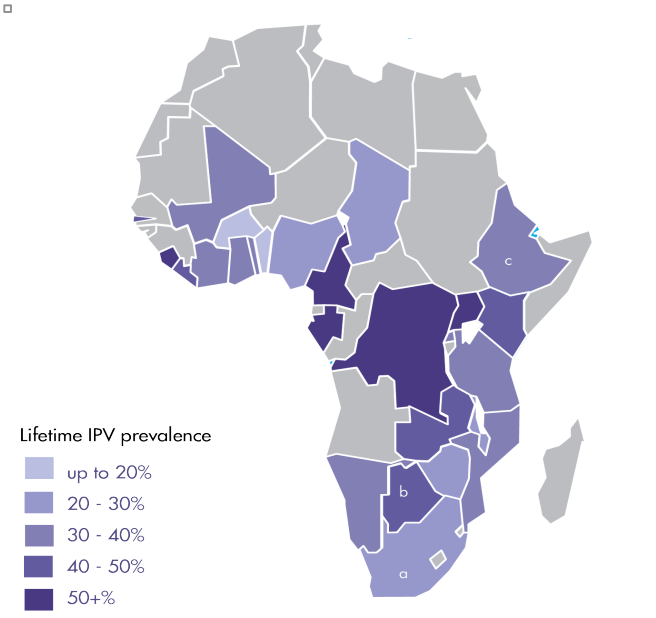
Global prevalence of IPV

A World Health Organization multi-country study found that between 15% to 71% of women experience physical and/or sexual IPV during their lifetime (Garcia-Moreno et al., 2006). A meta-analysis of data from 141 studies in 81 countries suggests that the global prevalence of lifetime physical and/or sexual IPV among women is 30% (Devries et al., 2013b). The 2015 Global Burden of Disease study found that past-year IPV was reported among 16.3% of women (Forouzanfar et al., 2016).

Sub-Saharan African prevalence of IPV

Sub-Saharan Africa has among the highest prevalence of IPV globally (Devries et al., 2013b). Population-based studies show that 30% of women in Southern Africa, 66% of women in Central Africa, and 39% of women in East Africa have experienced lifetime physical and/or sexual IPV (Devries et al., 2013b). In one of the first studies among men, the International Men and Gender Equality Survey (IMAGES) found that 39% of men had enacted IPV in their lifetime in Rwanda

(Barker et al., 2015). Lifetime IPV data from primarily population-based studies is presented in Figure 3 (Barchi, 2011; Garcia-Moreno et al., 2006; Gass et al., 2011b; Hindin et al., 2008b; Kishor & Bradley, 2012; MacQuarrie et al., 2013; Msuya et al., 2014; Nankinga et al., 2015; Simona et al., 2015; Wekwete et al., 2014).



Data from country's most recent Demographic Health Survey, with the exception of: a South African Stress and Health Survey, 2011 (population-based), b Maun Women's Study, 2011 (cross-sectional), c WHO Multicountry Study, 2006 (population-based)

Figure 3. Lifetime IPV prevalence in sub-Saharan Africa

South African prevalence of IPV

In South Africa, population-based surveys estimate that 19.0 - 31.8% of women experience IPV in their lifetime (Jewkes et al., 2002; Seedat et al., 2009). Large studies among South African men found that 27.5 – 31.8% report IPV perpetration (Dunkle et al., 2006; Gupta et al., 2008), and 27.6% of South African men report that they have ever raped (Jewkes et al., 2011).

Recent cross-sectional surveys conducted within specific populations present higher prevalence of IPV. In a clinical sample of 169 women, 47% reported lifetime IPV (Hansrod et al., 2015). In a school-based sample, 39% of 311 adolescent females reported past 3-month physical IPV (Russell et al., 2014). In a respondent-driven sampling study of 751 adolescent males, 40% of those in Johannesburg reported perpetrating past-year physical and/or sexual IPV (Peitzmeier et al., 2016). In a cross-sectional study of 2 603 men in an informal settlement near Johannesburg, 56% enacted physical and/or sexual IPV in the past year (Hatcher et al., 2016a). Respondent-driven sampling among 428 men in Cape Town found that 42% perpetrated recent IPV (Townsend et al., 2011).

Prevalence of Intimate Partner Violence in Pregnancy

IPV in pregnancy is measured either during the pregnancy itself or as recent violence in the 12 months leading up to data collection. Although I have conceptualized IPV as comprising physical, sexual, and/or psychological forms of violence, most studies measure IPV in pregnancy using only physical or sexual definitions. Removing psychological forms of violence from the definition of IPV helps with consistency of reporting because psychological violence is rather

challenging to define. A number of studies measure IPV in pregnancy as any partner violence that occurred in the 12 months leading up to birth (e.g., Bailey & Daugherty, 2007; Dietz et al.,1997; Gao et al., 2008). Many studies collapse past-year IPV and IPV during pregnancy into a single group during analyses (Heaman, 2005; Leung et al., 1999). Throughout the thesis, I attempt to delineate between past-year IPV and IPV during the pregnancy wherever possible.

Global Prevalence of IPV in Pregnancy

A systematic review of studies from 19 countries globally found that IPV in pregnancy ranged from 2.0 – 13.5% (Devries et al., 2010). Clinical samples report that IPV prevalence in pregnancy ranges from 0.9 – 20.1% in North America (Daoud et al., 2012; Gazmararian et al., 1996) and 1.8 - 5.0% in Western Europe (Bacchus et al., 2004a; Hedin et al., 1999).

Postpartum physical and/or sexual IPV varies considerably depending on the location and sample. In a prospective cohort in Brazil, 2% of women reported postpartum physical and/or sexual IPV (Silva et al., 2015). Population-based research from China and the U.S. similarly estimates IPV postpartum at between 1-2.5% (Guo et al., 2004; Martin et al., 2001). In small clinical samples in the U.S. and Western Europe, IPV postpartum is estimated to range from 10-24% (Gielen et al., 1994; Hedin, 2000; Romito et al., 2009).

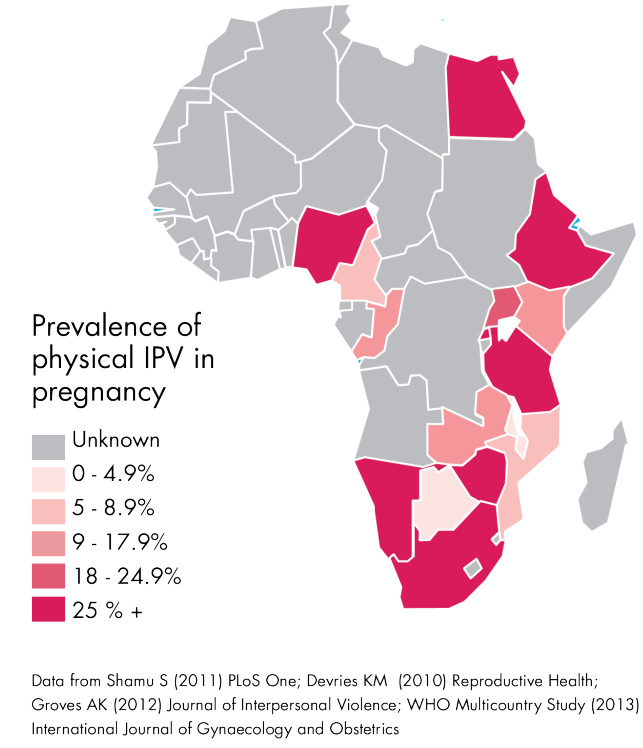


Figure 4. Prevalence of physical IPV in pregnancy

Sub-Saharan African Prevalence of IPV in Pregnancy

The prevalence of IPV in pregnancy in sub-Saharan Africa studies ranges from 2% to 57% (Shamu et al., 2011). Population-based data suggests that between 3% and 13.5% of sub-Saharan African women experience IPV in pregnancy (Devries et al., 2010). The WHO Multicountry Study found that IPV occurred in pregnancy among 32.5% of women in Tanzania, 31.1% of women in Ethiopia, and 48.9% of women in Namibia (Pallitto et al., 2013). In a cross-sectional clinical sample of 2 042 pregnant women in Zimbabwe, 15.9% reported IPV during pregnancy (Shamu et al.,

2013b). Figure 4 presents data from population-based and clinical studies of IPV in pregnancy across sub-Saharan Africa (Devries et al., 2010; Groves et al., 2012; Pallitto et al., 2013; Shamu et al., 2011). Missing data in the figure, represented in gray, is due to limited resources for this specific type of research in several sub-Saharan African countries.

South African Prevalence of IPV in Pregnancy

There are an increasing number of studies examining prevalence of IPV in pregnancy or in the period leading up to pregnancy. A longitudinal South African study among 445 women in Durban found that 21% experienced physical and/or sexual IPV in pregnancy (Groves et al., 2015). A longitudinal study in Cape Town among 544 women learned that 28% reported physical IPV and 14% sexual IPV in the past year leading up to the antenatal clinic visit at 28-32 weeks gestation (Koen et al., 2014). The follow-up data from that study reported prevalence of any IPV in pregnancy (physical, sexual, and/or psychological) as 32% (Koen et al., 2016). In Durban, a longitudinal study among 570 pregnant women identified any IPV in pregnancy (again defined as physical, sexual, and/or psychological) in 35% of the cohort (Mbokota & Moodley, 2003). A household sample of 340 pregnant women in a rural area near Durban found that 25% had experienced physical, sexual, and/or psychological IPV in pregnancy (Hoque et al., 2009).

Other South African studies of pregnant women have been cross-sectional in design and are non-representative in nature. These studies are helpful, however, in their measurement of recent physical and/or sexual IPV. In a clinical sample of 1 395 women in Soweto (in Johannesburg), 31% reported past-year physical and/or sexual IPV at their antenatal visit (Dunkle et al., 2004b). A cross-sectional Cape Town study measuring past-4-months physical and/or sexual IPV among 119 pregnant women noted prevalence of 25%, a rate that likely only included violence experienced during the current pregnancy (Eaton et al., 2012). In a Cape Town cross-sectional study among 623 HIV-positive pregnant women, 16.3% reported past-year physical and/or sexual IPV (Bernstein et al., 2016).

Postpartum, 22% of women in the Durban longitudinal study reported physical and/or sexual IPV in the four months after delivery (Groves et al., 2015). However, no other studies have, to my knowledge, measured postpartum IPV in South Africa.

Health impacts of IPV in Pregnancy

IPV has widespread consequences on physical, sexual, reproductive, and mental health of women. The Global Burden of Disease study confirms that in 2015, a total of 186 000 deaths and

13 803 000 disability-adjusted life years could be attributed to IPV, representing a higher burden of disease than factors such as lead, sugar-sweetened beverages, and drug use (Brugha & Murray, 2016). In South Africa, IPV is among the top ten risk factors for burden of disease (Brugha & Murray, 2016), placing it among the priority health issues in the 2012 Lancet Health in South Africa series (Mayosi et al., 2012).

Here, I examine the evidence base for the impact of IPV on women's physical, sexual/reproductive, and mental health. In each of the following subsections, I start by briefly summarizing the literature relating IPV to women's health outcomes in the general population, followed by information on IPV and women's health in pregnancy. The final section explores influence of IPV experienced by the mother on infant and child health outcomes.

Physical Morbidity and Mortality

IPV leads to trauma, pain, and memory loss (Bonomi et al., 2006; Campbell, 2002; Ellsberg et al., 2008; Garcia-Moreno et al., 2006). In a systematic review, chronic pain was significantly associated with lifetime IPV (Dillon et al., 2013). In a population-based study from Australia, pain was the physical symptom with the strongest relationship to IPV (Loxton et al., 2006). Dillon et al.'s systematic review notes that other chronic health conditions associated with IPV include fatigue, respiratory problems, diabetes, low iron, malnutrition, gastrointestinal problems, and cardiovascular disease (Dillon et al., 2013). In cross-sectional studies, IPV was related to poor sleep (El-Sheikh et al., 2013; Walker et al., 2011; Woods et al., 2010). Sleep disturbances are primarily mediated through the pathway of mental health, since IPV causes PTSD and depressive symptomology that worsen sleep quality (Rauer et al., 2010; Walker et al., 2011; Woods et al., 2010).

During pregnancy, IPV may have particularly strong associations with maternal death. Approximately one-third of femicide globally occurs at the hands of an intimate partner (Stockl et al., 2013a). Research from the U.S. has found that intimate partners are responsible for two-thirds of the pregnancy-related violent deaths of women (Martin et al., 2007). Physical assault by a partner is associated with maternal death (El Kady et al., 2005). and there is a statistical relationship between IPV in pregnancy and attempted or completed femicide (McFarlane et al., 2002). In South Africa, the rate of intimate femicide is 5.6 per 100 000 (Abrahams et al., 2013), or more than double the rate in the U.S. (Lyons, 2016). Studies in South Africa and elsewhere have confirmed that intimate femicide is driven in part by harmful masculinities that focus on

jealousy, virility, and sexual propriety (Mathews et al., 2014; Taylor, 2012) – all beliefs that can be heightened around the time of pregnancy for some violent men (Decker et al., 2004).

Intimate partner violence is related to many of the causes of maternal death that are prominent in both resource-rich and resource-constrained settings. Placental abruption, antepartum hemorrhage, hypertension, and sepsis are all more common among women experiencing IPV around the time of pregnancy (Frances, 2013; Janssen et al., 2003; Silverman et al., 2006). Longitudinal research and population-based data from national health surveys confirms that IPV is associated with lower odds of skilled delivery(Goo and Harlow, 2012; Ononokpono and Azfredrick, 2014; Refaat, 2013; Singh et al., 2015; Turan et al., 2012). Each of these factors is, in turn, among the leading causes of maternal death according to systematic review of global data by the WHO (Khan et al., 2006). Maternal death is associated with IPV (Confidental enquiry into maternal child health, 2007), though measurement of this association is lacking in many settings.

Sexual and Reproductive Health and Birth Outcomes

IPV is associated with declines in reproductive health among women. One systematic review of cross-sectional studies from primarily resource-rich settings found strong and consistent evidence that IPV is associated with sexual health outcomes such as chronic pelvic pain, pain during intercourse, painful menses, and sexual dissatisfaction (Coker, 2007). Cohort studies find that women with a lifetime history of IPV have increased incidence of sexually transmitted infections (Johnson & Hellerstedt, 2002; King et al., 2000; Seth et al., 2015).

In cross-sectional studies among pregnant women in resource-rich settings, IPV is associated with increased risk of miscarriage (Campbell, 2002; Huth-Bocks et al., 2002; Silverman et al., 2007) and premature labor (El Kady et al., 2005; Rodrigues et al., 2008). In a meta-analysis of 12 studies, IPV was associated with 48% increased odds of pre-term birth (Hill et al., 2016). A meta-analysis of 7 longitudinal studies showed that maternal IPV was associated with double the risk of pre-term birth (Shah et al., 2010).

Women from resource-rich settings who experienced IPV in pregnancy were more likely to experience abruption (El Kady et al., 2005), antepartum hemorrhage (El Kady et al., 2005; Janssen et al., 2003), vaginal bleeding (Audi et al., 2012; Moraes et al., 2009; Silverman et al., 2006b), high blood pressure (Silverman et al., 2006b), miscarriage (Escriba-Aguir et al., 2012), and intrauterine growth restriction (Janssen et al., 2003). Physical, sexual, or psychological

violence in pregnancy are associated with obstetric problems and premature rupture of membranes (Audi et al., 2012).

These associations seem to hold in resource-constrained settings. In Cameroon's population-based Demographic Health Survey, lifetime IPV was associated with 50% higher odds of spontaneous fetal loss after adjusting for socio-demographics (Alio et al., 2009b). In cross-sectional Tanzanian data from the WHO Multi Country study, women with a history of IPV were 60% more likely to have pregnancy loss and nearly twice as likely to experience an induced abortion in adjusted analysis (Stockl et al., 2012). Cross-sectional data from Guatemala found that recent IPV doubled the rates of miscarriage among pregnant women after adjusting for confounders (Johri et al., 2011).

Mental Health

A meta-analysis of 16 longitudinal studies found that lifetime IPV nearly doubles the rate of incident *depressive symptoms* among women (Devries et al., 2013a). Another meta-analysis of 67 observational and experimental papers found a 3-fold increase in the odds of postpartum depressive symptoms among women reporting IPV during pregnancy (Howard et al., 2013). Similarly, cross-sectional studies from resource-rich settings found that lifetime experience of IPV is associated with depression (Huth-Bocks et al., 2002; Pico-Alfonso et al., 2006), and recent IPV was associated with a 6-fold increase in depression (Romito et al., 2005). Often IPV is measured in mental health studies as comprising physical and sexual forms of abuse. However, it is important to note that longitudinal research has confirmed that psychological and financial forms of IPV are strongly linked to depression (Postmus et al., 2012).

Two systematic reviews found that IPV was associated significantly with *post-traumatic stress disorder (PTSD)* in 14 and 33 included studies, respectively (Dillon et al., 2013; Lagdon et al., 2014). As with depression, PTSD symptomology may be influenced by the severity and type of violence experienced. In a prospective cohort in the U.S., women reporting three or more types of IPV were nine times as likely to develop PTSD than non-abused counterparts (Houry et al., 2006). In other longitudinal research in the U.S., experiencing psychological and physical IPV was associated with four times the odds of PTSD symptomology (Cavanaugh et al., 2012). Cross-sectional studies from the U.S. and India show that sustained abuse is related to increasing levels of PTSD symptoms (Chandra et al., 2009; Woods et al., 2008). However, one small case control study from South Africa did not find a significant association between IPV and PTSD, perhaps because the sample of 114 women was too small to reach statistical significance (Hansrod et al., 2015).

Anxiety displays a consistent association with IPV in 16 studies included in a systematic review (Dillon et al., 2013). Another systematic review of 15 studies found a similar significant association (Lagdon et al., 2014). As with other mental health sequelae, increased severity or frequency of violence seems to be related to greater anxiety symptomology (El-Sheikh et al., 2013; Pico-Alfonso et al., 2004).

Women who report IPV are more likely to have suffered from *suicidal ideation* than their non-abused counterparts (Afifi et al., 2010; Ellsberg et al., 2008; Ishida et al., 2010; Pico-Alfonso et al., 2006). The systematic review of longitudinal studies found an association between IPV and incident suicidal attempts, although the limited number of studies precluded meta-analysis (Devries et al., 2013a). In pooled analysis of WHO Multicountry Study data from ten countries, women with a lifetime history of IPV were three times more likely to have suicidal thoughts and four times more likely to have attempted suicide (Ellsberg et al., 2008).

The same associations between IPV and mental health that are found in the general population seem to hold around the time of pregnancy. A large body of literature suggests that women who experienced violence in pregnancy have increased odds of reporting *postpartum depression*. A meta-analysis of 37 studies primarily from the U.S. found that lifetime physical, sexual, and/or psychological IPV was associated with nearly three-fold increased risk of major depressive disorder and 50% increased risk of postpartum depression (Beydoun et al., 2012). *Antepartum depression* was associated with lifetime "domestic violence" in a systematic review that included 7 studies from the U.S. and Europe (Lancaster et al., 2010). The intensity of violence experienced may be related to depression. In longitudinal research among 1 133 pregnant women in Brazil, participants who experienced physical and/or sexual IPV in pregnancy alongside psychological violence had triple the odds of postpartum depression after adjusting for socio-demographics (Ludermir et al., 2010). A population-based Canadian study among 6 421 mothers showed that threats and physical IPV starting before and continuing during pregnancy was associated with 4-fold increase of postpartum depression (Urquia et al., 2011). A systematic review of studies from Latin America suggest a linear relationship; increased severity of IPV in pregnancy was associated with increased depressive symptomology (Han & Stewart, 2014).

Type of IPV in pregnancy may also have a unique influence on depression. Severe psychological or severe sexual violence in pregnancy was associated with 2- to 3-fold odds of probable depression among a clinical sample of 239 women the U.S. (Kastello et al., 2016). Several other cross-sectional studies have found that psychological IPV alone during pregnancy is a significant predictor of postpartum depression (Romito et al., 2009; Tiwari et al., 2008; Woolhouse et al., 2012).

The literature around IPV and depression in the perinatal phase from resource-rich settings is consistent with sub-Saharan African findings. A population-based birth cohort in South Africa found that of 726 women, those reporting recent IPV (physical, sexual, and/or psychological) had double the odds of antenatal depression, even after controlling for socio-demographic characteristics (Brittain et al., 2015). A cross-sectional study among 1 180 pregnant women in Tanzania found that recent physical and/or sexual IPV is related to 3- and 4-fold higher odds of depressive or anxiety symptomology, respectively (Mahenge et al., 2013). A longitudinal study among 76 women in Nigeria found that IPV was associated with depressive symptoms at each of five time-points from the year before pregnancy to 12 months postpartum (Ogbonnaya et al., 2013). A cross-sectional study among 376 pregnant women in Egypt found that lifetime IPV tripled the odds of depressive/anxious symptomology (Abdelhai & Mosleh, 2015).

With regards to trauma, a cross-sectional Tanzanian study among 1 180 pregnant women found that recent IPV increased odds of *PTSD* during pregnancy 3-fold (Mahenge et al., 2013). Suicidality and IPV has been less studied in the African context. One cross-sectional study amon 842 women in Zimbabwe suggested that severe IPV (in the form of five or more events) doubled the odds of suicidal thoughts among postpartum women (Shamu et al., 2016).

One cross-sectional study examined IPV and *psychological distress* specifically among HIV-infected pregnant women. The authors found that recent physical, sexual, and/or psychological IPV was associated 3.6 times the odds of psychological distress even after controlling for other predictors (Bernstein et al., 2016). No research, to our knowledge, has specifically examined the association between IPV and *anxiety* in pregnancy.

Health impact of IPV in Pregnancy for Infants

A growing body of literature demonstrates cross-sectional associations between maternal exposure to IPV and infant mortality. Clinical samples from the U.S. suggest that IPV in pregnancy is associated with increased risk of perinatal death (Coker et al., 2004; El Kady et al., 2005; Yost et al., 2005).

Population-based Demographic Health Survey data from Kenya suggests that experiencing lifetime IPV is associated with under-2 mortality (Rico et al., 2011). Similarly, population-based Demographic Health Survey data from Nigeria finds an association between each type of IPV (physical, sexual, or emotional) and infant death (Okenwa et al., 2011). In Ghana, Demographic Health Survey data suggests that lifetime experience of physical IPV more than doubles the odds of perinatal mortality (Pool et al., 2014). Studies elsewhere in resource-

constrained settings have shown that a mother's experience of lifetime IPV is associated with perinatal death (Ahmed et al., 2006) and under-5 mortality (Asling-Monemi et al., 2003).

Infants born to mothers who report IPV in pregnancy are more likely to have low birth weight (Boy & Salihu, 2004; Huth-Bocks et al., 2002; Kaye et al., 2006). A meta-analysis of 15 studies found that odds of low birth weight increased by 53% among women experiencing lifetime IPV (Shah et al., 2010). In the longitudinal birth cohort in South Africa, recent IPV among the mother was associated with smaller head circumference-for-age z-scores (Brittain et al., 2015).

IPV in pregnancy is associated with worse health outcomes for children. Longitudinal research from the U.S. suggests that IPV in pregnancy is associated with worse overall child health at one year (McMahon et al., 2011). Population-based Demographic and Health Survey data from Kenya, Rwanda, and Honduras show associations between lifetime IPV and child stunting (Rico et al., 2011). Demographic and Health Survey data from eight African countries also suggests that beliefs supporting physical IPV (termed "wife-beating" in the survey) is associated with reduced odds that women will have fully vaccinated children (Singh et al., 2015). Population-based data from Uganda suggests that lifetime IPV is associated with double the risk of infant illness and diarrhea (Karamagi et al., 2007b). Fetuses and infants of women who experienced IPV during pregnancy may experience physical outcomes such as bruising, flesh wounds, and broken bones (Ezechi 2004; Valladares 2005).

Child abuse is more likely among families with a history of IPV (Feldhaus 1997). Longitudinal research in the U.S. shows that maternal exposure to psychological and financial abuse at baseline predict use of spanking in following years (Huang et al., 2010; Postmus et al., 2012). Cross-sectional research finds that children who witness IPV are at increased risk of experiencing other forms of trauma such as neglect, corporal punishment, physical maltreatment (Bourassa & Berube, 2007; Chan, 2011). Longitudinal research from Hong Kong found that IPV during pregnancy increases the odds of physical maltreatment of children three years later (Chan et al., 2012). Population-based, longitudinal research from the U.S. found that children witnessing maternal IPV were twice as likely to be reported to Child Protection Services due to child abuse (Casanueva et al., 2009). It is important to note that both perpetrators and survivors of IPV can be perpetrators of child maltreatment (Dixon et al., 2007).

Ultimately, the relationship between IPV and parenting quality can shape child wellbeing and behavior. Longitudinal research from the U.S. suggests that IPV at baseline has a direct effect on internalizing (depression, anxiety) and externalizing (aggression) behaviors among children four years later (Huang et al., 2010). Importantly, IPV also operates through the pathway of

parenting, with spanking increasing and parenting skills decreasing for women who experienced IPV at baseline (Huang et al., 2010). Longitudinal research in both the U.S. and the U.K. found that women reporting IPV during pregnancy had children with greater internalizing behaviors (anxiety and depression) and behavioral problems (hyperactivity, emotion, conduct problems) two to four years later (Flach et al., 2011; McFarlane et al., 2014).

Parenting is not the only pathway linking maternal exposure to IPV to subsequent child outcomes. The physiological outcomes of increased prenatal stress can alter fetal neural development and a child's subsequent behaviour (Wadhwa, 2005; Weinstock, 2008). IPV in pregnancy can also worsen the mother and infant bond, leading to child behavioral outcomes (Huth-Bocks et al., 2004). Lastly, the many mental health sequelae related to IPV in pregnancy for the mother have concomittant effects on child development (Deave et al., 2008; Murray et al., 1996).

Maternal exposure to IPV throughout one's childhood also seems to frame health outcomes later in life. A systematic review of 22 studies from the U.S. found that witnessing a mother's experience of IPV as a child was associated with increases in risky health behaviors later in life such as smoking, alcoholism, illicit drug use, high number of sexual partners, and adolescent pregnancy (Bair-Merritt et al., 2006). A meta-analysis of 118 studies found that children witnessing IPV experienced by a mother had worse psychosocial functioning which comprised psychological, emotional, social, and academic outcomes (Kitzmann et al., 2003). A systematic review of 10 global studies found consistent evidence for the witnessing of IPV as a child and use of IPV as an adult (Gil-Gonzalez et al., 2008). These data suggest that addressing IPV in pregnancy and postpartum is essential if we are to alter the intergenerational transmission of violence across the globe.

Dynamics of IPV in Pregnancy

The dynamics of IPV before, during, and after pregnancy are not fully understood. In some settings, pregnancy is protective, whereas in others pregnancy seems to be a time of increased vulnerability to IPV. In cross-sectional data from 2 042 pregnant women in Zimbabwe, physical violence decreased during pregnancy, but sexual and psychological IPV consistent before pregnancy and during pregnancy (with sexual IPV increasing from 36 to 39% and psychological IPV increasing from 40 to 44%) (Shamu et al., 2013b). Increased sexual violence in late pregnancy was explored in a companion qualitative study that highlighted that men perceived the physical and emotional changes of pregnancy make women less willing to have sex and justify men forcing or coercing sexual encounters (Shamu et al., 2012). In the U.S. a sample of 109

pregnant women identified new incidents of IPV among women who had not experienced IPV before pregnancy (Anderson et al., 2002a). Longitudinal data from Brazil showed that 9% of women who experience no IPV before or during pregnancy had incident postpartum IPV (Silva et al., 2015). Other U.S. population-based data shows that IPV continues or even escalated in pregnancy (Goodwin et al., 2000). Among 1 314 women in Mexico, IPV worsened during pregnancy for 71% of women (Diaz-Olavarrieta et al., 2007).

Population-based studies from the U.S. suggests that IPV before pregnancy is associated with higher risk of IPV during pregnancy (Charles & Perreira, 2007; Martin et al., 2001). Longitudinal data from the U.S. and the U.K. show that violence in pregnancy predicts continued abuse postpartum (Bianchi et al., 2016; Bowen et al., 2005). Similarly, population-based data from Canada found that women who were abused before and during pregnancy also experienced IPV postpartum (Daoud et al., 2012). A South African longitudinal study among 1 480 women in Durban found that IPV incidence was persistently high during pregnancy and the early postpartum period (Groves et al., 2014).

However, other research shows important contradictions to this notion of IPV persistency. Longitudinal data from the U.S. and Nicaragua found that despite high levels of partner violence before and during pregnancy, IPV abated postpartum (Koenig et al., 2006; Macy et al., 2007; Salazar et al., 2009). Among 420 postpartum women in Brazil, physical IPV stopped after the infant was born for the majority of participants (Menezes et al., 2003).

It may also be the case that postpartum stressors serve as triggers to increase levels of violence after delivery. Longitudinal research among 1 400 women in Spain suggested that postpartum psychological violence peaked at five months (Escriba-Aguir et al., 2013). In the longitudinal South African study among 1 480 women, prevalence of IPV dropped significantly (from 25 to 18%) during the late postpartum phase from four to nine months (Groves et al., 2015). Both of these studies highlight potential for the early postpartum phase to be a time of increased IPV risk. Others have noted that when relationship stress exceeds a couple's ability to cope, men may use harmful behaviors such as IPV (Groves et al., 2014; Jasinski, 2001; Romito et al., 2009).

Factors associated with IPV in Pregnancy

Several factors associated with IPV in pregnancy in sub-Saharan African settings. These can be organized by individual-level and relationship-level:

Individual level predictors of IPV in pregnancy

- *Low education level* of the woman was associated with experience of IPV in pregnancy in a South African cross-sectional study (Hoque et al., 2009), a finding that mirrors cross-sectional findings from other African settings (Fawole et al., 2008; Umeora et al., 2008). In the WHO Multi-Country Study, among non-pregnant women, the lowest and highest levels of education seem to be protective against IPV (Abramsky et al., 2011a).
- *Being unemployed* was associated with IPV in one cross-sectional South African study among pregnant women (Hoque et al., 2009), again mirrored elsewhere in sub-Saharan Africa as measured by low socio-economic status (Ezechi et al., 2009; Umeora et al., 2008). However, data around employment and IPV are conflicting with population-based studies finding income protective against IPV (Abramsky et al., 2011b; Hindin et al., 2008a), but a study in India showing that women's increased income predicts new incidents of partner violence (Krishnan et al., 2010).
- *A woman's being diagnosed with HIV in pregnancy* increases the odds of IPV in pregnancy (Dunkle et al., 2004b; Hoque et al., 2009). An association that has been found between HIV diagnosis and IPV in other cross-sectional studies from sub-Saharan Africa (Ezechi et al., 2009; Ntaganira et al., 2008; Olagbuji et al., 2010). However, it is important to note that HIV status disclosure is not always associated with IPV in African research (Bernstein et al., 2016).
- *Unplanned pregnancy* is a risk marker of IPV since violence male partners often try to control reproductive health decisions like contraception (Miller et al., 2010; Pallitto et al., 2013). Unplanned pregnancy can also lead to further episodes of violence (Jasinski, 2001). Women are more likely to experience psychological distress when they disagree with their partners about the intendedness of the pregnancy (Romito et al., 2009). Women learning of an unintended pregnancy alongside a new HIV diagnosis can lead to a "double disclosure bind," with women anticipating harsh reactions for either condition (Crankshaw et al., 2014).
- *Alcohol use by the woman* is associated with IPV in pregnancy in longitudinal South African research (Dunkle et al., 2004b), and is confirmed elsewhere (Olagbuji et al., 2010). In the study among HIV-positive pregnant women, problem drinking by the woman was associated with IPV in pregnancy (Bernstein et al., 2016). *Alcohol use by a partner* has been measured as a driver of IPV in pregnancy elsewhere (Fawole et al., 2008; Ntaganira et al., 2008), and is confirmed in studies among South African men who are partnered with non-pregnant women (Abrahams et al., 2004; Gass et al., 2011a).

Relationship-level predictors of IPV in pregnancy

- *Relationship dynamics* have been noted as important predictors of IPV around the time of pregnancy. In longitudinal research in South Africa, lower relationship power (or women's ability to have a say in decisions and sexual choices) and higher relationship stress predicted IPV in pregnancy and postpartum (Groves et al., 2014). Marital status was protective among HIV-positive, South African pregnant women, with those married less likely to experience IPV than non-married counterparts (Bernstein et al., 2016).
- *History of violence* in the current relationship was strongly predictive of IPV in pregnancy and postpartum in a longitudinal South African study (Groves et al., 2015). A history of earlier violence, in the form of childhood sexual abuse or forced sex at first intercourse, was associated with an increased risk of IPV in pregnancy in a longitudinal South African study (Dunkle et al., 2004b). This has been explored in other African settings, with previous sexual violence, experiencing abuse in childhood (Kaye et al., 2001; Ntaganira et al., 2008), and witnessing abuse in childhood (Kaye et al., 2001), associated with IPV in pregnancy.
- *Multiple partnerships* is another behavior that has been strongly associated with perpetration of IPV in South Africa (Abrahams et al., 2004), but has not yet, to my knowledge, been measured among pregnant women.
- *Male partner constructs:* There are many other potential factors at the relationship-level that may influence IPV in pregnancy, but have not yet been assessed. Male partner characteristics, such as his gender views and propensity towards sexual entitlement, seem to drive IPV in studies among non-pregnant populations (Fulu et al., 2013; Santana et al., 2006). Also, around the time of pregnancy, concerns about paternity have been theorized to be an evolutionary driver of men's use of IPV (Goetz et al., 2008). These should be examined within the context of female partner's pregnancy.

C. Links between IPV & HIV

Research has shown increasingly strong links between IPV and HIV. Early on in the HIV epidemic, researchers agreed that a similar risk environment heightens women's IPV risk and increases HIV risk (Maman et al., 2000). Over the past decade, empirical evidence has accumulated to suggest that IPV and HIV operate not only *within* a similar risk environment, but that IPV directly and indirectly increases HIV acquisition. In addition, HIV diagnosis can lead to incident episodes of violence.

IPV and Risk of HIV Acquisition

Even when adjusting for other key predictors, such as sexual behavior, women who report IPV are more likely to be HIV-positive in cross-sectional studies across the globe (Dude, 2011; Dunkle et al., 2004b; Fonck et al., 2005; Maman et al., 2002; Silverman et al., 2008). Conversely, cross-sectional studies suggest that women living with HIV are more likely to experience IPV than HIV-negative women (McDonnell et al., 2003; Ntaganira et al., 2008; Were et al., 2011).

As mentioned in Chapter 1, this robust cross-sectional association between IPV and HIV is consistent in studies among pregnant women (Shamu et al., 2011). More importantly, the association has been confirmed in longitudinal studies that show IPV to be associated with incident HIV infection (Decker et al., 2009; Jewkes et al., 2010; Kouyoumdjian et al., 2013). A meta-analysis of 5 cohort studies demonstrated a longitudinal association between IPV and incident HIV infection (Li et al., 2014). In the 19 cross-sectional studies included in meta-analyses, exposure to both physical and sexual IPV predicted doubled odds of HIV infection (Li et al., 2014).

The Global Burden of Disease Study (Figure 5) combines data on IPV and years lost to HIV disability to show that sub-Saharan Africa bears the greatest burden of disease associated with the IPV-HIV intersection (Brugha & Murray, 2016). This means that IPV and HIV work together in this setting to add considerable burden of disease to African populations.

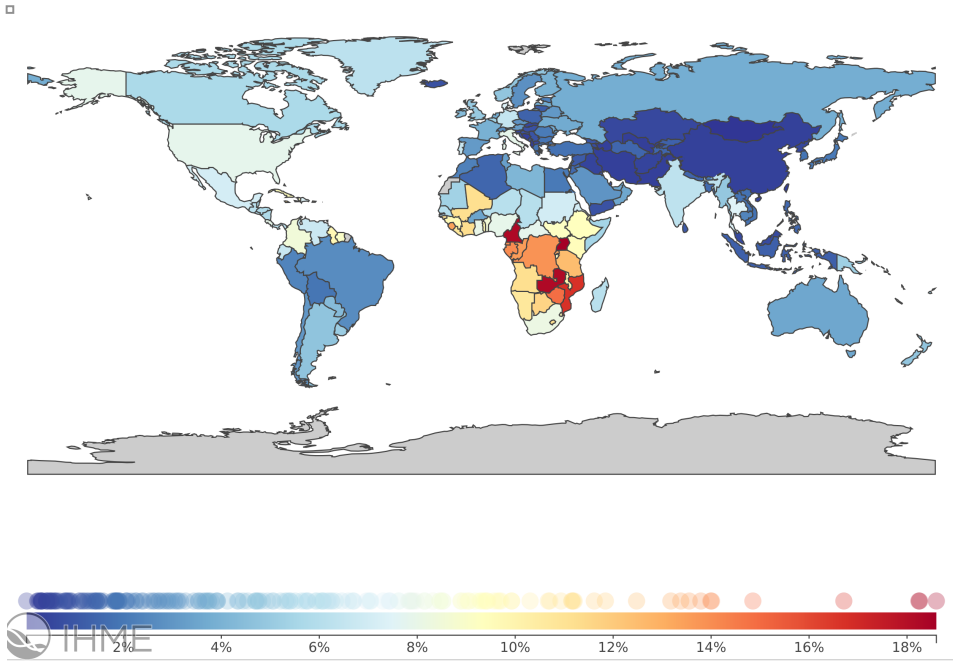


Figure 5 Global Burden of Disease data on percent of total HIV Years Lost to Disability that can be attributed to intimate partner violence among females 15-49 years, 2015

We can understand the links between IPV and HIV acquisition as being both direct and indirect. Directly, IPV can increase risk of HIV acquisition through damage to the epithelium during forced sex (Draughon, 2012). Immune activation and inflammation associated with the psychological trauma of IPV may also directly increase the likelihood of HIV acquisition (Heise & McGrory, 2016). Indirectly, a number of factors seem to link IPV in a causal manner to incident infection. Meta-analyses found that historical experience of sexual or psychological violence from a family member (including in childhood) predisposes women to risky sexual behaviors (Arriola et al., 2005; Norman et al., 2012). A systematic review found that physical IPV has a strong and consistent relationship with women's risky sexual behaviors, such as condom use (Coker, 2007). Longitudinal data suggests that men who enact IPV often have a cluster of health behaviors (binge drinking, transactional sex or use of prostitution, multiple concurrent partners) that also place female partners at greater risk (Decker et al., 2009; Dunkle & Decker, 2013). An important refinement of this research is the finding that psychological IPV, even without concurrent physical or sexual violence, is a predictor of HIV infection (Kayibanda et al., 2012). This suggests that the threats associated with IPV, regardless of physical or sexual violence, can lead to riskier health behaviors and place women at heightened HIV risk.

HIV and incident cases of IPV

HIV diagnosis and subsequent partner disclosure can lead to new incidents of IPV (Campbell et al., 2008), although much of the evidence for this association emerges from qualitative literature with small samples of women. Among 8 women reporting IPV after HIV disclosure, Colombini et al. (2016) learned that new HIV diagnosis was a trigger for partner violence, even in relationships with no prior history of IPV. Mulranen et al. (2015) studied 20 postpartum women living with HIV in Swaziland, of whom 9 reported IPV following disclosure, and learned that violence resulted from acute triggers like HIV status disclosure and also from ongoing marital tensions around fertility. In-depth interviews with 50 HIV-positive women in the United States identified 3 who had experienced verbal or physical assault after disclosure (Gielen et al., 1997). One longitudinal study among 1 092 pregnant women in Durban learned that IPV did not increase postpartum among the 76.3% of women who disclosed their HIV-positive status (Maman et al., 2016). However, those women who chose not to disclose had 5-fold increased odds of experiencing postpartum IPV, suggesting that non-disclosing women may be in more violent relationships than their counterparts who disclose. This limited empirical evidence suggests that HIV disclosure and subsequent IPV is an important area for further research.

IPV prevalence among HIV-Positive Women

Researchers have only recently begun to measure the effect of IPV on health of women already living with HIV. Meta-analysis suggests that the rate of intimate partner violence among HIV-infected women in the U.S. is 55%, or more than double the national average (Machtinger et al., 2012c). In the longitudinal Women's Interagency HIV Study, 48% of the 1015 HIV-positive women followed over 20 years reported a lifetime history of IPV (Decker et al., 2016). In another U.S. cohort, 63% of HIV-infected women experienced physical and/or sexual violence, including but not limited to violence from a partner (Gielen et al., 2001). In cross-sectional clinical samples of HIV-positive women, between 44 - 68% had experienced physical and/or sexual abuse from intimate partners or others (Burke et al., 2005; Liebschutz et al., 2000; McDonnell et al., 2003; Ramachandran et al., 2010).

In sub-Saharan Africa, data on rates of IPV among HIV-positive women suggests a similar pattern. A prospective cohort of 2 836 pregnant women in Kenya found that HIV-positive women experienced higher rates of IPV compared to their HIV-negative counterparts (37% vs. 26%) (Kiarie et al., 2006). Kiarie *et al.* (2006) also found that HIV-positive participants had 4.8 times the odds of reporting IPV within 2 weeks postpartum, compared to HIV-negative counterparts. A cross-sectional study of HIV-positive, South African pregnant women found past-year IPV prevalence to be 16.4% (Bernstein et al., 2016). In a case-control study of 169 women in South Africa, rates of physical and sexual IPV were higher among HIV-positive women, but the difference between HIV-negative counterparts did not reach statistical significance (Hansrod et al., 2015).

Health effects of IPV among HIV-Positive Women

Preliminary evidence from exploratory U.S. studies suggests IPV leads to worse HIV-related health outcomes for women. However, much of this evidence comes from small cross-sectional studies. In cross-sectional research among 118 women, violence and other forms of trauma were associated with 4.3-fold increased odds antiretroviral failure (Machtinger et al., 2012b). Among 251 HIV-positive men and women, lifetime experience of IPV was associated with a lower CD-4 count and having a detectable viral load (Schafer et al., 2012). Two cross-sectional studies among women showed that IPV was associated with a greater incidence of opportunistic infection (Liebschutz et al., 2000; Nava et al., 2011). Again, all of these studies have been conducted cross-sectionally, with small samples from resource-rich settings, and none have included pregnant

women. A longitudinal study among 2 222 women either living with HIV or at-risk of acquiring HIV in urban areas of the U.S. found past-year experience of abuse (including, but not limited to IPV) was associated with 2 times the odds of death (Weber et al., 2012). As the evidence for this report was presented only in a conference format, it is not clear whether the same association between violence and mortality holds among the HIV-positive population or whether IPV on its own contributes to this association.

Few studies have examined IPV among HIV-positive populations in sub-Saharan Africa. One longitudinal Kenyan study among 214 female sex workers found that recent IPV was associated with *lower* risk of detectable viral load (Wilson et al., 2016). Through qualitative interviews, the authors discovered that resilience and a desire to stay healthy despite IPV drove the positive health outcomes among women living with recent violence.

D. Impact of IPV on PMTCT uptake

Few studies directly measure the effect of IPV on PMTCT, but theory and early empirical findings suggest a link. This is supported by three lines of thought. Firstly, as described in Section B of this chapter, health care utilization theories illustrate that unhealthy partnership dynamics, such as IPV, may serve as important barriers and enablers to PMTCT adherence. Secondly, preliminary quantitative and qualitative studies suggest that IPV and fears of IPV may make it more difficult for women to adhere to particular steps within the PMTCT cascade. Thirdly, literature highlights several plausible pathways through which IPV may hinder PMTCT.

Preliminary studies showing influence of IPV on PMTCT

Few studies to date have set out to measure the effect of IPV on the entire PMTCT cascade. One important exception is a recent cross-sectional study by Hampanda (2016) in Zambia. Hampanda examined the impact of IPV on several PMTCT steps among 320 women. She found that IPV worsens ART adherence in pregnancy, nevirapine at birth, ART adherence postpartum, and infant nevirapine postpartum.

While no other similar studies on the entire PMTCT cascade, to my knowledge, exist in sub-Saharan Africa, it is possible to summarize the extant literature with regards to each individual PMTCT step. In this way, I am able to draw upon evidence from a multitude of existing studies that may not have been conceptualized specifically around PMTCT, but offer insights into the potential impact of IPV on these important health behaviors.

Early and Sufficient Antenatal Clinic attendance

Studies from the U.S. suggest that women experiencing lifetime IPV are less likely to start antenatal care on time (Dietz et al., 1997; Thananowan & Heidrich, 2008) or choose to opt out of antenatal care altogether (Diaz-Olavarrieta 2002). Longitudinal research from the U.S. suggests that IPV leads to twice the odds of missing antenatal clinic visits or delaying care until late in the pregnancy, during the third trimester (Goodwin et al., 2000; Subramanian et al., 2012).

HIV Testing

Anticipated violence is associated with declines in HIV testing among pregnant women (Bajunirwe & Muzoora, 2005a; Maman et al., 2011a; Medley et al., 2004; Pool et al., 2001; Tchendjou et al., 2011; Turan et al., 2011; Turan et al., 2012). Research from Malawi and Kenya highlights that when women consent to an HIV test without the husband's approval, they often suffer domestic violence as a consequence – regardless of their actual HIV diagnosis (Bajunirwe & Muzoora, 2005b; Turan et al., 2011).

ART uptake & Linkage to care

Studies in the U.S. show that a history of physical and/or sexual violence (including but not limited to violence from a partner) decreases the likelihood of HIV-positive women using ART when medically eligible (Cohen et al., 2004; Jones et al., 2010b). One cross-sectional study in Uganda found that IPV was associated with three times the risk of not being on ART at the time of the study (Osinde et al., 2011).

Qualitative studies from sub-Saharan Africa suggest that fear and experience of IPV influence pregnant women's decision to take up HIV services (Kilewo et al., 2001; Onono et al., 2015a). A Malawian qualitative study with 52 men, women, and health providers echoed that concerns around IPV cause women to avoid PMTCT services (Nyasulu & Nyasulu). In South Africa, a qualitative study among 28 pregnant and postpartum women living with HIV illustrated strong fears around partner discrimination, rejection and abandonment, causing women to forgo HIV treatment (Stinson & Myer, 2012).

Clinic attendance & Retention in Care

In a U.S. study of 853 male and female HIV-positive patients, a lifetime history of IPV was associated with missed clinic visits and delayed linkage to care (Siemieniuk et al., 2010). In another U.S. study of men and women, intimate partner violence predicted a higher "no show

rate" at the HIV clinic (Schafer et al., 2012). In a study of 116 Kenyan women, 28.5% named partner dynamics (including violence, negative attitudes, and lack of disclosure) as a barrier to access to HIV services (Otieno et al., 2010). In a qualitative study in Malawi, fear of partner conflict and separation was a prominent reason cited for loss-to-follow-up in PMTCT programmes (Bwirire et al., 2008).

ART adherence

The cross-sectional study by Hampanda in Zambia found that among 320 pregnant women, IPV reduced the odds of adequate adherence in pregnancy by 74%. Similarly, experiencing IPV was associated with 89% reduced odds of adequate adherence postpartum. In both instances, IPV was measured as a lifetime exposure and adequate adherence was defined as self-reported adherence of >80% using a visual analog scale (Hampanda, 2016).

The remaining literature on the relationship between IPV and ART adherence emerges from resource-rich settings. In one site of the U.S. Women's Interagency HIV Study, lifetime experience of IPV was associated with 87% lower odds of optimal ARV adherence (Connors et al., 2012). A greater number of lifetime traumatic events was associated with poorer adherence among 611 men and women in another U.S. study, although IPV was only one traumatic exposure measured (Mugavero et al., 2006). This relationship has been quantitatively confirmed by other small, cross-sectional studies in the U.S. among non-pregnant women living with HIV (Lopez et al., 2010; Rose et al., 2010a; Trimble et al., 2013).

Importantly, IPV may have an indirect relationship with HIV adherence. In a Haitian study of 194 patients, partner conflict was not associated with adherence (Malow et al., 2013). However, when depression was added to the model, partner conflict was associated with depression, which in turn predicted poor adherence. This finding suggests that it is crucial to explore pathways linking IPV to PMTCT outcomes.

Skilled birth attendance

Experience of IPV in pregnancy and postpartum was associated with less use of skilled delivery services in Kenya in longitudinal research (Turan et al., 2012). Demographic and Health Survey population-based data from African settings such as Kenya, Egypt, and Zambia, and Nigeria have confirmed that women with lifetime exposure to IPV have 26-29% lower odds of skilled delivery (Goo & Harlow, 2012; Ononokpono & Azfredrick, 2014; Refaat, 2013). Similarly, Demographic and Health Survey data from eight African countries showed an association between supportive attitudes towards wife-being and lower odds of delivering in a facility (Singh et al., 2015). Skilled

birth attendance is particularly relevant for HIV-positive pregnant women, as it ensures that essential services around infant prophylaxis and infant HIV diagnosis are administered at the correct time.

Nevirapine at birth

The Zambian study among 320 HIV-positive women measured the effect of IPV on nevirapine at birth but found no significant impact (Hampanda, 2016). Similarly, in a large prospective study in Kenya, intimate partner violence was not associated with nevirapine use among 2836 women (Kiarie et al., 2006). However, "male involvement in antenatal care" predicted better adherence to nevirapine in one South African study (Peltzer et al., 2011).

Early infant HIV diagnosis

Few studies have examined the relationship between violence and early infant diagnosis. One qualitative study in Malawi among 56 women found that IPV indirectly limited women's willingness to test infants because it caused them to avoid partner disclosure (Donahue et al., 2012).

Exclusive Breastfeeding or other Safe Feeding

In a population-based sample of 118 579 U.S. women, those experiencing IPV in pregnancy or during the 12 months leading up to delivery were 35 - 52% less likely to breastfeed their infants (Silverman et al., 2006a). Using DHS data from eight sub-Saharan African countries, lifetime IPV victimization was adversely associated with early and exclusive breastfeeding (Misch & Yount, 2014). However, a systematic review conducted a decade ago saw no significant association between IPV and breastfeeding in papers from resource-rich settings (Bair-Merritt et al., 2006).

Among HIV-positive women, the research is less developed around violence and exclusive breastfeeding. A prospective study in Kenya with 281 HIV-positive women did not find an association between IPV and safe breastfeeding (Onono et al., 2014). In Kenya, male partners influenced feeding choices of infants (Kiarie et al., 2003).

Transmission of HIV to infants

Few studies have measured the association between maternal experience of IPV and HIV transmission to infants. A case-control study in Kenya measured physical violence using a single

item and found no association with HIV-positive infant status (Onono et al., 2015b). Male antenatal attendance halved the risk of MTCT in a Kenyan study, an association that persisted after controlling for maternal viral loads (Aluisio et al., 2011). It is possible that there is a bi-directional relationship between IPV and infant acquisition of HIV, since one Nigerian study showed that women reporting that an infant was HIV-positive had nine-fold increase in the odds of incident violence from a partner (Ezeanochie et al., 2011).

Pathways from IPV to PMTCT

Several mechanisms may underpin the association between IPV and poor PMTCT behaviors (Fig. 6). These potential pathways can be represented using a dyadic conceptual framework, which posits that both individual factors *and* relationship characteristics influence a woman's HIV-related health (Montgomery et al., 2012). This framework highlights the predisposing personal and relationship context, including dyadic characteristics, such as marital status and relationship length, as well as personal characteristics like socio-demographics, clinical history, and financial status. The framework highlights the many types of IPV, and denotes that for this study, IPV will be defined as recent (past 12 months) experience of physical, sexual, and/or psychological IPV.

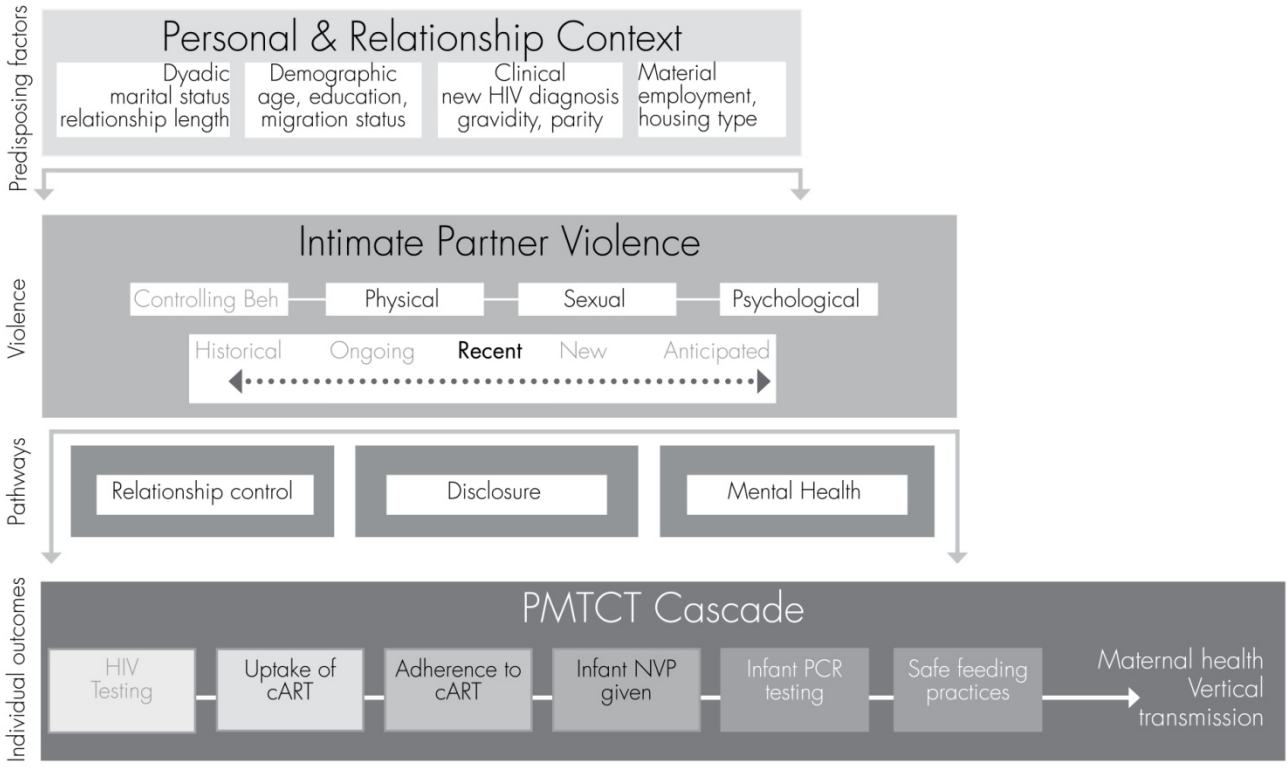


Figure 6. Pathways linking IPV to PMTCT outcomes

Three theoretical pathways for the effects of IPV on utilization of PMTCT services are highlighted in this framework; relationship control, disclosure, and mental health; and represent thinking in the current literature on why IPV may shape PMTCT uptake.

Relationship control

The first potential pathway is *relationship control*, or the extent to which HIV-positive women may be coerced or inhibited by the partner's controlling behavior. Relationship control by a partner has emerged as a barrier to health care engagement in qualitative studies (Wilson et al., 2007). A qualitative study among 64 women in the U.S. described how violent partners control a woman's ability to seek medical care by ensuring that she never goes to the clinic alone or insisting that they themselves speak to clinicians on behalf of the woman (Lichtenstein, 2006).

IPV is strongly associated with men prohibiting women's access to contraception and contraceptive services (Alio et al., 2009a; Fanslow et al., 2008) leading to double the odds of unintended pregnancy in meta-analysis (Lassi et al., 2014). Another meta-analysis of seven studies found that IPV halved the odds of women's use of contraception (Maxwell et al., 2015). It is important to note that relationship control and IPV can also work in the opposite direction, causing women to seek out additional health services. For example, among 1 262 women in the U.S., reproductive control and IPV increased young women's use of emergency contraception and testing for sexually transmitted infections (Kazmerski et al., 2015). An interesting mechanism for this divergence in evidence is that women experiencing IPV may increase their utilization of hidden forms of contraception in an effort to counter the reproductive control enacted by violent partners (Reed et al., 2016). Regardless of directionality of the association between IPV and access to health services, reproductive control, which includes forcing women to become pregnant or sabotaging their access to contraception, has steadily increased as an important area for further research and intervention (Miller et al., 2014; Silverman & Raj, 2014).

Partner Disclosure

A second pathway occurs when fear of new or continued IPV leads women to avoid *disclosure* of their HIV status to male partners (Mepham et al., 2011). In a longitudinal study of 293 pregnant, South African women living with HIV, authors found that experiencing two or more types of IPV (vs. no violence or one type) halved the odds of disclosure to a partner (Makin et al., 2008). In Tanzania, among 490 women who chose not to disclose, 15% listed partner conflict (violence or separation) as a primary reason for non-disclosure (Antelman et al., 2001). In a study of 23 pregnant and postpartum HIV-positive women in the United States, Njie-Carr *et al.* found that 3

women with recent violence avoided partner disclosure because they feared a violent reaction (Njie-Carr et al., 2012).

Non-disclosure to male partners has a significant impact on treatment adherence (Bajunirwe et al., 2009; Medley et al., 2004; Wouters et al., 2009), and poses a risk for sexual transmission of HIV if the male partner is still HIV-negative (Bond, 2010; Desgrees-du-Lou et al., 2009; Katz et al., 2009; Orne-Gliemann & Desgrees-Du-Lou, 2008). This is partly because when pregnant women do not disclose, it is challenging for them to visit the HIV clinic or take treatment openly (Awiti Ujiji et al., 2011). Through these pathways, non-disclosure to partners increases the odds of vertical transmission of HIV (Myer, 2011). In a recent systematic review of PMTCT, partner disclosure was associated with poor PMTCT uptake in a majority of both quantitative (6 of 9) and qualitative (17 of 24) studies (Gourlay et al., 2013a). Evidence from South Africa suggests that the average time gap between obtaining an HIV-positive test result and disclosing this result to a sex partner is as high as 16 months (Wong et al., 2009).

In addition to posing as a risk factor for non-disclosure, IPV can occur as a sequela for those women who do choose to disclose to partners. Studies in the U.S. suggest that between 20.5 – 33% of women newly diagnosed with HIV experience incident physical or sexual violence from a partner (Pence et al., 2007; Sowell et al., 2002; Zierler et al., 2000). The literature is sparser in sub-Saharan Africa, but several studies do exist. In a cross-sectional Nigerian study of 652 pregnant women, 17% experienced IPV before HIV testing and 49% experienced IPV after testing for HIV and disclosing their status to partners (Ezechi et al., 2009). In another Nigerian study of 89 women, 7.9% reported violence after partner disclosure and a further 15.3% reported abandonment by a partner (which can be conceptualised as a form of physical and/or psychological abuse) (Ezegwui et al., 2009).

However, it is important to note that not all studies show an association between HIV partner disclosure and subsequent IPV. In Kenya, among 1638 HIV-positive women, only 6 experienced immediate violence in the two weeks following diagnosis (Kiarie et al., 2006). One reason for the discrepancy is the time of measurement. A study with 310 HIV-positive women in Baltimore, U.S., found that while only 4% reported immediate physical abuse following partner disclosure, 45% experienced IPV in the months following diagnosis (Gielen et al., 2000).

Qualitative data among HIV-positive pregnant women support these quantitative findings. In Swaziland, a study among 19 postpartum women living with HIV in Swaziland, 9 reported IPV following disclosure (Mulrenan et al., 2015b). A Tanzanian study with 62 men and women found that HIV disclosure was a trigger for physical and emotional IPV (Maman et al., 2001). In Zimbabwe, a qualitative study with 64 pregnant and postpartum women suggested that

IPV occurs after HIV disclosure in the form of sexual coercion (Shamu et al., 2012). In Malawi, interviews with 9 newly-diagnosed mothers found that all experienced a severe form of partner conflict, such as abandonment, following partner HIV disclosure (Njunga & Blystad, 2010). One qualitative study in South Africa did not find that women experience partner conflict or violence following disclosure (Stinson & Myer, 2012).

Mental Health

Mental health is a third theoretical pathway through which IPV may inhibit PMTCT uptake. As synthesized in Section C.2, a well-developed body of literature shows that IPV leads to emotional trauma, anxiety, chronic stress, suicidal ideation, and depression among women in the general population. Mental health challenges, in turn, worsens adherence to ART. Longitudinal research confirms that depression can lead to incident occasions of non-adherence to ART (Bottonari et al., 2010; Kacanek et al., 2010). This association between IPV and mental health is as (if not more) pronounced among HIV-positive women. Cross-sectional studies from the U.S. confirm that among HIV-positive cohorts, women with a lifetime history of IPV have higher rates of depression (Illangasekare et al., 2012; McDonnell et al., 2005), anxiety (Gielen et al., 2005), and post-traumatic stress disorder (Axelrod et al., 1999).

Poor mental health may impact on ART adherence among pregnant women, although one systematic review found no quantitative evidence to confirm this association (Gourlay et al., 2013b). Indeed, much of the literature linking depressive symptoms to PMTCT adherence in sub-Saharan Africa is based upon qualitative research (Chinkonde et al., 2010; Delva et al., 2010a; Kasenga et al., 2010; Painter et al., 2004).

There are a number of reasons that IPV might lead to poor adherence through the mental health pathway. The stress of IPV may compound with the stress of HIV, making it challenging to adhere (Illangasekare et al., 2012). Coping skills can also be altered by mental health. In a longitudinal study in the U.S. among 87 HIV-positive participants, patients with depression had lower adherence to ART even if they had the same number of life stressors as non-depressed counterparts (Bottonari et al., 2010). In a cross-sectional study among 190 HIV-positive men and women in the U.S., IPV was related to non-adherence and to coping among women (Lopez et al., 2010).

IPV may serve as a barrier to health care because of feelings of denial and shame that preclude women to seek care openly (McCauley et al., 1998). In a large mixed-methods study of PMTCT adherence in Kenya, women described the difficulties of maintaining good health behaviors amidst the despondency and despair of coping with a new HIV diagnosis themselves

(Kohler et al., 2014). The diagnosis of HIV in pregnant women trigger depressive thoughts, denial, and self-condemnation, with some women reporting suicidal ideation around this time (Donahue et al., 2012; Kohler et al., 2014). Among non-pregnant women in a large U.S. qualitative study, IPV led to "internalization of the violence" through depression, social withdrawal, and feelings of helplessness (Lichtenstein, 2006).

Women's vulnerability to IPV prior to HIV diagnosis may create a self-image of being damaged, inhibiting self-care and access to regular health services (Leenerts, 1999; Rothenberg & Paskey, 1995). Mental health could be the link between IPV and poor self-care. Cross-sectional and longitudinal studies suggest that women experiencing IPV and reporting lower SRPS scores have increased risk of depression (Campbell et al., 1995; Hatcher et al., 2012; Nduna et al., 2010).

Mental health seems to mediate the relationship between IPV and adherence to ART. A Haitian study among men and women suggests that IPV and adherence is mediated by depression (Malow et al., 2013). A cross-sectional U.S. study among men who have sex with men found that IPV led to mental health problems, which in turn reduced ART adherence (Pantalone et al., 2010). To my knowledge, no studies to date have explored mental health as a pathway from IPV to adherence among pregnant or postpartum women.

E. Gaps in the Evidence Base

There are several important gaps in the extant literature, some of which this doctoral research aims to answer. The research linking IPV to adherence among non-pregnant populations is emerging mainly from resource-rich settings. Because the studies are small and cross-sectional in nature, it is challenging to assess whether there is a true association between women's experience of violence and ART adherence. A systematic review has yet to be conducted to better understand whether, and to what extent, IPV impacts HIV behaviors. Paper 1 aims to fill this gap.

In terms of the association between IPV and PMTCT, the Hampanda (2016) paper offers an important set of preliminary associations in a sub-Saharan African setting. However, the methodology was cross-sectional in nature, limiting our ability to draw causal conclusions from the findings. The analysis only offers bivariate results, which means that IPV may be a marker for poor PMTCT behaviors rather than a causal factor driving PMTCT adherence. Both of these gaps are addressable in this doctoral research, as Paper 4 uses structural equation modeling within a longitudinal cohort of pregnant and postpartum women.

The pathways underpinning any potential IPV and PMTCT association are also poorly understood. Much of the conceptual work around identifying pathways draws from non-pregnant

populations or from resource-rich settings. Given the high burden of both IPV and HIV in sub-Saharan Africa, it is important to establish a richer understanding of *why* women's experience of partner violence may be related to their HIV behaviors. In particular, qualitative research should establish what health workers and pregnant women themselves think about IPV in relation to PMTCT behaviors. Paper 2 aims to fill this gap.

This preliminary qualitative exploration should also be complemented by a deeper set of interviews specifically with women who live with both IPV and HIV, in order to tease out potential pathways linking violence to PMTCT. The reason that a deeper qualitative study can add to extant literature is that while extant qualitative research has suggested an association between IPV and HIV, little research has explained *why* these two conditions may be linked. I aim to fill this gap in the literature in Paper 3. Similarly, in quantitative literature, an increasing number of studies shows an association between IPV and worsened ART adherence, but little data exists around the relative strengths of potential pathways linking IPV to HIV adherence behaviors. Paper 4 aims to fill this gap specifically among pregnant and postpartum women.

PMTCT is largely atheorized, with existing theories focused primarily on the individual woman alone (Geldsetzer et al., 2016; Hampanda, 2012). Using a traditionally biomedical lens, many PMTCT programs view women as rational actors who are "non-compliant" if they miss essential health care steps (Betancourt et al., 2010). This is in opposition to many settings where HIV treatment and related health care decisions can be viewed as a social process, with people weighing the benefits of treatment with potential negative social outcomes (stigma and discrimination, rejection from homes, inability to access resources) (Merten et al., 2010). Viewing PMTCT as a social process helps incorporate IPV into the theoretical lens, since partner violence is necessarily a relational event. Additional empirical findings around the dyadic nature of PMTCT can help fill this hole in the literature. Papers 2-4 aim to speak to this theoretical gap.

A recent systematic review identified a need for high-quality trials measuring how potential interventions prevent or mitigate the effects of IPV in pregnancy on women's and infant health (Jahanfar et al., 2013). This doctoral research is observational in nature, and will not be able to measure the impact of an intervention on women's experience of IPV. However, as the PhD research is nested within a randomized controlled trial of which I am Co-Principal Investigator (Pallitto et al., 2016), the larger body of work may begin to answer this critical programmatic gap.

F. Synthesis of the Literature

The extant literature has shown that IPV causes detrimental physical, mental, and reproductive health outcomes among women. IPV is increasingly linked to declines in birth outcomes, infant health, and child wellbeing. Over the recent years, researchers have better defined how IPV is related to incident HIV infection among women. One of the unanswered questions is how recent physical, sexual, and psychological IPV impacts the lives of women already living with HIV. Yet, preliminary evidence from small studies suggests that IPV may be a driver of worsened health behaviors, including those required for successful PMTCT. The extent to which HIV remains a global health concern means that placing IPV on the HIV research agenda could have important policy and practice implications.

Alongside the myriad of poor health outcomes, IPV is also a human rights violation in its own right (UN General Assembly, 2016). While IPV is illegal in many settings and there are strong global commitments to end its use (UN General Assembly, 1979, 1993), violence from a male partner continues to occur in the lives of 30% of women globally (Devries et al., 2013b). South Africa, as a signatory of the Declaration of the Elimination of Violence against Women has the responsibility to prevent and respond to cases of IPV. Yet, in practice, large gaps exist to implementing the national and global commitments that the South African goverment has made (United Nations Special Rapporteur on Violence against Women, 2015). Understanding IPV in the lives of pregnant and postpartum women living with HIV may help spur future research and programs around ending IPV.



Chapter 3. Methodology

Photo credit: Abigail Hatcher, Sensitizing a Safe & Sound clinic to techniques for addressing IPV in pregnancy

The three research aims of this doctoral research were answered using quantitative and qualitative techniques for data collection and analysis. Together, this doctoral work aims to contribute to the evidence demonstrating how and to what extent IPV is a driver of PMTCT non-adherence in pregnant and postpartum women. Analysis for each research aim followed a sequential approach, with distinct data analysis plans for each paper. Thus, in this chapter, I present methodology for each individual manuscript.

Aim 1: Assessing the effect of IPV on HIV adherence entailed a systematic review of the literature on IPV and ART adherence among women and a quantitative meta-analysis (Paper 1).

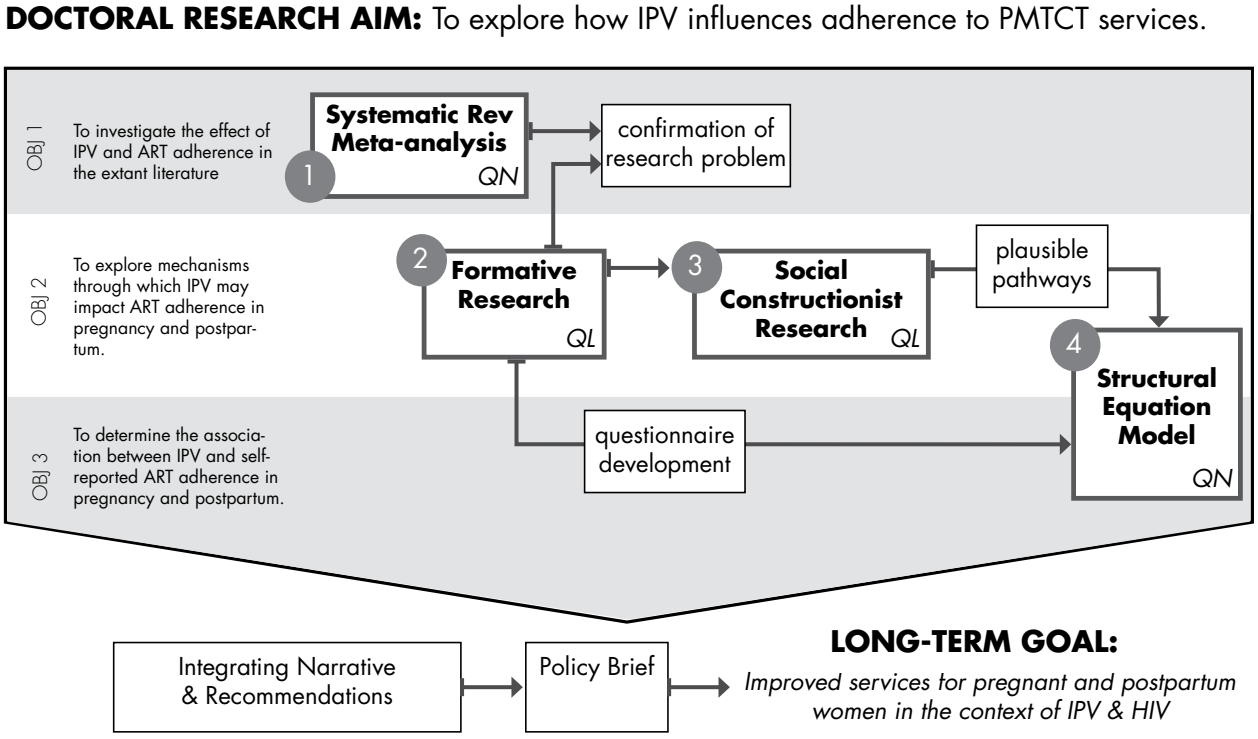
Aim 2: Understanding the reasons why IPV may be related to HIV behaviors among pregnant and postpartum women was achieved using thematic coding of qualitative formative research with key informants (Paper 2) and a social constructionist analysis of in-depth interviews with women living with IPV and HIV (Paper 3). Elucidating the mechanisms underpinning the association between IPV and ART adherence also entailed structural equation modeling of quantitative cohort data (Paper 4). The conceptualization of the structural equation model was strongly informed by qualitative mechanisms identified in Papers 2 and 3.

Aim 3: Measuring the association between IPV and ART adherence in pregnancy and postpartum was achieved using bivariate and multivariate regression techniques from quantitative data (Paper 4). Similarly, structural equation modeling provides an estimate of the relationship between IPV and ART adherence while controlling for key pathways.

A. Mixed method strategy

The nature of the research was sequential mixed methods, which is an approach to answering an area of research inquiry with both qualitative and quantitative data (Creswell & Clark, 2007). Qualitative and quantitative data for the four individual manuscripts were collected using a sequential exploratory approach (Creswell & Clark, 2007). This type of mixed method approach is characterized by using preliminary qualitative research to set the stage for deeper qualitative and quantitative research. The integration strategy was to connect the different types of data and analytical results so that each research phase informed the next (Creswell et al., 2011).

Figure 5 presents the overall doctoral aim with a depiction of how each specific objective is addressed by the included manuscripts. Boxes with thicker outlines represent individual papers, whereas boxes with thinner outlines demonstrate a point of connecting various types of data (also called a "point of interface") (Morse & Niehaus, 2009). As evidenced by the figure, quantitative and qualitative research were used initially to confirm the relevance of the research problem. Formative qualitative research was used to inform development of appropriate quantitative tools. Two types of qualitative research helped identify plausible pathways linking IPV to PMTCT adherence. These pathways were then tested quantitatively in the final quantitative manuscript.



IPV: intimate partner violence; PMTCT: prevention of mother-to-child transmission; ART: antiretroviral therapy; QN: quantitative research; QL: qualitative research

Figure 7. Mixed method study design

Mixed Method Research Plan

Prior to developing a protocol, a scoping review of the literature helped frame the initial research question. Scoping reviews are seen as best practice because they map the existing evidence base and define the appropriate scope for research questions (Armstrong et al., 2011). This scoping review led to the systematic review conducted for Paper 1.

The quantitative meta-analysis of Paper 1 confirmed the importance of the research problem, namely that IPV influences women's HIV treatment behaviors. It offered evidence from resource-rich settings on the extent to which violence impacts ART adherence. The systematic review also suggested the major gap in literature, finding no extant studies among pregnant populations or in resource-constrained settings. By confirming the novelty and importance of the doctoral research question, I was able to proceed more confidently with my qualitative and quantitative data collection.

The qualitative formative research presented in Paper 2 helped identify initial mechanisms linking IPV to PMTCT based on a small set of interviews with pregnant women themselves and a larger set of interviews with health workers and other key informants. The epistemological approach for this phase was to use qualitative research to gain an initial understanding of a new, understudied research topic - creating a explanation of why and how a previously unknown phenomenon occurs (Pasick et al., 2009). The findings of Paper 2 were used during quantitative survey development, a method of connecting data from the qualitative formative research with the future quantitative study (Creswell et al., 2011).

In Paper 3, a larger sample of women living with HIV and IPV allowed for a deeper understanding of mechanisms linking the two conditions. Because our initial qualitative research on Paper 2 provided preliminary pathways, this manuscript was more explanatory in nature. The decision to expand the sample from a proposed 24 women to a final group of 32 allowed a testing of qualitative mechanisms that the early interviews presented. This type of analytical improvisation during the research process is central to social constructionist approaches (Charmaz, 2008). The iterative process allowed Paper 3 to present a "dense analyses with explanatory power, as well as conceptual understanding," (Charmaz, 2008: 408). Data in this manuscript were presented as "merged data" (Creswell et al., 2011), with basic quantitative survey characteristics informing the presentation of quotes from individual participants.

An important contribution of Paper 3 to this particular research was the elucidation of potential causal pathways that could be tested using quantitative data. In Paper 4, I incorporated all four potential pathways identified in the qualitative findings in bivariate analysis: mental health, partner disclosure, partner control, and health care utilization. One pathway was omitted quantitatively since I did not measure it in quantitative data collection: resilience.

Blending paradigms

Despite differences in methodologies and theoretical assumptions, qualitative and quantitative mixed methods research can provide a richer set of answers to an area of inquiry (Greene, 2007). In this doctoral research, a positivist paradigm was used during quantitative data analysis (Papers

1 and 4), while qualitative research was informed by socio-ecological (Paper 2) and social constructionist views (Paper 3). Instead of consistently using a single research paradigm, I opted for diverse approaches that placed value on objective and subjective findings, or "intersubjectivity" (Morgan, 2007).

Points of interface

Altogether, there were various time-points during this research when one method spoke to the other, or what some scholars call the "point of interface" (Morse & Niehaus, 2009).] The point of interface was mainly during data analysis and data interpretation. A "multiphase design" allowed ample time to incorporate the formative qualitative findings from Paper 2 into the quantitative survey instrument. It also created space for using the meta-analytical findings of Paper 1 as a rationale for continued, deepened research. Paper 3 identified causal mechanisms that could be tested using the quantitative structural equation modeling methods in Paper 4. Similarly, Paper 3 findings around resilience helped explain the contradictory quantitative finding that a majority of women are self-reporting strong ART adherence despite living in violent relationships.

B. Methods for Paper 1: Systematic Review

The first doctoral paper was a systematic review of the literature on IPV and ART adherence among women.

Search strategy

We retrieved published English language of papers via PubMed, Web of Science, CINAHL, PsychInfo and Proquest Thesis & Dissertation through January 2015. We used a list of defined constructs and search terms, which is included in the published Paper 1 (see full manuscript in Chapter 5). Each individual database had a tailored search strategy that adapted the systematic review constructs to the database input style.

Study selection followed a three-step process (Fig 1): title and abstract review; full text review and quality appraisal. First, two authors independently reviewed all identified study titles and abstracts.

Duplicates and titles that do not meet the inclusion criteria were removed. The same authors independently assessed the full papers of those abstracts that met the eligibility criteria.

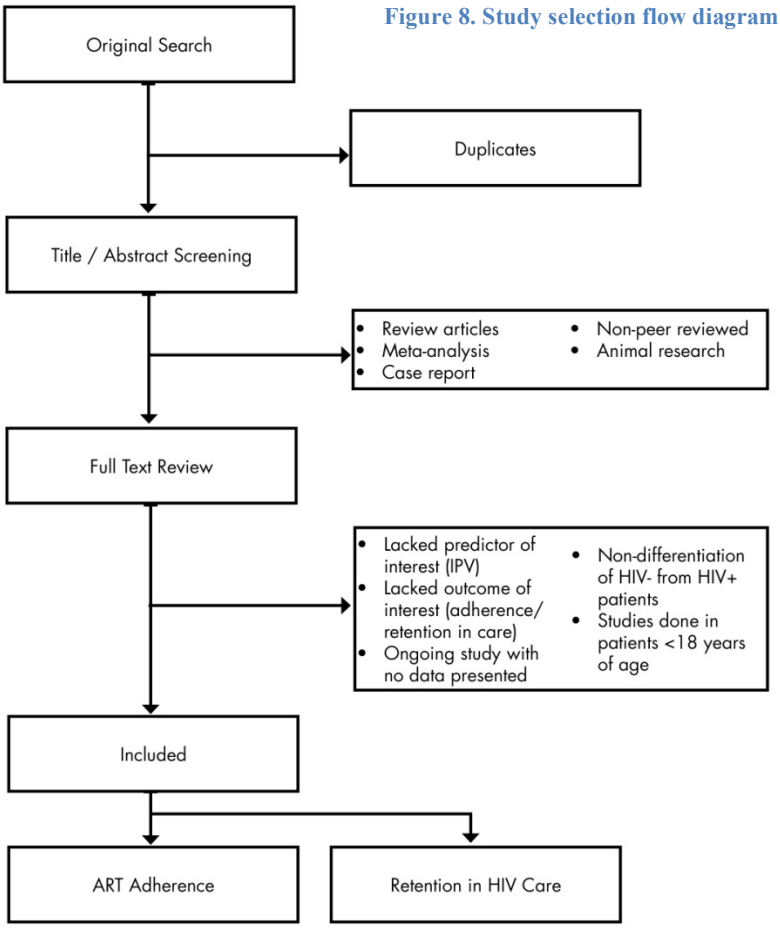


Figure 8. Study selection flow diagram

We dealt with varying forms of IPV (physical, sexual, and/or psychological) by including any definition of IPV in our search. However, we ensured that included studies measured IPV on its own (not combined with other forms of violence like childhood sexual violence or non-partner sexual violence).

At each stage, two authors independently reviewed the studies, noting discrepancies. Discrepancies were resolved through telephonic input from the senior author until a consensus was reached. Finally, the reviewers manually searched the reference lists of included articles for further key studies that could potentially be included.

Preliminary search

An initial test of the search strategy was explored to ensure there might be eligible papers to analyze (Table 2). Based on this, there seemed to be adequate literature using this search strategy. The numbers of papers were somewhat small, but certainly enough to review in full.

Table 1. Preliminary search results

IPV and ART Adherence							
		Web of Science	CINAHL	PubMed	PsychInfo	Proquest Dissertation	
		1/8	1/8	1/8	1/8	1/8	
		TOPIC	ABSTRACT	ALL	TX	ABSTRACT	
"abus$" OR "violen$" OR "batter$"	*1*		93141		239,327	316,561	abus* OR violen* OR batter*
"spous$" OR "domestic" OR "partner$" OR "wife" OR "wives"	*2*		52997		114,823	416,578	spous* OR partner* OR wife OR wives OR domestic
"hiv" or "hiv infect$" or "human immunodeficiency virus" OR hiv-1" OR "hiv-2"	*3*		63729		36,964	33,004	hiv OR hiv infect* OR human immunodeficiency virus OR hiv-1 OR hiv-2
"antiretroviral therapy" OR "antiretroviral$" OR "HAART" OR "nevirapine" OR "zidovudine" OR "antiviral$"	*4*		34494		75,845	485,441	antiretroviral* OR antiviral OR zidovudine OR nevirapine OR HAART OR ART OR cART OR mother-to-child transmission OR PMTCT
"adheren$" OR "complian$" OR "persisten$"	*5*		59602		37708	343045	adheren* OR complian* OR persisten*
loss to follow-up OR "LTFU" OR "missed visit$" OR "interruption" OR "linkage" OR "retention"	*6*		23204		2	329397	loss to follow-up OR LTFU OR retention OR missed visit* OR interruption OR linkage
1 AND 2 AND 3 AND 4	*7*	188	19	130	77		
1 AND 2 AND 3 AND 4 AND 5	*8*	52	7	44	33	3	TS=(adheren* OR complian*) AND TS=(antiretroviral* OR antiviral OR zidovudine OR nevirapine OR HAART OR ART OR cART) AND TS=(hiv OR hiv infect* OR human immunodeficiency virus OR hiv-1 OR hiv-2) AND TS=(spous* OR partner* OR wife OR wives OR domestic) AND TS=(abus* OR violen* OR batter*)
1 AND 2 AND 3 AND 4 AND 6	*9*	10	0	6	4	2	
		IAS					
intimate partner violence AND adherence		6294					

Data abstraction

The following data were abstracted and summarized in tables: citation; year of publication; country; study design and sampling; characteristics of the study population; outcomes (adherence, uptake of ART, retention in care). When available odds ratios (OR) and similar estimates (e.g. relative risk, hazard ratio) with confidence intervals were abstracted.

We anticipated that many studies would only present bivariate statistics, but where possible multivariate statistics were abstracted along with the different factors they control for.

Data analysis

Quantitative outcomes were entered into an Excel table. Pooled unadjusted odds ratios (OR) were calculated using random effects meta-analysis *metan* command in STATA.

Table 2. CASP Quality Appraisal Tool

Question	0 – study does not meet criteria	1 – study partially meets criteria	2 – study fully meets criteria
1. Does the study address a clearly focused RESEARCH QUESTION?			
2. Is the STUDY DESIGN appropriate to address the research question?			
3.1 – Does the study uses an appropriate SAMPLING method? [sample method; sample size]			
3.2 – Is the STUDY SAMPLE appropriate to address the research question? [clear inclusion/exclusion criteria; appropriate controls]			
3.3 – Is the level of NON-PARTICIPATION tolerable?			
4 – Is the exposure (IPV) appropriately MEASURED?			
5 – Are the outcomes (Uptake/Retention/Adherence to ART) appropriately assessed?			
6 – Are known CONFOUNDERS accounted for?			
7 – Are appropriate STATISTICAL analyses conducted?			
8 - Were ETHICAL issues appropriately considered?			
9 - Do the findings support the CONCLUSIONS?			
10 - Are the findings GENERALISABLE?			
Total score (/36): add scores for all questions.			

Quality appraisal

Quality appraisal was completed for all full texts by two independent reviewers using an adapted version of the CASP Quality Appraisal Checklist. Each study was judged on a rubric of twelve items, and a total score is provided in the summary table of study characteristics.

Reporting

The PRISMA Reporting Checklist was used to ensure that all aspects of systematic reviews were reported accurately (Table 3).

Section/topic	Item No	Checklist item	Reported on page No
Title			
Title	1	Identify the report as a systematic review, meta-analysis, or both	1
Abstract			
Structured summary	2	Provide a structured summary including, as applicable, background, objectives, data sources, study eligibility criteria, participants, interventions, study appraisal and synthesis methods, results, limitations, conclusions and implications of key findings, systematic review registration number	2
Introduction			
Rationale	3	Describe the rationale for the review in the context of what is already known	3-4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS)	4
Methods			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (such as web address), and, if available, provide registration information including registration number	n/a
Eligibility criteria	6	Specify study characteristics (such as PICOS, length of follow-up) and report characteristics (such as years considered, language, publication status) used as criteria for eligibility, giving rationale	4
Information sources	7	Describe all information sources (such as databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched	4
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated	Text S2
Study selection	9	State the process for selecting studies (that is, screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis)	4
Data collection process	10	Describe method of data extraction from reports (such as piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators	4-5
Data items	11	List and define all variables for which data were sought (such as PICOS, funding sources) and any assumptions and simplifications made	4-5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis	5, Text S3
Summary measures	13	State the principal summary measures (such as risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (such as I^2 statistic) for each meta-analysis	5
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (such as publication bias, selective reporting within studies)	5
Additional analyses	16	Describe methods of additional analyses (such as sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified	n/a
Results			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram	5 Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (such as study size, PICOS, follow-up period) and provide the citations	Table S2
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see item 12).	Table S2
Results of individual studies	20	For all outcomes considered (benefits or harms), present for each study (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot	Table S2 Figures 2-4
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency	4-8 Figures 2-4
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see item 15)	8
Additional analysis	23	Give results of additional analyses, if done (such as sensitivity or subgroup analyses, meta-regression) (see item 16)	n/a
Discussion			
Summary of evidence	24	Summarise the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (such as health care providers, users, and policy makers)	8-9
Limitations	25	Discuss limitations at study and outcome level (such as risk of bias), and at review level (such as incomplete retrieval of identified research, reporting bias)	9
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research	8-10
Funding			
Funding	27	Describe sources of funding for the systematic review and other support (such	11

Table 3. PRISMA Checklist of items to include when reporting a systematic review or meta-analysis

Limitations

Several limitations of the systematic review are important to mention. We only included studies that examined IPV and HIV behaviors among women, although men in violent partnerships are also important to examine. We used a limited number of databases, but attempted to overcome this limitation by doing hand searches of citations for each included article. The types of IPV measured in each study varied, suggesting that meta-analysis may have limitations.

C. Methodological Background for Papers 2-4

Nested Study

In order to explore the relationship between IPV and HIV-related adherence among pregnant women, I nested my mixed methods doctoral research within the Safe & Sound Trial. The Safe & Sound Trial is a randomized control trial testing the efficacy of brief empowerment counseling for reducing violence and improving mental health among pregnant women in urban Johannesburg, South Africa (Pallitto et al., 2016). As I served as Co-Principal Investigator of the Safe & Sound Trial, it was feasible to build the doctoral research around existing infrastructure of the trial.

Safe & Sound Trial Design

The trial conducted baseline interviews with pregnant women who experienced recent physical or sexual IPV (n=422) and those who do not (n=1160). Trained nurses then randomized women with IPV to receive the counseling intervention or an enhanced control condition. All women in the randomized control trial were followed up postpartum between 6-weeks and 24-weeks (Fig. 8).

The Safe & Sound intervention was comprised of several elements aimed to reduce women's experience of violence during pregnancy and postpartum. Described fully elsewhere (Hatcher et al.,

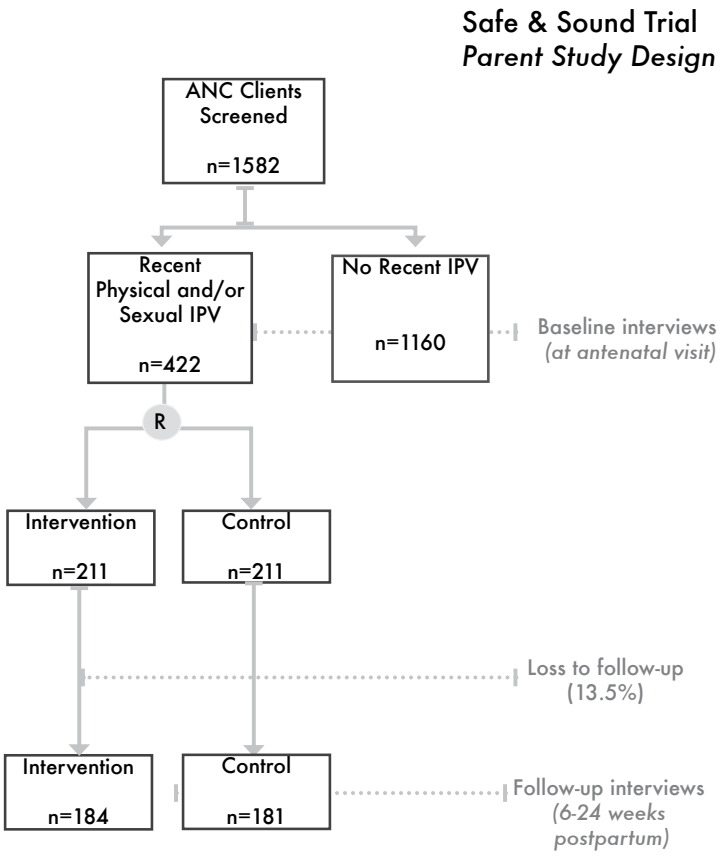


Figure 9. Safe & Sound Trial design

in press; Pallitto et al., 2016), the intervention included two 30-minute sessions that were tailored to the individual needs of women. The possible components were empathetic listening, safety planning, legal steps, and enhanced referrals to onwards services for IPV. HIV was not specifically targeted within the Safe & Sound intervention, but nurses were trained in the guidelines for offering PMTCT and were supportive of women who required assistance around HIV care and treatment.

Study Setting

The study setting was four antenatal clinics in the City of Johannesburg: Hillbrow Community Health Clinic; South Rand Hospital; Rosettenville Clinic; Yeoville Clinic. The City of Johannesburg is located in Region F and is comprised primarily of poor neighbourhoods with high rates of poverty and migrancy – both from rural South African towns and from neighbouring countries such as Zimbabwe, Malawi, and Swaziland. Clinics have a catchment area, denoted in blue, and most patients can walk or take a short mini-bus taxi to attend. Services are free of charge, although additional costs can be incurred if certain medications are stocked out.

The four Safe & Sound clinics agreed to participate in the parent trial, and we obtained ethical and Department of Health approvals to conduct research in the sites. All four sites offer PMTCT in line with national guidelines. Wait times in antenatal care are often 5-6 hours given the high demand for these services in many catchment areas.

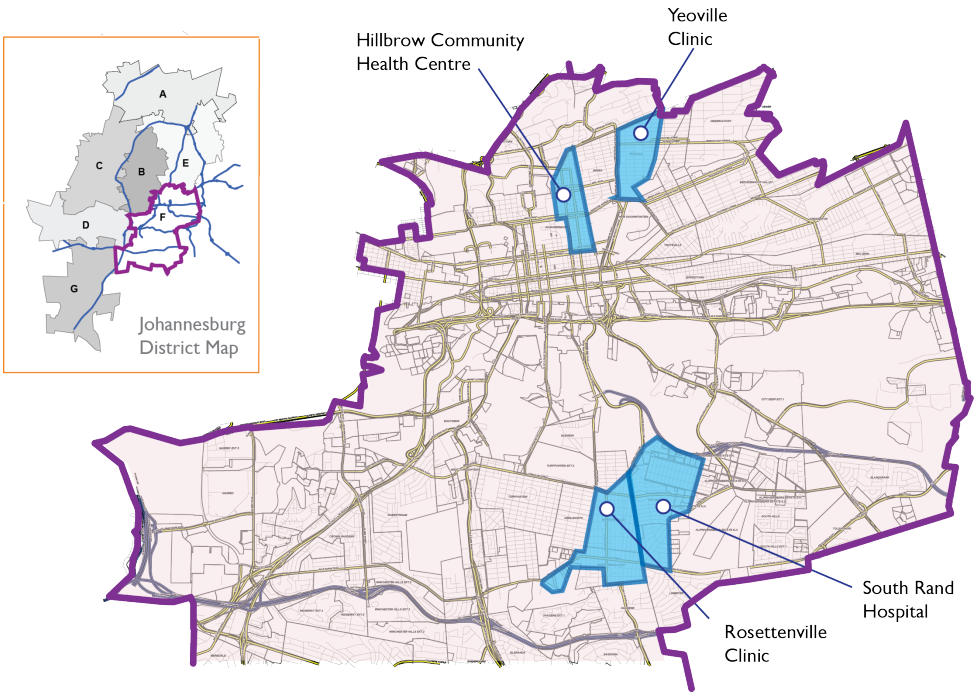


Figure 8. Map of study sites

D. Methods for Paper 2: Formative Research

The formative qualitative research for Paper 2 was part of a larger formative study conducted in advance of the Safe & Sound Trial. This paper was exploratory in nature and utilized qualitative research methods with key informants to better understand how IPV might be related to PMTCT.

Data collection

Prior to initiating the Safe & Sound trial, we conducted formative, qualitative research with a wide range of stakeholders with potential to take part in an IPV in pregnancy intervention. Table 5 describes the participant group, data collection approach, and total number of participants.

All in-depth interviews and FGDs were conducted in a private room in one of three participating clinics. (A fourth clinic was added to the parent study after completion of this formative research). I led a portion of qualitative interviews (n=12) and trained qualitative researchers, who were fluent in multiple local languages (Sotho, Zulu, Tswana), led the remainder of interviews and focus group discussions. Semi-structured discussion guides explored a wide range of topics (see Table 4). For the purpose of this analysis, the topics around PMTCT, the link between IPV and HIV-related health, and mental health were analyzed. Discussions were audio-recorded after obtaining participants' permission. The research

Table 4. Formative data collection methods

Participant Group	Size	Method	Sampling	Objective
Policy makers	(n=10)	Semi-structured interviews	Purposive	To determine the existing service provision patterns for ANC To explore a health sector response to IPV, and the value of integration with HIV activities (PMTCT)
Health care providers	(n=8)	Semi-structured interviews	Purposive	To understand the knowledge, attitudes, and practices of providers in responding to IPV To explore the receptivity of health workers to an IPV antenatal intervention To identify gaps and existing capacity in clinic and provider response to IPV
NGOs	(n=6)	Semi-structured interviews	Purposive	To determine the role NGOs play in addressing the psycho-social, legal and other needs of abused women To identify appropriate referral options for abused women, building on existing networks
Community leaders	(n=4)	Semi-structured interviews	Convenience	To understand community factors that support or prevent women from seeking IPV assistance during pregnancy
Pregnant women seeking antenatal care	(4 FGDs, n=13)	Focus group discussions	Convenience	To explore the preferences for the placement and timing of the intervention in the antenatal care services To understand women's perceptions of the proposed empowerment intervention To understand the patterns of help seeking and available community resources for violence and HIV
Pregnant abused women	(n=5)	Semi-structured interviews	Convenience	To identify barriers abused women might have to disclose abuse and to participate in the intervention To gain a better understanding of how to tailor the instruments and intervention to address the existing needs and concerns of abused women in the communities served by this project To understand the patterns of help seeking and available community resources for violence and HIV

team was comprised of three South African researchers and myself, an American researcher who has lived and worked in South Africa for the past decade.

Data analysis

Data from electronic recordings were either transcribed directly from the English or were translated from a local language (Sotho, Zulu, Tswana) into English by professional transcriptionists. The researcher who conducted the IDI or FGD reviewed each transcript for accuracy and added a brief memo including personal reflections on how the interview proceeded, observations, and notes about key themes.

I led a two-day computer-assisted qualitative analysis training for the research team, who was new to qualitative coding and write-up. The research team managed data in QSR Nvivo 10, a qualitative analysis software, using an analytical framework of thematic codes (Miles & Huberman, 1994). This was achieved through a day-long workshop that I facilitated where we collectively reviewed the study research questions and emerging issues of interest. Each thematic code was discussed among the team until consensus was reached regarding a definition for each code. Definitions were written in question form, to prepare for the next step of fine coding. The final codebook contained 23 broad codes that were applied to the database by three researchers, ensuring that each transcript was coded at least twice.

Next, pairs of researchers held a series of meetings to collectively develop 'fine codes' using an inductive approach to data analysis (Hutchison et al., 2010). We developed fine codes by printing out a full set of excerpts and creating a list of the sub-themes emerging from the data. The fine codes were constantly compared to the broad code definition – ensuring that finer themes related to the question of interest. This process was crucial for analytical rigor as it allowed the opportunity for seeking out disconfirming evidence (Miles & Huberman, 1994), and for adding to the preliminary 'audit trail' of decisions made by the research team (Lincoln & Guba, 1985). Lastly, the reports were shared and critiqued by at least one other member of the team, making the writing process itself an additional form of inquiry (Richardson, 2000).

The report themes (Table 5) explore three major aspects of designing and implementing a successful intervention. The first theme explores this particular setting, from a patient, community, and clinic perspective. The second theme touches on intervention content, with an emphasis on the topics that may be salient for pregnant women in this study context. This theme (C.5 Mental health; C.6 IPV-HIV link; C.7 PMTCT) was used to inform Paper 2 for the doctoral research. The third theme includes insight from participants about how we might design an intervention to be responsive and sustainable.

Table 5. Formative research themes

		Broad Code	Definition / Research question
Setting	C.1	Severity of Violence	What types of violence occur towards pregnant women? What are the impacts of this violence?
	C.2	Community Responses Resources	How does the broader community respond to incidents of IPV? What resources exist for victims of violence?
	C.3	Gaps in Clinic IPV Response	What challenges exist for clinics in responding to IPV?
	C.4	Receptiveness & awareness	How receptive are clinic staff to the idea of an IPV intervention? How aware are they of the violence experienced by patients?
Content	C.5	Mental Health	How can the intervention support the mental health of patients? How are the health care workers sensitized to Mental health?
	C.6	IPV - HIV Link	How are violence and HIV related in the lives of patients?
	C.7	PMTCT	What are the current PMTCT procedures? How do women respond to PMTCT services?
Design	C.8	Intervention Structure	How might the IPV intervention be designed? Who should implement it? How can intervention be designed to be most sustainable?
	C.9	Health Worker Training & Support	How can HWs be supported to deliver the intervention? How can ongoing mentorship improve the quality of intervention delivery?

Limitations

There were several limitations to this formative, qualitative research. Firstly, logistical constraints led to small sample sizes of each participant group. Secondly, there was potential that the perspective of individual researchers informed the data analysis process. Although we tried to limit a skewed version of the data using team analysis approaches, it is possible that certain views emerged more strongly during analysis and write-up.

E. Methods for Paper 3: Social Constructionist Research

The methods for the second qualitative paper were unique from those of the formative, qualitative research. Specifically, we used social constructionist research to explore pathways from IPV to PMTCT adherence among women who lived with both HIV and IPV. A larger sample with deeper exploration of emerging themes allowed us to both hypothesize new pathways and confirm them in later interviews.

Qualitative Sampling

The sample for the qualitative in-depth research was drawn purposively from the Intervention arm of the Safe & Sound Trial and from among women who had lifetime experience of IPV. This

sample was comprised of a total of 32 women living with HIV and who had some lifetime exposure to partner violence (Fig. 10). In practice, this included women participating in the trial (ie. experiencing recent IPV), as well as women who were not eligible to enroll in the trial, but who had experienced IPV in their lifetime. These lifetime history participants had already completed a full study baseline questionnaire and agreed to be contacted about further research. Study nurses guided the selection of participants based on their impression of women's willingness to take part in an additional interview, their knowledge of women's experiences of IPV, and women's HIV-positive status.

The sample included 26 women with recent IPV and 8 women with lifetime experience of IPV. Roughly equal numbers of participants were pregnant vs. postpartum at the time of interviews. In total, 12 participants were partially non-adherent or taking no medication at all during pregnancy. A full set of participant characteristics is included in Chapter 7 (Paper 3).

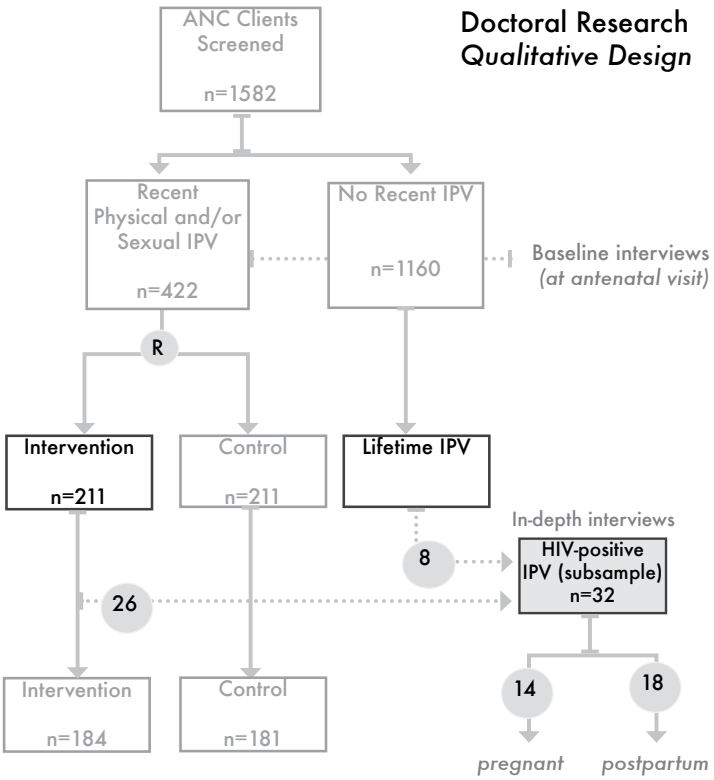


Figure 11. Qualitative nested study design

Qualitative Data Collection

The goal of in-depth interviews was to explore why and how IPV influences PMTCT behaviors in pregnancy and postpartum. It was anticipated that this portion of the interviews would lead to hypothesis development, and that one interview will build on the others in an effort to further explore these dynamics. As described in more detail in Chapter 6, the methodology for this study was informed by *narrative, constructionist approaches* to researching IPV (Allen, 2011).

In-depth interviews were conducted face-to-face, in a private clinic room, at a convenient time for the woman (e.g., a time when she is already visiting the clinic for services). I conducted a portion of these interviews among participants who were conversant in English, a Masters student conducted a portion in English, and two trained Nurse Researchers conducted the remainder in a

South African language of the participants' choosing (Tswana, seSotho, isiZulu). To ensure that interviews achieve adequate depth, the first six transcripts were reviewed jointly with the researchers to establish future questions, points of clarification, and initial themes.

An in-depth interview guide explored several themes (Appendix G). Theme 1 examined the *IPV-HIV link*: what relationship between IPV and HIV in women's lives, including participant perceptions of the directionality of the relationship (does HIV lead to IPV or visa versa?). Theme 2 explored women's *perceptions of HIV-related health* outcomes. For example, these questions unpacked how IPV frames PMTCT uptake decisions and impact of IPV and HIV on the success of pregnancy and health of infant. Theme 3 dived deeper into *mechanisms* through which IPV may impact PMTCT-related health behaviors. This portion of the interview was comprised of semi-structured questions around relationship control, mental health, and partner disclosure.

Qualitative Data Analysis

Trained transcriptionists transcribed digitally-recorded data verbatim, and I checked a portion (40%) of transcripts for accuracy. Each transcript was reviewed by a researcher to ensure clarity and for additional detail about tone and non-verbal cues. Interviews conducted in the local language (Sesotho or isiZulu) were translated directly into English and reviewed for translation errors by the researcher who led the interview. All data collection materials were stored in a locked file cabinet and electronic voice files and transcripts were password protected and stored on an encrypted server. At the point of transcription, the lead researcher assigned a pseudonym unrelated to the participant's real name for ease of analysis. The data presented here note the pseudonym, age, and whether the woman was pregnant or postpartum.

To ensure that interviews achieved adequate depth and richness, the first 6 transcripts were reviewed jointly to establish future questions, points of clarification, and initial themes. Researchers reviewed full transcripts and created detailed 'memos' to highlight initial impressions of the data. This review process was repeated at two other time-points (upon completion of 18 interviews and 28 interviews). Both reviews led to tweaking of the interview guides, with major themes retained but sub-questions altered to enhance probing and clarity. The team developed an initial coding framework based on the preliminary review of 6 transcripts and "sensitizing concepts", or preliminary ideas around how to examine the data (Bowen, 2006).

The coding framework was applied to all transcripts by myself and a Masters student I supervised using Dedoose qualitative analytic software. The focus of double-coding was to ensure that code application was consistent across transcripts and that code definitions were robust. Rather than assessing inter-rater reliability, we used a series of phone calls and in-person

meetings to refine codes until consensus was reached. This process led to a refined set of thematic codes that comprised broad topics such as relationship characteristics, experience of violence, HIV diagnosis, PMTCT uptake, mental health, social support, partner HIV serostatus disclosure, and reflections on being asked about IPV in pregnancy. Next, we established a system of fine codes that emerged inductively from the data. Fine codes were applied to a portion of transcripts by three researchers, ensuring that every transcript was double-coded. Examples of fine codes within the partner HIV disclosure section were: fear of partner response, reactive or polarized methods of disclosure, male partner denial of disclosure, concern for the child, supportive steps, and displaced anger. During analysis, cases that did not fit the overall picture, called "exceptional cases", were actively sought out. Trustworthiness of findings was ensured by the team approach to data analysis, coding discussion meetings, and by presenting initial findings to groups of colleagues and peers.

Limitations

There were several limitations to this qualitative research. It is possible that other forms of IPV were important to women but were not brought up in the interviews. For example, little data emerged around contraceptive control or spiritual abuse, but it is possible that these forms of violence occurred. Future research would be strengthened by asking specifically about these forms of violence in relationships. As with any form of research, the positionality of the researcher can influence how participants respond. As a white, non-South African woman, it was crucial that I build rapport and trust with participants before exploring sensitive questions. I was able to establish an empathetic and containing interview environment by using trauma-informed skills that I learned through the study and via weekly supervision by a clinical psychologist throughout the research period. These skills include: managing my own emotional response, setting a calm tone prior to starting the interview, listening with empathy but not sympathy, carefully observing participant cues to detect moments where probing is too deep (e.g. looking away, wringing hands, being on the verge of tears). The skills I learned were then instilled in Nurse Researchers through regular debriefing and supervision meetings. This helped diffuse power differentials associated with their being employed, wealthier, black South African women in comparison to the study participants.

F. Methods for Paper 4: Structural Equation Modeling

The final manuscript built upon the findings from Papers 2 and 3, which posited potential mechanisms through which IPV impacts on ART adherence. This paper also drew upon robust

findings from Paper 1 that suggest IPV is associated with ART adherence among women, and deepened these by looking at a cohort of pregnant and postpartum participants.

Nested Study design

The design for Paper 4 was a quantitative study for which we recruited and followed a subset of women who were HIV-positive at the baseline visit of the Safe & Sound Trial. We leveraged existing data collection for the parent study at baseline. New data collection added for this doctoral research included following up women who were HIV-positive but did not experience violence (n=139). In Figure 11, these additional data collection methods are highlighted in gray shading. Thus, the PhD research adds to the parent study by examining the existing cohort from the perspective of HIV infection and uptake of services.

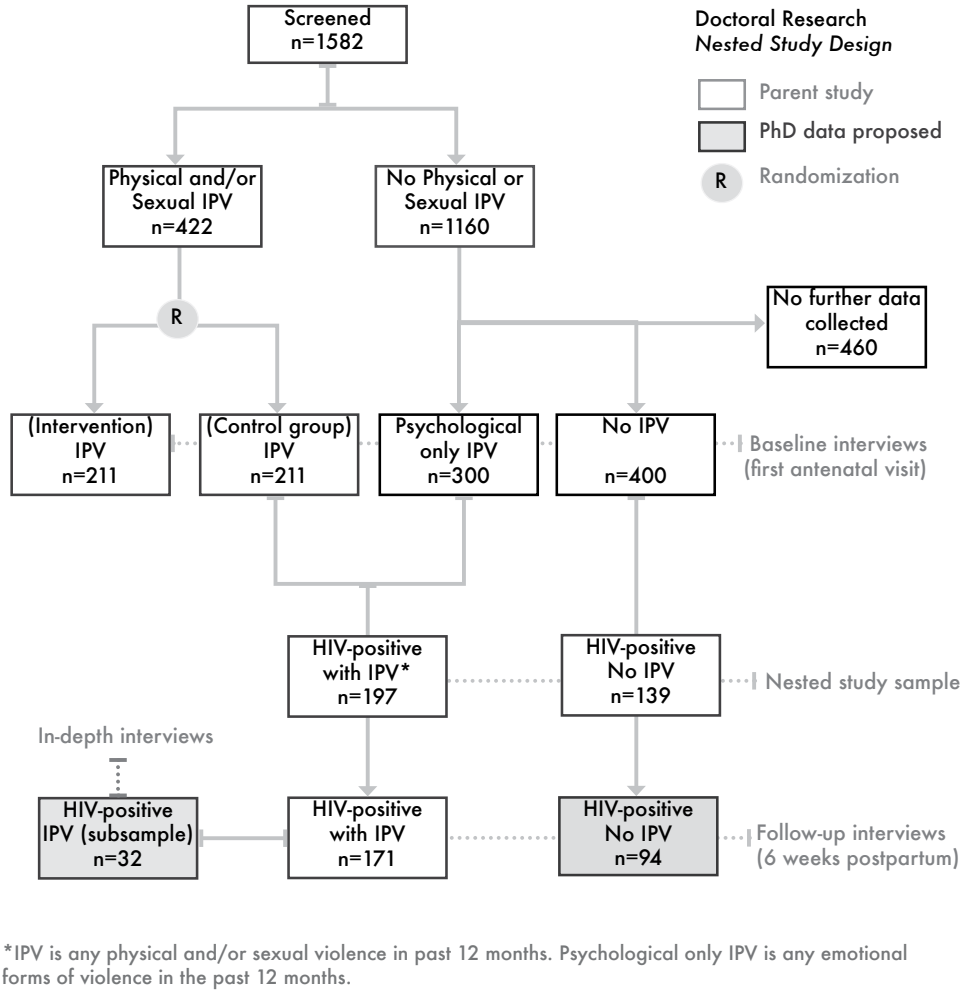


Figure 9. Doctoral research nested study design

Study Population

The study population was pregnant women accessing services from three antenatal clinics in Johannesburg. The population was comprised of a large group of antenatal clients (n=1582) screened for their experience of IPV in the previous 12 months. Of these, we knew a portion would be HIV-infected, and these women were invited to be followed-up at their 6-week routine postpartum clinic visit. In practice, the follow-up visits were scheduled anywhere from 6-24 weeks postpartum.

All participants in this PhD sub-study were HIV-positive at baseline. The *subsample* of participants with IPV was comprised of HIV-positive participants from the Safe & Sound Trial (i.e. reported physical and/or sexual violence at baseline) as well as HIV-positive patients who experienced only psychological violence at baseline. The subsample of non-IPV women was comprised of HIV-positive women who screened negative for recent IPV during their first antenatal visit.

Eligibility

Participants were *eligible* if they were over 18 years of age, were pregnant at baseline, and did not exhibit an immediate safety risk (suicidality or fearing for the safety of one's children). Eligible participants were women who self-report at least one form of IPV in the previous 12 months (physical, sexual, or psychological) in the baseline interview. It is important to note that this eligibility criteria is somewhat broader than the parent study, which determined eligibility by physical and/or sexual violence only. In other words, those women experiencing only psychological IPV at baseline were "reallocated" to the IPV-yes group for the current study. This serves to balance the group sizes, while accounting for the fact that psychological IPV has been shown to have similar health and behavioural effects as physical and sexual violence (Groves et al., 2012).

Sample size

The sample size for this study was constrained by the sample size of the parent study, which aimed to recruit approximately 300 women who were HIV-infected. Based on a recent Johannesburg study, we assumed just over half (63%) of these women would be adherent to ART (El-Khatib et al., 2011).

From data suggesting that IPV is associated with lower odds of self-reported ART adherence (Adjusted odds ratio 0.75, p=0.005) (Lopez et al., 2010), we assumed that adherence may be reduced by up to 25% due to IPV. Thus, even after accounting for loss to follow-up, we

would have adequate power (> 0.80) in our sample to assess reductions in adherence similar to that seen in other studies, from 75% to 56% (Table 6).

Table 6. Sample size calculation

Alpha	N1 (HIV+, IPV+)	N=2 (HIV+, IPV-)	Proportion N1 >95% adherent	Proportion N2 >95% adherent	Power
0.05	**128**	**128**	**.56**	**.75**	**0.909***
0.05	128	128	.58	.75	0.838
0.05	128	128	.6	.75	0.739

* denotes decrease in adherence found in similar studies

Quantitative Data Collection

Quantitative data for both the Safe & Sound Trial and the PhD studies was collected by trained Nurse Researchers posted at each clinic for the duration of the study. Data were collected on paper forms (Appendix I) measuring the following outcomes and predictors:

Primary exposure: IPV. To measure IPV in pregnancy and in lifetime, women were asked 20 items from the IPV instrument of the WHO Multi-Country Study at baseline and follow-up (Garcia-Moreno et al., 2006). This instrument measures physical, sexual, and psychological IPV in the past year and throughout one's lifetime. It was developed by our WHO collaborators, and has been used in sites globally to measure IPV prevalence, including in South African studies (Dunkle et al., 2004a; Jewkes et al., 2010; Jina et al., 2012; Townsend et al., 2011). We added two questions on financial violence: "*Has your partner withheld money for essentials (e.g., food) even when he has money for other things?" "Does your partner take away your own earnings or savings without your permission?".* We also added one additional question to account for psychological violence in the form of forced exile: *"Has your partner ever forced you to leave the house?".* The WHO instrument was analyzed as a dichotomous outcome (any physical and/or sexual IPV). We used Tsai et al.'s approach to generating an IPV intensity index from equally weighted averages of thirteen z-scores (for which each item was standardized to a mean of 0 and standard deviation of 1) (Tsai et al., 2016). Higher values denote greater intensity of IPV. The measure loaded as a single factor during confirmatory factor analysis, and the index had good internal reliability (baseline Chronbach's $\alpha = 0.86$; follow-up $\alpha = 0.88$).

Primary outcome: Self-reported postpartum ART adherence > 90% was measured using the 30-day Visual Analog Scale (VAS). The VAS has been validated globally (Walsh et al., 2002) and in South Africa (Peltzer et al., 2010a), and shows strong correlation with measures such as electronic medication monitoring and unannounced home pill count (Buscher et al., 2011; Oyugi et al., 2004). The VAS asks individuals to mark a line at the point along a continuum showing

how much ART they have taken in the past month (Giordano et al., 2004). We converted the VAS scores into a dichotomous outcome of adherence (>90% vs. <90% adherence, a cut-off that has been used in similar studies (Mepham et al., 2011; Simoni et al., 2006)). For the final structural equation model, we analyzed VAS as a continuous variable (0 – 100% adherence).

Pathways: Relationship Control. *Controlling behaviors* was measured using five items from the WHO Multicountry Study instrument about how male partners control clothing, movement, and access to social networks (Garcia-Moreno et al., 2006). ***Mental Health.*** Mental health for this study was defined as three constructs: anxiety, depression, and post-traumatic stress. *The Hospital Anxiety and Depression Scale (HADS)*, a 14-item measure for assessing mental health in primary health care settings (Zigmond & Snaith, 1983), has been used in South Africa (Abratt & Viljoen, 1995), and was analyzed as two dichotomous outcome (HADS-D score of >15 vs. <=15; HADS-A score of >15 vs. <=15). *The Harvard Trauma Questionnaire*, a 16-item measure for post-traumatic stress disorder (PTSD) (Mollica et al., 1992), has been validated in South Africa (Ward et al., 2004). Each item is asked on a 4-point likert scale and scores are summed. It was analyzed as a dichotomous outcome using a cut-off score developed in similar settings (Roberts et al., 2008) (probable PTSD >28 vs. <=28). ***Disclosure.*** Two items determined self-reported partner disclosure at baseline and follow-up: "*Does your partner know your HIV status?"; "Did you disclose it to him?"*. ***Health care utilization*** was determined by asking women at follow-up to self-report the number of antenatal visits they made.

Covariates: Socio-demographics. Questions were asked at baseline and were adopted from similar studies to assess socio-demographic characteristics: age, education, unemployment, housing type, ethnicity, migration. ***Food insecurity*** was measured using the 3-item, validated Household Hunger Scale (Deitchler et al., 2010), and a woman was considered food secure if she had no or little household hunger (score of ≤ 2). ***Relationship characteristics*** included several questions around the current partnership: marital status, length of time with partner, whether still in a relationship. ***Clinical characteristics at baseline.*** *Gravidity and parity* were measured by asking women two questions about previous pregnancies. *New HIV diagnosis* was assessed as women who test positive for the first time during this pregnancy. ***Clinic site*** refers to which clinic the participant attended antenatal care (Yeoville, South Rand, Hillbrow, Rosettenville), and clustering by clinic was accounted for in final models.

Quantitative Data Analysis

We conducted analyses for Paper 4 in Stata 13.1 (StataCorp LLC, College Station, TX). First, we examined scales for internal consistency using Cronbach's alpha. We conducted bivariate analyses of the outcome variable against the exposure variable and other selected socio-

demographic variables. Bivariate analyses (t-test, χ^2 test) were conducted to examine differences by adherence status for normally distributed variables. Nonparametric bivariate analyses (Mann-Whitney U test) were conducted for non-normally distributed study variables (children, education, time with partner, time on ART, controlling behaviors, intensity of IPV, postpartum age at follow-up).

To measure the association between recent IPV and adherence to HIV medication, we initially conducted bivariate logistic regression models. We then adjusted for socio-demographics associated with adherence at $p \leq 0.20$, a liberal cut-off point to ensure conceptually important variables were retained. We report on the odds ratios and the alpha statistic at the significance level of 0.05.

We next conducted Structural Equation Modelling (SEM) with maximum likelihood estimation to test relationships between IPV, potential mediators, and ART adherence in pregnancy and postpartum. First we used exploratory factor analysis to determine the correct measurement model for latent variables: IPV at baseline and IPV at follow-up. For indicators to be retained in the latent variable, each observed item needed a factor loading of at least 0.40. In the case of IPV at follow-up, this requirement led to the dropping of three sexual violence items. Thus, IPV at follow-up specifically measures intensity of physical and psychological IPV only.

We then used bivariate regression and evidence from our previous qualitative work to guide preliminary model building. Model modifications were performed based on modification indices and theoretical plausibility. After deriving a path model solution, we regressed each included latent and observed variable on the following covariates: age (years); food security (household hunger scale); education (years completed); time since ART initiation (days). Once model fit was satisfactory, we trimmed non-significant paths.

Final SEM models are presented using standardized parameters and we used Cohen's typology of small (≤0.10 or less), medium (0.30), and large (≥ 0.50) effect sizes to assess these relationships (Cohen, 1977). Measures for model fit included an absolute measure (standardized root-mean-square residual), a parsimonious measure (root-mean-square error of approximation) and an incremental measure (comparative fit index) (Bentler, 1990; Steiger, 1990). Acceptable model fit assumed the model met the following criteria: SRMR<0.08; RMSEA<0.08 for reasonable fit and <0.05 for good fit; and CFI≥0.90. We report the χ^2 fit statistic but note that it is less valuable as a measure of model fit given its tendency to inflate in large sample sizes (Hooper et al., 2008).

Limitations

A limitation of this quantitative analysis is the use of self-reported adherence. Several methods allow assessment of ART adherence, but none is, as yet, considered the ‘‘gold standard’’ (Berg & Arnsten, 2006). Research in sub-Saharan Africa uses many measures, such as questionnaires, pharmacy refill records, pill counts, visual analog scales, and electronic drug monitors. In most PMTCT and general HIV populations, self-report is used as an adherence measure due to its simplicity and low cost (Mills et al., 2006; Nachega et al., 2012). Nevertheless, it would be stronger to have an objective biomarker of adherence, such as viral loads, as the outcome.

Mental health screening tools developed primarily in resource-rich setting may be less appropriate for sub-Saharan African settings (Tsai et al., 2013). Given the challenges associated with identifying culturally-specific cut-points for depression, anxiety, and PTSD, we included these symptoms as continuous variables in the final models. This choice recognizes that even when symptomology fails to meet a clinical diagnosis, it can lead to psychosocial effects that are important to consider in public health programming (Judd et al., 1998). Our brief mental health screener, HADS, may be a better measure for general distress than either anxiety or depression alone (Norton et al., 2013).

G. Ethical Considerations

The parent study received approval from the Wits Human Research Ethics Committee (HREC-M121179) and WHO Ethics Research Committee (ERC-RPC471), found in Appendix B. Because this research is for degree purposes, a full HREC approval for secondary analysis was obtained (HREC M140451), found in Appendix A.

All research was conducted along the principles of informed written consent, with additional written consent provided for granting permission to digitally record qualitative interviews. Paper-based data regarding IPV and HIV (participant structured questionnaires, qualitative reflection notes) were stored separate to identifying information (participant follow-up information, socio-demographics data) and kept in a locked file cabinet kept in a locked study office. Data and identifying information were linked using unique participant identifier numbers. Electronic data (systematic review abstraction, transcription of qualitative data, abstraction of quantitative data) were stored in password-protected computers and online in an encrypted server that could only be accessed by study investigators.

All researchers involved in the study had been trained in research ethics prior to commencing study activities. Given the special considerations of researching violence, all portions of this study adhered to the WHO ethical guidance on IPV research (WHO, 2001). The

parent study also established two teams for monitoring the safety of the research. The *Data Safety Monitoring Board* examined data at study midpoint, to determine whether it is in the best interest of participants to continue. The *Study Advisory Committee* was comprised of South African experts in IPV who have guided the intervention and research since inception.

Three additional ethical concerns merit attention. First, there was risk associated with loss to reputation or stigma should a participant's IPV or HIV status be intentionally or unintentionally disclosed. In response to these reputational ethical concerns, we built in a number of special precautions:

- *We identified a private room in each clinic where women will be screened and interviewed. Women were invited to meet with the Nurse Researcher at the clinic. All efforts were made to find a time that is safe and convenient for them. For example, if a male partner expected a woman to return quickly from clinic, we found an alternate convenient time to continue the questionnaire.*
- *The male partners were not informed about a woman's participation in the research because of the potential for an abusive partner to react violently. In the case of phoning participants, and the risk that partners will hear them, Nurses were trained to ask "is this a safe time to speak?" before continuing.*
- *The research was presented broadly so that the specific nature of the study was not made public. The title of the research was neutral "Safe & Sound", rather than calling it a study about violence. Only when the participant and interviewer were alone did the qualitative researcher provide further information about the nature of the study.*
- *All data collection materials were stored in a locked file cabinet and computers will be password protected to minimize the risk to participant confidentiality.*

Second, it was possible that participants would experience psychological distress related to recounting IPV experiences. Findings elsewhere (DePrince & Freyd, 2004; Griffin et al., 2003; Jorm et al., 2007) suggest the risk of distress associated with asking women about violence is low, and in the South African setting, risk of psychological distress is minimized if researchers conducting the interviews are trained to respond (Sikweyiya & Jewkes, 2012). Indeed discussing traumatic experiences with supportive providers can be therapeutically beneficial (Jansen et al., 2004; Savell et al., 2006), whereas ignoring or disconfirming experience of abuse can lead to future psychopathology (Rieker & Carmen, 1986; Warshaw et al., 1998). Nonetheless, we established several mechanisms to protect participants from potential harm related to participation:

- *We hired a team of dedicated Nurse Researchers who participated in intensive initial and ongoing training. The training incorporated personal reflection, role plays, group activities on several topics (background of IPV, triggers of IPV in pregnancy, HIV-IPV link, resources, referral procedures, reporting requirements, empathic listening skills, best practice patient follow-up). A*

dedicated Referral List developed for the trial during the formative research phase was used to guide onwards referrals (Appendix C).

- *We developed a distress protocol specific to women experiencing IPV. Basic elements of the distress protocol were employed during most interviews included in this study: a calm, non-judgmental approach to inquiry; watching for signs of resistance when inquiring about violence to avoid re-traumatisation; offering tissues if participants cried; offering a break from the interview. In cases of severe distress, researchers were trained to invite participants to stop the interview, a technique that was used with one participant, and to offer supportive referrals. In the case of current suicidal thinking, researchers were trained to make a direct referral to a psychiatric ward of the nearest hospital. In this sample, no participants revealed current suicidal thinking but several participants recounted a history of suicidal ideation, for which researchers offered empathetic listening and referrals to a nearby community psychology counseling service.*

With these precautions in place, we found that the temporary difficulty in discussing sensitive topics led to minimal psychological harm on the part of participants.

Lastly, there were important ethical considerations regarding the researchers themselves. Research on IPV is known to place researchers at risk of vicarious trauma, or the process when a researcher or therapeutic professional moves from a position of empathizing with a participant's experience towards taking it on personally (Pearlman & Saakvitne, 1995). Because IPV is necessarily a traumatic event, researchers studying this topic are regularly exposed to traumatic material and need tools to adapt and respond to this exposure (Campbell 2002, Morrison 2007). Together with the Co-Principal Investigator on the trial, who is a clinical psychologist specializing in trauma, I developed an approach to ensure that research staff were able to be resilient to vicarious trauma throughout the trial. Specifically, our team implemented the following procedures, which have been incorporated into *Guidelines for the prevention and management of vicarious trauma among researchers of sexual and intimate partner violence* (Sexual Violence Research Initiative, 2015) :

- *In initial training, all staff were trained around recognizing symptoms of vicarious trauma, stress, and burn-out (Coles et al., 2014)*
- *We used a team approach to debriefing through weekly meetings with the entire team to discuss difficult cases, take note of IPV treatment approach, debrief challenges, and share professional impact of the work. This was coupled with consistent check-ins with managers and colleagues which occurred informally at multiple time-points each week (Hatcher et al., 2015a).*
- *We created a fund within our project to give researchers access to dedicated providers who could offer professional supervision (a psychologist or social worker) (Woollett & Hatcher, 2016). In practice fewer than half of the team members accessed this, but it was a resource that I accessed throughout the PhD.*

These steps cannot ensure that vicarious trauma is eliminated altogether, but they assisted in enhancing staff resilience around the emotional burn-out associated with IPV research. A positive by-product of focusing on staff coping and supervision strategies was that our research team developed quite cohesive approaches to supporting one another. Ultimately, this was strategic for ensuring staff wellbeing and safety, but also for ensuring research quality.



Chapter 4. Systematic Review

Hatcher, A. M., E. M. Smout, J. M. Turan, N. Christofides and H. Stöckl (2015). Intimate partner violence and engagement in HIV care and treatment among women: A systematic review and meta-analysis. *AIDS* 29(16): 2183-2194.

Photo credit: Abigail Hatcher, Safe & Sound team during an experiential training exercise on antenatal patients who have to balance the requirements of PMTCT with competing demands like violence.

A. Introduction

Advances in HIV care and treatment have led to remarkable health gains among those living with HIV. Yet, many HIV-positive patients remain out of care, fail to take up treatment, or are non-adherent to antiretroviral therapy (ART). Such challenges with engagement in HIV are common among females (Lazo et al., 2007; Merenstein et al., 2008), and are responsible for a considerable proportion of morbidity and mortality among HIV-positive women (Poundstone et al., 2001; Sackoff et al., 2006).

There are a number of reasons for poor engagement in HIV care, among which intimate partner violence (IPV) has received increasing attention. IPV is defined as any behavior within an intimate relationship that causes physical, psychological or sexual harm (WHO, 2007), and global prevalence among women is estimated to be 30% (Devries et al., 2013b). IPV is associated with HIV infection in cross-sectional (Maman et al., 2002) and prospective studies (Jewkes et al., 2010; Kouyoumdjian et al., 2013). A meta-analysis of data from 28 studies showed that multiple forms of IPV are associated with incident HIV infection in women (Li et al., 2014). Research points to direct links between IPV and HIV infection, via forced sex, as well as indirect links, via heightened HIV risk among IPV perpetrators and a reduced ability for women in violent relationships to negotiate condom use (Decker et al., 2009; Dunkle & Decker, 2013; Stockl et al., 2013b).

Despite this emerging literature around HIV acquisition, less is known about the influence of IPV for those already living with HIV. Evidence suggests that women living with HIV have a high likelihood of relationship violence. Clinical samples from resource-rich settings estimate that 68-95% of HIV-positive women experience IPV in their lifetime (Borwein et al., 2013; Brady et al., 2002; Cohen et al., 2000; Sowell et al., 2002; Vlahov et al., 1998). In resource-constrained settings, HIV-positive women are twice as likely as HIV-negative counterparts to report lifetime violence from a partner (Fonck et al., 2005). HIV diagnosis, in itself, can trigger relationship conflict and violence (Ezechi et al., 2009; Pence et al., 2007; Sowell et al., 2002; Zierler et al., 2000). Importantly, HIV testing, regardless of the serostatus outcome, can lead to violence (Hatcher et al., 2013; Shamu et al., 2014), suggesting that even this first step in accessing care and treatment may pose an IPV risk.

IPV leads to declines in HIV-related health, with studies finding an association between IPV and virologic failure (Nava et al., 2011; Schafer et al., 2012), lower CD-4 counts (Schafer et al., 2012), higher incidence of opportunistic infection (Liebschutz et al., 2000; Nava et al., 2011), marked increase in episodic diseases (e.g. pneumonia, bronchitis, sinusitis) (Liebschutz et al.,

2000), and greater risk of mortality (Weber et al., 2012). Negative effects on engagement in care and treatment may be a leading reason for IPV being associated with poor health outcomes for HIV-infected women.

Several plausible mechanisms could drive the relationship between IPV and HIV-related engagement in care. Fear of new or continued IPV leads women to avoid disclosure of their status to male partners (Makin et al., 2008; Mepham et al., 2011; Tam et al., 2015), which in turn has a significant impact on treatment adherence (Bajunirwe et al., 2009; Medley et al., 2004; Wouters et al., 2009). When women are fearful of violence from their partners, they may be more likely to default on medications or may have other health priorities, such as physical safety, that trump adherence (Hatcher et al., 2014). Qualitative studies have explored how fear and experience of IPV influence women's decisions to take up and stay retained in HIV services (Antelman et al., 2001; Hatcher et al., 2014; Kilewo et al., 2001). Given the well-established links between IPV and mental health (Chandra et al., 2009; Ellsberg et al., 2008; Ishida et al., 2010; Mahenge et al., 2013; Martinez et al., 2009; Pico-Alfonso et al., 2006), it is possible that poor mental health is the main explanation for how IPV impacts on ART adherence (Ammassari et al., 2004; Cook et al., 2002; Starace et al., 2002; Sumari-de Boer et al., 2011). Alternately, feelings of denial and shame may preclude abused women's abilities to seek care openly (McCauley et al., 1998), or partner control may inhibit access to medical care (Lichtenstein, 2006).

Despite health risks associated with IPV among HIV-infected persons, IPV remains an understudied factor in the literature around HIV care and treatment (Gari et al., 2013). Evidence on the association between IPV and adherence has yet to be reviewed systematically. This study examined the relationships between IPV and engagement in HIV care and treatment (ie. ART uptake, ART adherence measured through self-report or by viral loads, and retention in HIV care) through a systematic review and meta-analysis.

H. Methods

A systematic review and meta-analyses were conducted on studies measuring an association between IPV and ART use, ART adherence (self-reported), ART adherence (viral suppression), and retention in HIV. The aim was to determine the extent to which IPV is related to engagement in HIV care and treatment among women.

Selection criteria

This review follows PRISMA reporting guidelines for systematic reviews (see Table 4) (Moher et al., 2009). Studies were eligible for inclusion if they: 1) included adult women living with HIV; 2) presented primary, quantitative data in a peer-reviewed manuscript based on cross-sectional, case control, or longitudinal data; and 3) measured the predictor of interest (IPV) and at least one outcome of interest. No restrictions were placed on study setting or population.

Search strategy

Electronic searches were conducted using the following databases: PubMed, Web of Science, CINAHL, and PsychoInfo. Articles in English or French were included if they had been published in peer-reviewed journals before or up to January 2015. Search terms and a full search strategy can be found in Chapter 3: Methodology.

Study selection

Using the "online search" function of EndNote (Reuters, 2011), all titles and abstracts matching the search terms were imported. Two authors (AMH, EMS) independently reviewed all identified study titles and abstracts. Papers were retained if at least one search term for predictor or outcome concept was found. Abstracts that did not meet all inclusion criteria were excluded and reason for exclusion noted. Exclusion criteria included publication factors and population characteristics (Figure 12).

The same authors (AMH, EMS) independently screened full papers of all included abstracts. Full papers with discrepancy about inclusion were

Text S2. Search Terms

Constructs	Search terms
Intimate partner violence	Keywords: "emotional abuse" OR "violence" OR "acquaintance rape" OR "sexual abuse" OR "domestic violence" OR "exposure to violence" OR "battered females" OR "intimate partner violence" OR "rape" OR "battered wom*n" OR "domestic abuse" OR "family violence" OR "family abuse" MESH terms: domestic violence OR partner violence OR battered OR spouse abuse OR spouse violence OR domestic abuse OR partner abuse OR sexual abus* OR sexual victimi* OR sexual violence OR rape
HIV treatment	Keywords: hiv" OR hiv infect* OR human immunodeficiency virus OR hiv-1 OR hiv-2 OR "aids" OR "antiviral drugs" OR "drug therapy" OR antiretroviral MESH terms: hiv/ OR hiv 1/ OR hiv 2 antiretroviral OR antiretroviral therapy, highly active OR zidovudine OR nevirapine
Adherence and retention	Keywords: adheren* OR complian* OR persisten* OR loss to follow-up OR LTFU OR retention OR missed visit* OR interruption OR linkage OR treatment failure OR "continuum of care" MESH terms: medication non adherence/ or adherence/compliance/ OR adherence/non adherence/ OR adherence/persistence/ OR adherence/pill taking/ OR adherence challenges/ OR adherence behaviours/ OR Lost to Follow-Up OR Clinic visit$ OR visit$, clinic OR Failure$, Treatment OR Treatment Failures OR Disease Progression

PubMed search strategy

1. (domestic violence or partner violence or battered or spouse abuse or spouse violence or domestic abuse or partner abuse or sexual abus* or sexual victimi* or sexual violence or rape[MeSH Terms])
2. (hiv/ or hiv 1/ or hiv 2 antiretroviral or antiretroviral therapy, highly active or zidovudine or nevirapine[MeSH Terms])
3. (medication non adherence/ or adherence/compliance/ or adherence/non adherence/ or adherence/persistence/ or adherence/pill taking/ or adherence challenges/ or adherence behaviours/ or Lost to Follow-Up or Clinic visit$ or visit$, clinic or Failure$, Treatment or Treatment Failures or Disease Progression[MeSH Terms])
4. 1 and 2 and 3

Web of Science search strategy

1. "emotional abuse" OR "violence" OR "acquaintance rape" OR "sexual abuse" OR "domestic violence" OR "exposure to violence" OR "battered females" OR "intimate partner violence" OR "rape"
2. "hiv" OR hiv infect* OR human immunodeficiency virus OR hiv-1 OR hiv-2 OR "aids" OR "antiviral drugs" OR "drug therapy" OR antiretroviral
3. adheren* OR complian* OR persisten* OR loss to follow-up OR LTFU OR retention OR missed visit* OR interruption OR linkage OR treatment failure OR "continuum of care"
4. 1 and 2 and 3

PsycInfo search strategy

1. su.Exact("emotional abuse" OR "violence" OR "acquaintance rape" OR "sexual abuse" OR "domestic violence" OR "exposure to violence" OR "battered females" OR "intimate partner violence" OR "rape")
2. su.Exact("hiv" OR "aids" OR "antiviral drugs" OR "drug therapy")
3. su.Exact("health care utilization" OR "retention" OR "compliance" OR "persistence" OR "treatment" OR "medication" OR "continuum of care")
4. 1 and 2 and 3

CINAHL search strategy

1. MW (("spousal abuse" OR "battered women" OR "emotional abuse" OR "violence" OR "acquaintance rape" OR "sexual abuse" OR "domestic violence" OR "exposure to violence" OR "battered females" OR "intimate partner violence" OR "rape"))
2. MW ("hiv" OR "aids" OR "antiviral drugs" OR "drug therapy")
3. MW ("health care utilization" OR "retention" OR "compliance" OR "persistence" OR "treatment" OR "medication" OR "continuum of care")
4. 1 and 2 and 3

Figure 13. Search terms

reviewed by a third author (HS) to reach consensus. Exclusion reasons were noted. No additional study was identified by searching the reference lists of included articles.

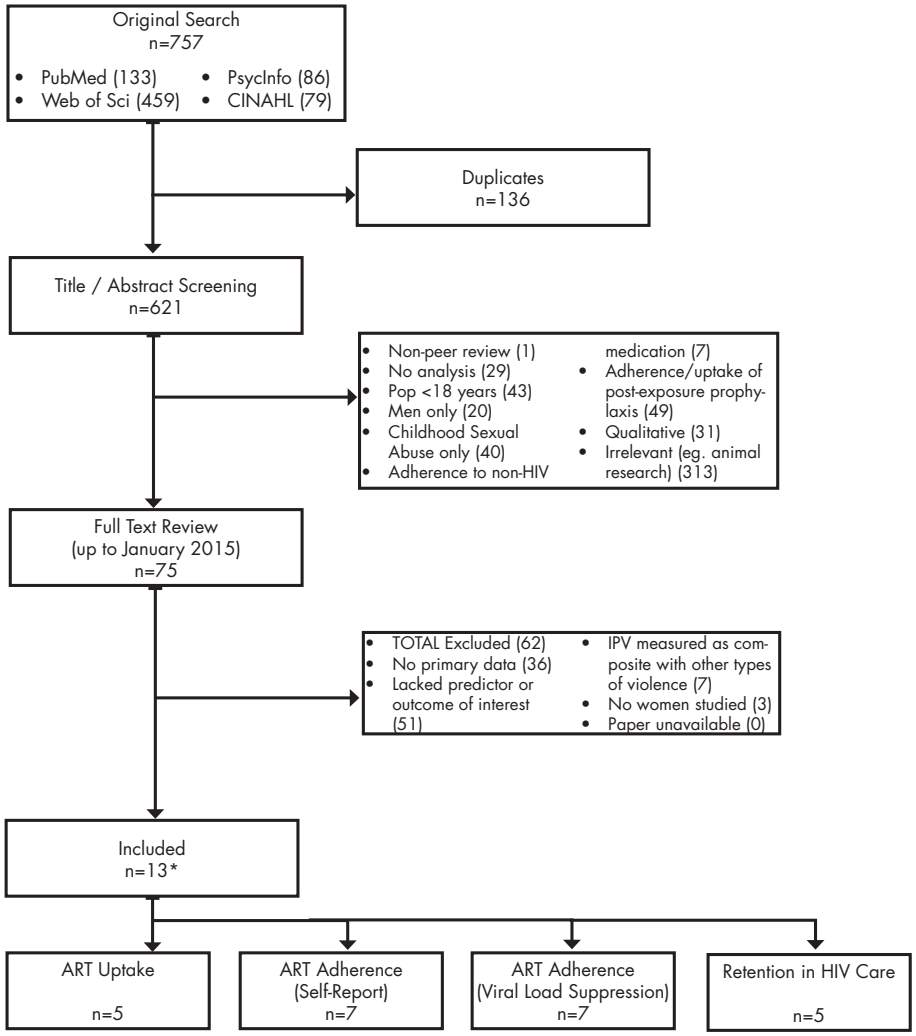


Figure 10. Flow diagram

Data extraction

Data were extracted on study design, setting, population, sample size, measures used to investigate IPV, and measures used to assess engagement in HIV care. As meta-analysis required data from among women only and in dichotomous outcomes, authors of several papers (n=7) were contacted directly via email and asked to abstract 2x2 tables in Excel: numbers of women reporting IPV vs. not and reporting engagement in care vs. not. Authors of all seven papers requiring additional information were willing and able to provide these data.

Quality appraisal

A quality appraisal was conducted on all included studies using an adapted Critical Appraisal Skills Programme (CASP) quality appraisal tool (Table 2 in Chapter 3) (Oram et al., 2012). The quality appraisal form includes 15 questions about study quality for which papers received a numeric score representing the extent to which they met the criteria: 0 (non responsive), 1 (partially responsive), or 2 (fully responsive).

Data analysis

Meta-analyses were conducted separately for dichotomous engagement in care outcomes. Dichotomous outcomes were deemed appropriate since key outcomes of interest were either inherently dichotomous (i.e. current ART use) or represented non-normally distributed continuous data (i.e. adherence, viral suppression). An assessment was made by the authorship team to ensure that "clinical heterogeneity" was acceptable to lend each outcome to meta-analysis (Deeks et al., 2008).

Quantitative outcomes were extracted into an Excel table. This included details on overall IPV prevalence in the study, cases and non-cases among women with IPV and without IPV, and correlation coefficients. Pooled unadjusted odds ratio (OR) estimates (with corresponding 95% confidence intervals) were calculated using random effects meta-analysis in STATA (Harris et al., 2008). No adjustment was made for potential confounders, given that few studies reported covariate data. Heterogeneity among studies was estimated using the I^2 statistic, with significant heterogeneity detected at the $p<0.05$ level. Sensitivity analysis for publication bias was undertaken through visual inspection of funnel plots (Sterne & Harbord, 2004) and Egger's test statistic (with small-study effects being detectable at a conservative $p<0.10$ level) (Egger et al., 1997). To aid comparison with other systematic reviews, the self-reported adherence outcome was transformed to a standardized mean difference (Chinn, 2000).

I. Results

Our search strategy identified 621 unique records, of which 554 were excluded during abstract screening (Figure 13). Full texts were obtained for 75 papers, of which 62 were excluded upon further screening. A total of thirteen studies measured the association between IPV and at least one of the primary outcomes: ART uptake, ART adherence (self-report), ART adherence (viral suppression), and retention in HIV care.

Key features of included papers

Table 8 presents the key characteristics and outcomes of the thirteen included studies (Blackstock et al., 2015; Blank et al., 2015; Illangasekare et al., 2012; Kalokhe et al., 2012; Lopez et al., 2010; Malow et al., 2013; Ramachandran et al., 2010; Rose et al., 2010b; Ryerson Espino et al., 2015; Schafer et al., 2012; Siemieniuk et al., 2013b; Sullivan et al., 2015; Trimble et al., 2013). Most studies (n=11) were conducted in the United States and sample sizes across all studies were relatively small, with a median of 234 participants. All thirteen studies were cross-sectional. Most studies (n=12) were conducted among the general HIV-infected population, with Kalokhe et al. conducting their study among high-risk crack/cocaine users.

Measures of Intimate Partner Violence

Measures of IPV were based on self-reports across all thirteen studies. As shown in Table 1, several studies used brief, unvalidated screening tools to assess violence (Illangasekare et al., 2012; Malow et al., 2013; Ramachandran et al., 2010; Rose et al., 2010b). Validated instruments included the Severity of Violence Against Women Scale (Schafer et al., 2012; Trimble et al., 2013), the Conflict Tactics Scale (Lopez et al., 2010), the Slapped, Threatened, and Throw instrument (Kalokhe et al., 2012), and the Women's Experience of Battering (WEB) scale (Blackstock et al., 2015; Ryerson Espino et al., 2015; Schafer et al., 2012; Sullivan et al., 2015). Ryerson Espino (2015) bolstered the WEB scale to include dimensions of forced sex and fears around physical safety. Siemieniuk (2010) trained clinic researchers to conduct a standardized screening using a single introductory question about any domestic abuse, after which women were considered to have IPV if they spoke in a semi-structured way about violence within a current or past relationship.

Eleven studies used lifetime experience of IPV as the exposure of interest, whereas two analyzed IPV in the past 12 months (Illangasekare et al., 2012; Trimble et al., 2013). Although several other papers included measures of recent violence (past 12 months (Lopez et al., 2010; Ryerson Espino et al., 2015); past 5 months (Ramachandran et al., 2010)), the authors did not conduct analysis using the "recent violence" data.

Ethical considerations

Quality scores are reported in Table 8. All studies reported informed consent procedures and ethical review. However, Siemieniuk and Schafer were the only authors to detail specific steps taken by clinicians when women disclosed IPV (Schafer et al., 2012; Siemieniuk et al., 2013b).

Table 7. Characteristics of included papers (n=13)

Author	Year	Sample size (women)	Population group	Type of study	Violence Measure	Outcome of interest	Country	CASP Quality Appraisal	Type of IPV Measure
Blackstock	2015	748	Women only	Cross-sectional	10 item Women's Experience of Battering (WEB) Scale	Retention (medical records)	United States	20	Ever, Physical and Psychological
Blank*	2015	587	Women only	Cross-sectional	10 item (WEB) Scale	Uptake (medical records), Adherence (self-report and viral suppression), Retention (medical records)	United States	20	Ever, Physical and Psychological
Illangasekare	2012	196	Women only	Cross-sectional	3 items from the Partner Violence Screen	Uptake (medical records), Adherence (viral suppression)	United States	16	Past 12 months, Asked at 1 timepoint, Physical, Psychological
Kalokhe*	2012	175	Women & Men (Crack/cocaine users, total 343)	Cross-sectional	5 items from the Slapped, Threatened, and Throw (STaT) instrument	Uptake (self-report), Retention (medical records)	United States	18	Ever, Physical, Sexual, Psychological
Lopez*	2010	94	Women & Men (total 190)	Cross-sectional	17 item Conflict Tactics Scale	Adherence (self-report)	United States	20	Ever, Past 12 months, Physical, Sexual, Psychological
Malow*	2013	166	Women & Men (total 194)	Cross-sectional	4 items from (unnamed) partner relationship scale	Adherence (self-report)	Haiti	20	Ever, Physical, Psychological
Ramanchandran	2010	18	Women & Men (total 56)	Cross-sectional	3 items of Abuse Assessment Screen	Uptake (self-report)	United States	14	Ever, Past 5 months, Physical, Sexual, Psychological

Rose*	2010	40	Women only	Cross-sectional	1 item from Traumatic Life Events Questionnaire	Adherence (self-report and viral suppression)	United States	15	Ever, Physical
Ryerson Espino*	2015	102	Women only	Cross-sectional	10 item (WEB) Scale plus 6 additional items on forced sex and fear	Adherence (viral suppression)	United States	22	Ever, Past 12 months, Asked at multiple timepoints, Physical, Sexual, Psychological
Schafer	2012	64	Women only	Cross-sectional	46 item Severity of Violence Against Women Scale (SVAWS) instrument and 10 item WEB Scale	Adherence (viral suppression), Retention (medical records)	United States	20	Ever, Physical, Sexual, Psychological
Siemieniuk	2013	339	Women only	Cross-sectional	Rich single-item screening question, assessed by interviewer as physical abuse,sexual abuse, emotional abuse, isolation, neglect, intimidation, and/or financial abuse	Uptake (medical records), Adherence (viral suppression), Retention (medical records)	United States	22	Ever, Physical, Sexual, Psychological
Sullivan*	2015	564	Women only	Cross-sectional	10 item WEB Scale	Adherence (viral suppression)	United States	22	Ever, Physical, Psychological
Trimble	2013	272	Women only	Cross-sectional	46 item SVAWS instrument	Adherence (self-report)	United States	21	Past 12 months, Physical, Sexual

* Authors contacted for raw data on outcomes of interest.

Current ART use

Five studies measured ***current ART use***. Three studies used self-report of a single question ("are you currently on ART?") to assess ART use at time of interview (Blackstock et al., 2015; Kalokhe et al., 2012; Ramachandran et al., 2010). Two assessed current ART use via clinical data routinely collected in the HIV clinic (Illangasekare et al., 2012; Siemieniuk et al., 2013b).

No individual studies found a statistically significant relationship between IPV and current ART use among women. Siemieniuk found that participants who experienced IPV were more likely to report ART non-use, but this association did not reach statistical significance (p=0.069) (Siemieniuk et al., 2013b). Kalokhe found lower current ART use among 343 male and female cocaine users who had ever experienced IPV (p=0.001), but this relationship was not significant among women alone (Kalokhe et al., 2012). Ramachandran found that men and women reporting a history of IPV were less likely to be using ART (66%) than non-abused counterparts (93%, p=0.04), but data were not available among women only (Ramachandran et al., 2010). Illangesekare found no significant association between experience of lifetime IPV and ART use in a sample of 196 HIV-infected women (risk ratio [RR]=0.73, 95% confidence interval [CI] 0.39–1.42) (Illangasekare et al., 2012). Blank found no significant relationship between lifetime IPV and ART use (RR=1.01, 95%CI 0.88–1.16) (Blackstock et al., 2015).

ART adherence measured by Self-report

Six studies included self-reported measures of ***ART adherence***. Two used the AIDS Clinical Trials Group Questionnaire, which measures good adherence as greater than 90% in the past 3-days and 30-days (Lopez et al., 2010; Ryerson Espino et al., 2015). Trimble used an adaptation of the Morisky Medication Adherence Scale (Trimble et al., 2013), in which good adherence was defined as scores of 7 or higher. Participants in Malow's study noted the percentage of time they took medicine as prescribed, with good adherence defined as 95% or greater (Malow et al., 2013). Blank used the Case Adherence Index (CAI), dichotomized into poor adherence (=<10) or good adherence (>10) (Blackstock et al., 2015). Rose asked the patient's physician to rate on a scale of 0-10 how adherent they believed the patient to be, with good adherence assessed as >=9 (Rose et al., 2010b).

Of the seven studies that assessed ART adherence using self-report, three found significant outcomes among women. Trimble found that mean adherence scores on the MMAS were significantly lower among women who reported IPV (M=5.49, SD=2.06) than among those without (M=6.57, SD=1.57, p<0.001) (Trimble et al., 2013). Using a dichotomous outcome, this

translated to lower odds of good adherence among women reporting IPV (OR=0.28, 95%CI 0.17-0.47). Rose found poorer adherence among women with IPV as measured by the continuous outcome of physician-reported scale (r=-0.38, p<0.05) (Rose et al., 2010b). As a dichotomous outcome, women with IPV had lower odds of good adherence (OR=0.15, 95%CI 0.03-0.70). Blank et al. found self-reported adherence was significantly worse among women who reported IPV (RR=0.74, 95%CI 0.72–0.88) (Blackstock et al., 2015). Lopez found that among women, "extreme IPV" (e.g. use of a weapon) was associated with decreased adherence as a continuous variable (r=-0.26, p=0.026) (Lopez et al., 2010). When using "any IPV" as the exposure of interest, Lopez did not find a significant difference (OR=0.45, 95%CI 0.15-1.29). Ryerson Espino did not find a significant association, with a similar proportion of women reporting good adherence with (36.1%) and without IPV (40.0%) (Ryerson Espino et al., 2015). Malow did not find a significant direct association between IPV and non-adherence, but when using structural equation modeling, did find that partner conflict led to depression, which in turn was related to non-adherence (Malow et al., 2013).

ART adherence measured by Viral Load

Seven studies assessed adherence using patient medical records of ***viral load suppression***. Dichotomized outcomes for viral load suppression used the clinically-relevant cut-off at the time of study: 500 copies/mL (Siemieniuk et al., 2013b), 400 copies/mL (Illangasekare et al., 2012) and 200 copies/mL (Blackstock et al., 2015; Blank et al., 2015; Rose et al., 2010b; Ryerson Espino et al., 2015; Sullivan et al., 2015).

Of the seven studies measuring viral load suppression, three found a significant association with IPV. Siemieniuk found that women experiencing IPV were more likely to have viral loads greater than 500 copies/mL than IPV-negative counterparts (p=0.027) (Siemieniuk et al., 2013b). Rose et al. also found a significant association, with the frequency of IPV related to increased HIV viral load (r=0.44, p<0.01) (Rose et al., 2010b). Espino found viral load suppression significantly lower among women reporting IPV (76.4%) than their counterparts (93.3%, X^2=4.01 p<0.05) (Ryerson Espino et al., 2015). Illangesekare found no significant association between viral load of >400 copies/mL among those with IPV (59.6%) or without IPV (61.8%) (Illangasekare et al., 2012). Odds ratios reported in Blank, Schafer, and Sullivan were non-significant ((OR=1.05, 95%CI 0.65-1.70); (OR=1.14, 95%CI 0.42-3.07); (OR=0.72, 95%CI 0.47-1.10), respectively).

Retention in HIV care

Five studies measured ***retention in HIV care***. Blackstock and Blank defined retention by any self-reported HIV medical care in the past 6 months (Blackstock et al., 2015; Blank et al., 2015). Kalokhe used self-report and asked participants "In the past 12 months have you gone to a doctor or clinic for HIV care?" (Kalokhe et al., 2012). Siemieniuk used patient medical records and defined poor retention in care as ever having had an interruption in clinical care greater than 365 days (Siemieniuk et al., 2013b). Schafer classified patients as having a high clinic no show rate (NSR >=33% missed visits) and low NSR (<33% missed visits) (Schafer et al., 2012). Because these retention measures have important conceptual differences, they were deemed too heterogeneous to lend this outcome to meta-analysis.

Siemieniuk found that interruptions in clinical care were more common among women with a history of IPV (20.4% vs 11.9%, p=0.032) (Siemieniuk et al., 2013b). Kalokhe found that IPV positive participants were more likely to be out of care in the past 12 months (29.4 vs 18.8%, p=0.01) (Kalokhe et al., 2012). Neither Blackstock nor Blank found a significant relationship between IPV and any self-reported medical care in the past 6 months (OR=0.92 (0.68-1.24)) (Blackstock et al., 2015). Schafer found no significant relationship between IPV and a high no show rate among women (OR=1.11 (0.27-4.60) (Schafer et al., 2012).

Meta-analysis of engagement in care outcomes

Meta-analysis suggests that IPV is associated significantly with lower odds of current ART use (Fig. 14; OR=0.79, 95%CI 0.64-0.97). However, since the extant literature shows heterogeneity (I^2=68.9%, p=0.012), this finding should be interpreted cautiously.

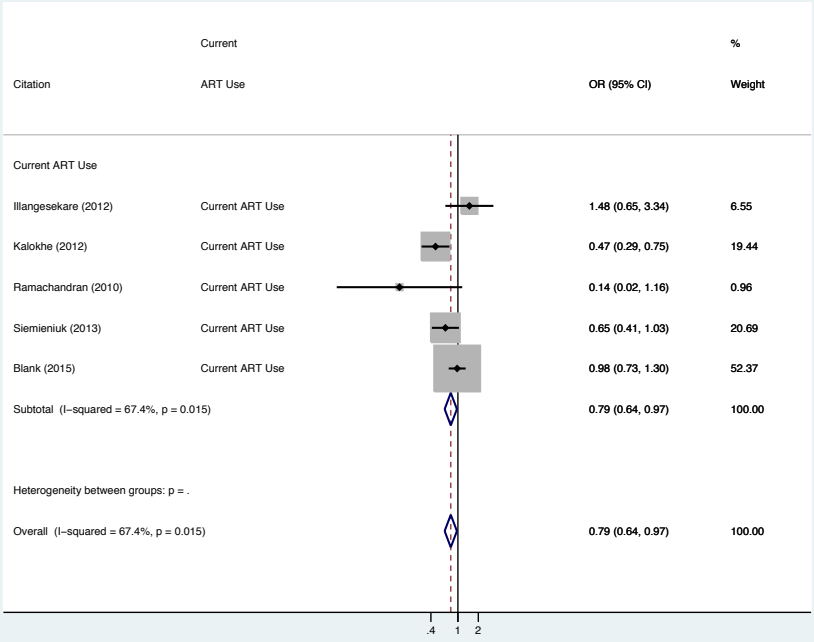


Figure 15. Meta-analysis of IPV and ART Use

The meta-analytical association suggests that IPV is associated with lower odds of self-reported adherence (Fig. 15; OR=0.48, 95%CI 0.30-0.75). Self-reported adherence also shows significant heterogeneity (I^2=56.0%, p=0.044). To compare this outcome to other studies, the odds ratio was transformed into an effect size (standardized mean difference d=-0.404).

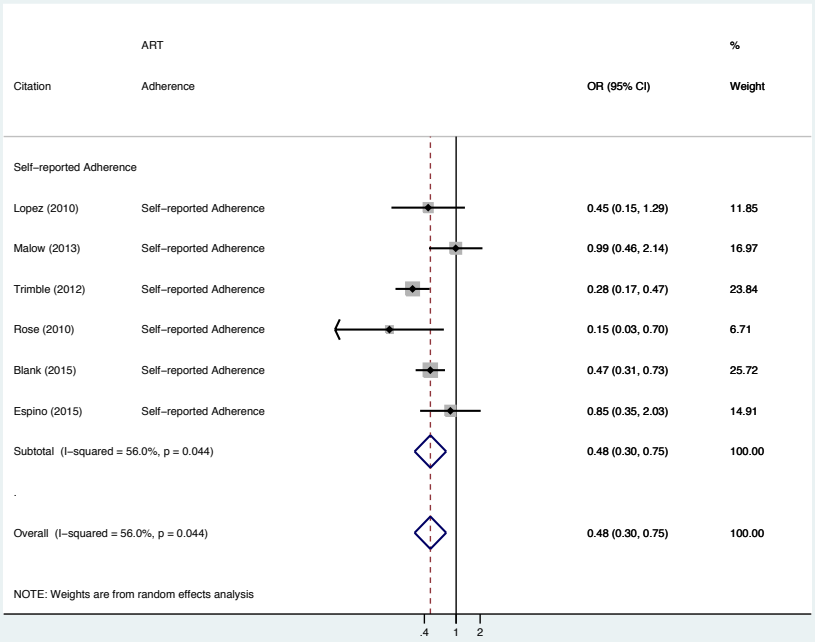


Figure 16. Meta-analysis of IPV and self-reported ART adherence

There is a significant meta-analytic association between IPV and worsened viral load suppression (Fig. 15; OR=0.64, 95%CI 0.46-0.90), with acceptable level of agreement across studies (I^2=41.2%, p=0.116).

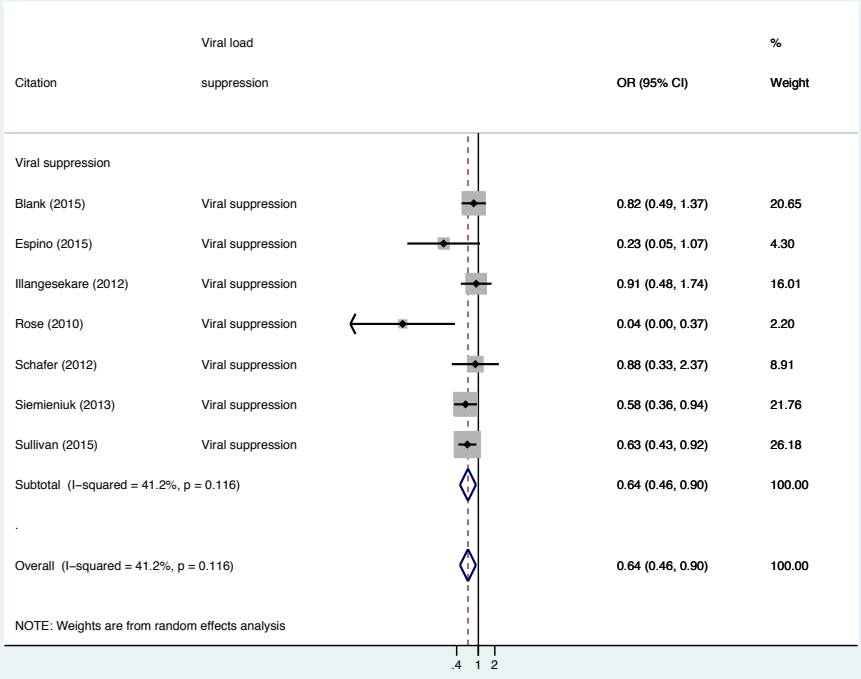


Figure 17. Meta-analysis of IPV and viral load suppression

All meta-analyses were visually inspected for potential publication bias through funnel plots and Egger's test for small-study effects. There was no evidence of publication bias for current ART use (Fig. S1; P=0.486), self-reported adherence (Fig. S2; P=0.859), or viral suppression (Fig. S3; P=0.176).

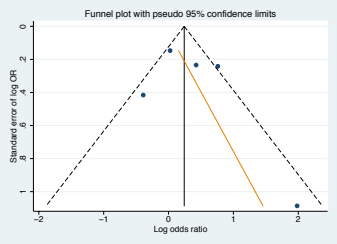
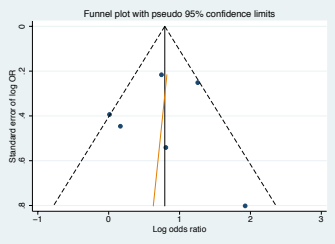
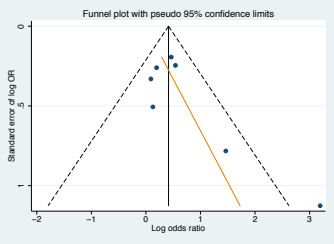


Fig 18. Funnel plot: ART use



Funnel plot: self-reported adherence



Funnel plot: viral suppression

J. Discussion

Uptake and adherence to ART is a key pathway through which IPV may negatively influence HIV-related health of women globally. Meta-analysis suggests that IPV reduces the odds of ART adherence among women, a finding that is consistent when adherence is measured by self-report (OR=0.48, 95%CI 0.30-0.75) or viral load suppression (OR=0.64 95%CI 0.46-0.90). Adherence offers a potential explanation for why IPV has been linked to worsened clinical outcomes among HIV-positive women (Liebschutz et al., 2000; Nava et al., 2011; Schafer et al., 2012; Weber et al., 2012). The meta-analytic effect size suggests that IPV exhibits a greater magnitude of association with ART adherence (d=-0.404) than other conditions such as depression, substance use, stigma, financial constraints, or pill burden (Langebeek et al., 2014).

The causal pathway between IPV and engagement in HIV care and treatment is supported by related trauma literature. Mugavero *et al.* found that each additional episode of lifetime trauma was related to non-adherence even when controlling for depression, substance use, and race (Mugavero et al., 2006). Cohen *et al.* found that a history of any type of physical or sexual abuse (including in childhood) increased the odds of women declining HAART when medically eligible (Cohen et al., 2004). These and other studies (Cohen et al., 2004; Dale et al., 2014; Jones et al., 2010a; Liebschutz et al., 2005; Machtinger et al., 2012a; Mugavero et al., 2006; Mugavero et al., 2009; Pence et al., 2008) were excluded from this systematic review because they analyzed IPV alongside other forms of violence (eg. childhood sexual abuse, non-partner violence). While such

an approach may be useful conceptually, it will be crucial for future studies to prioritize clear and consistent measurement of IPV as a stand-alone construct.

The current evidence base on IPV and HIV care has several important gaps. Nearly all studies were conducted in the United States, limiting translation to other settings globally. This geographic skew, though consistent with broader IPV literature (O'Reilly et al., 2010; Shah et al., 2010), warrants urgent attention since both HIV and IPV prevalence are high in regions such as sub-Saharan Africa (WHO, 2013a; WHO et al., 2013). The few sub-Saharan African studies that do examine IPV among HIV-positive patients draw from couples who jointly take part in research and may come from relationships that are distinct from 'normal' HIV-positive patients (Darbes et al., 2012; Were et al., 2011).

Measures for retention in HIV care were too disparate to be analyzed systematically. This shortcoming is suggestive of weaknesses in conceptualization of HIV care retention, which continues to lack a 'gold standard' measurement method (Mugavero et al., 2012). We also found a lack of harmonization regarding the measurement of IPV, with comprehensive, validated measures employed in only three studies (Kalokhe et al., 2012; Lopez et al., 2010; Trimble et al., 2013). Since behaviourally-specific assessment of IPV helps elucidate the connections between violence and health outcomes (Stockman et al., 2010), future research should employ comprehensive measures of IPV (Garcia-Moreno et al., 2006).

Another gap relates to the clinical nature of responding to violence disclosure in the research setting. Only two authors detailed specific steps taken by clinicians when women disclosed IPV (Schafer et al., 2012; Siemieniuk et al., 2013b). This represents a significant oversight given the well-established guidance around how to conduct IPV research in a clinically meaningful and ethically responsible way (WHO, 2001, 2013b).

A final research gap is the extant focus on the 'general population' of HIV-positive patients. It is possible that the association between violence and HIV-related outcomes may be distinct among other special populations (eg. adolescents, pregnant women, men who have sex with men, sex workers) and these sub-groups deserve attention in future research.

Limitations

There are several limitations of the current systematic review that should inform interpretation of findings. We focused the systematic review on HIV-positive women, but such a conceptualization should be followed by future work to understand IPV towards HIV-positive men. Literature included (Kalokhe et al., 2012; Lopez et al., 2010; Ramachandran et al., 2010) and excluded

(Gari et al., 2014; Mutasa-Apollo et al., 2014; Pantalone et al., 2010; Siemieniuk et al., 2013a) from this review illustrates that HIV-positive men experience challenges to engagement in care on par or in excess to those of women.

Papers selected for final review have important limitations around comparability, given the variety of populations and sampling strategies used across the studies. There were no longitudinal studies included in this review, which suggests that meta-analytic findings can be viewed as a correlation but that IPV and engagement in care may not be causally related. Databases used may have inadvertently limited the search, although we attempted to compensate for this shortcoming by reviewing all citations included in the final set of full papers assessed (n=67). Interrater reliability was not formally assessed with regards to the selection of articles, but a third colleague was consulted to review any discrepancies in the inclusion/exclusion process.

Conclusion

In order to ensure HIV-related health among women, it is essential to address conditions that impact their ability to uptake and stay engaged in care and treatment. IPV is one such condition, and its association with declines in ART adherence requires urgent attention. Policy makers and programmers are beginning to recognize the central role that violence plays in the lives of women living with HIV (United States Government, 2013; USAID, 2009). Yet, despite calls for violence screening and intervention within HIV care and treatment programs, few HIV clinics have IPV-specific protocols in place (Nakimuli-Mpungu et al., 2012). HIV care and treatment programs can draw upon existing guidelines for screening and responding to IPV in the health sector (Moyer, 2013; WHO, 2013b), or can look to a growing number of specialist programs that address IPV alongside HIV (Machtinger et al., 2015; Turan et al., 2013; Wagman et al., 2015a; Wyatt et al., 2011). To ensure that women benefit from medical advances, future studies should develop and test interventions to address IPV within HIV clinical care.



Chapter 5. Qualitative Results (1)

Hatcher, A. M., N. Woollett, C. Pallitto, K. Mokoatle, S. Delany-Moretlwe, C. Macphail, H. Stockl and C. Garcia-Moreno (2014). Bidirectional links between HIV and intimate partner violence in pregnancy: Implications for prevention of mother-to-child transmission. *Journal of the International AIDS Society* 17: e19233.

Photo credit: Abigail Hatcher, Inner-city Johannesburg mural on which Safe & Sound logo is based.

Introduction

Prevention of mother-to-child transmission (PMTCT) has reduced new infant HIV infections from an estimated 32% in the absence of treatment (Coutsoudis et al., 1999; Miotti et al., 1999), to as low as 1% (Lehman et al., 2009; Mofenson, 2010b). However, major gaps to achieving PMTCT coverage remain. In 21 priority African countries, PMTCT coverage is estimated to be 65% (WHO et al., 2013). A recent meta-analysis in low- and middle-income settings suggests that while 75% of pregnant women adhere to antiretroviral therapy (ART) during pregnancy, only 53% maintain adequate adherence levels in the postpartum period (Nachega et al., 2012). Ensuring PMTCT adherence is crucial, particularly as countries increasingly move towards "Option B+", a policy that offers immediate, lifelong treatment for pregnant women living with HIV (World Health Organization, 2010).

Many structural drivers influence PMTCT uptake and adherence. The literature has noted that structural factors such as stigma (Bond et al., 2002; Bwirire et al., 2008; Mepham et al., 2011; Turan et al., 2011; Turan & Nyblade, 2013; Watts et al., 2010), poverty (Mepham et al., 2011), and transport costs (Bwirire et al., 2008) inhibit women's ability to adhere to PMTCT. Another key structural factor shaping access and adherence to PMTCT may be intimate partner violence (IPV). Fear and experience of IPV influence pregnant women's decisions to take up HIV services (Antelman et al., 2001; Kilewo et al., 2001), and anticipated violence is associated with declines in HIV testing among pregnant women (Bajunirwe & Muzoora, 2005a; Hatcher et al., 2011; Maman et al., 2011a; Medley et al., 2004; Pool et al., 2001; Tchendjou et al., 2011; Turan et al., 2011; Turan et al., 2012). A history of physical or sexual violence decreases the likelihood of HIV-positive women using ART when medically eligible (Cohen et al., 2004; Jones et al., 2010b), and those who experience abuse are more likely to miss clinic visits and delay linkage to care (Siemieniuk et al., 2010).

Little research to date has explored the association between IPV and PMTCT. In one qualitative study in South Africa, IPV was described as a common barrier to ART adherence in pregnancy (Mepham et al., 2011). Healthy intimate partner relationships improve PMTCT uptake: male involvement in antenatal care predicted better adherence to nevirapine in one South African study (Peltzer et al., 2011); male antenatal attendance halved the risk of MTCT in a Kenyan study, an association that persisted after controlling for maternal viral loads (Aluisio et al., 2011).

Using qualitative research methodology, we explored IPV as a potential structural driver of HIV-related health among pregnant women. This research aimed to contribute to literature

suggesting that structural drivers shape the health and well-being of those already living with HIV, and may pose barriers to uptake of proven prevention strategies.

Methods

We conducted qualitative research to explore the links between IPV and HIV-related health among pregnant women and service providers in Johannesburg, South Africa. This research was a portion of a larger formative study, intended to help our team design an intervention to address IPV in pregnancy. In this setting, an estimated 29% of pregnant women are HIV-infected (National Department of Health, 2012) and between 25-35% experience physical or sexual IPV in the 12 months leading up to pregnancy (Dunkle et al., 2004b; Groves et al., 2012; Hoque et al., 2009; Mbokota & Moodley, 2003).

Conceptual Framework

In order to explore the relationship between IPV and HIV-related health of pregnant women, we used an adapted socio-ecological conceptual framework (Fig. 16), which posits that broader structural factors and relationship characteristics influence a woman's HIV-related health (Montgomery et al., 2012). This type of approach has been embraced by social scientists, who note that broader social and societal factors shape how women are able to adhere to ART (Hirsch, 2007) and the extent to which they experience IPV (Heise, 1998). A socio-ecological framework highlights that the structural context influences the conditions and health outcomes of both IPV and HIV.

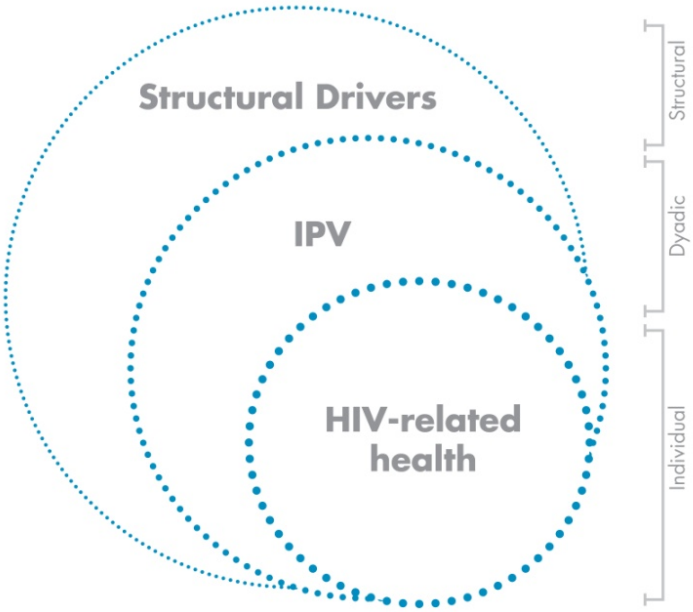


Figure 19. Conceptual framework for qualitative research

Data Collection

We conducted an exploratory qualitative study using in-depth interviews (IDIs) and focus group discussions (FGDs) with a wide range of stakeholders with potential to take part in, deliver, or scale-up an intervention for violence in pregnancy. Participants included pregnant women, pregnant women experiencing IPV, health workers, non-governmental organizations, community leaders, and policy makers (Table 9).

Table 8. Data collection methods for qualitative research

Participant Group	Group Size	Method	Sampling	Example Participants	Topics
Pregnant women at ANC	(n=13 women in 4 FGDs)	Focus group discussions	Convenience	-	Social and structural drivers of IPV; Types of IPV in pregnancy; Patterns of help seeking and available community resources for violence and HIV; Barriers to disclosing IPV; Receptivity to an antenatal intervention.
Pregnant abused women	(n=5)	Semi-structured interviews	Convenience	-	Existing needs and concerns of abused women; Patterns of help seeking and available community resources for violence; Links between IPV and HIV; Receptivity to an antenatal intervention
Policy Makers	(n=10)	Semi-structured interviews	Purposive	Department of Health managers, Academic experts	Types of IPV in pregnancy; Current health sector response to IPV; Potential integration with HIV activities, including PMTCT
Health Providers	(n=8)	Semi-structured interviews	Purposive	Doctors, nurses, lay counselors in antenatal clinics	Types of IPV in pregnancy; Knowledge and practice responding to IPV; Receptivity of health workers to antenatal intervention; Existing capacity in clinic
Non-Governmental Orgs	(n=6)	Semi-structured interviews	Purposive	Shelters, Police, Counseling services	Psycho-social, legal and other needs of abused women; Referral options for women living with IPV
Community leaders	(n=4)	Semi-structured interviews	Convenience	Pastors, Neighbourhood representatives, Traditional healer	Community factors that support or prevent women from seeking IPV assistance during pregnancy

Pregnant women seeking antenatal care from two antenatal clinics were recruited for four FGDs (a total of n=13 women participated). Women were given group information about the study while they waited in queue for a clinic appointment. All FGDs were conducted in a private room in the clinic, led by trained moderators who were the same sex as participants and fluent in multiple local languages (Sotho, Zulu, Tswana). Semi-structured discussion guides explored several topics (Table 1). Discussions were audio-recorded after obtaining participants' permission and signing an informed consent form. The discussion groups lasted for about 1 hour and 30 minutes, and women were reimbursed R50 (US $6). Because of the group nature of focus groups,

additional confidentiality measures were implemented: during the informed consent process, researchers explained that questions about women's individual experiences of violence or HIV would not be asked, but rather the discussion would address the issue as observed in the community.

Pregnant women who were experiencing IPV were identified during the focus group discussions. Trained researchers explained that those women who had personal experience of IPV and were interested in participating in in-depth interviews could approach the research team outside of the information giving session and privately indicate their interest in taking part in an interview. The interviews (n=5) took place in a private room at the clinics while the pregnant women were still waiting to be seen by clinic staff. As shown in Table 1, the topics explored through structured interview guides were more focused on IPV-related help-seeking and the relationship between IPV and HIV. On average, these interviews lasted about 60 minutes.

In depth interviews with *Other Key Stakeholders* were led by the research team and covered similar topics. This group was comprised of policy makers (n=10), health workers (n=8), non-governmental organizations (n=6), and community-based organizations (n=4). Stakeholder interviews focused on service provision and asked questions about available resources for women experiencing IPV. Some anecdotes of cases were shared, but this was not the main rationale for these interviews.

Several steps were taken to ensure confidentiality and provide additional support for participants during the research. In keeping with ethical considerations of researching IPV in pregnancy, all research was conducted based on the World Health Organization guidance on ethical and safety considerations in researching violence against women (WHO, 2001). Study staff were trained to describe research as the "social barriers" to use of health services in the community, so as to reduce any undue risk associated with participating in a violence-related study. All participants were offered an information sheet containing contact information for local resources (counseling, legal advice, and health care). Given the high prevalence of IPV in South Africa it was likely that participants in categories other than 'pregnant and experiencing IPV' category had experienced or witnessed IPV. If any individual demonstrated a need for additional assistance, they were offered an opportunity to speak to someone about their experience of intimate partner violence, and given referrals to organizations that could assist them. However, no participants asked for this referral during the course of the formative research.

All participation in this formative research was sought on the basis of informed consent and good clinical practice guidelines. Ethics approval was obtained by the World Health Organization (WHO A65780) and University of the Witwatersrand (HREC M110832).

Data Analysis

The interview and focus group discussion data were transcribed verbatim in the language in which they were conducted and, as necessary, translated from the local language (Sotho, Zulu, Tswana) into English by professional translators. To ensure accurate translation, each transcript was reviewed by a researcher, and queries were resolved through discussions among the researchers via phone or email. All identifying information about the participant or clinic setting was removed and transcripts were saved by a file name with no personal details.

Data were managed in QSR Nvivo 10, a qualitative analysis software package, following a two-day qualitative management and analysis training of the research team. Members of the research team collaboratively built an analytical framework of broad codes by creating a 'start list' of possible themes and building upon the research questions. Each broad code, or wide thematic basket of ideas (Miles & Huberman, 1994), was applied to each transcripts by two researchers using NVivo. The research team then held a series of meetings to collectively develop 'fine codes' using an inductive approach – deriving meaning from the data itself rather than imposing pre-formed ideas (Hutchison et al., 2010). Fine codes were developed by printing out a full set of excerpts (from each database) related to each code, and identifying sub-themes emerging from the data.

Results

We found qualitative evidence of strong bidirectional links between IPV and HIV among pregnant women. Here, we present a conceptual framework (Fig. 18) for understanding the ways in which IPV is related to HIV-related health of pregnant women.

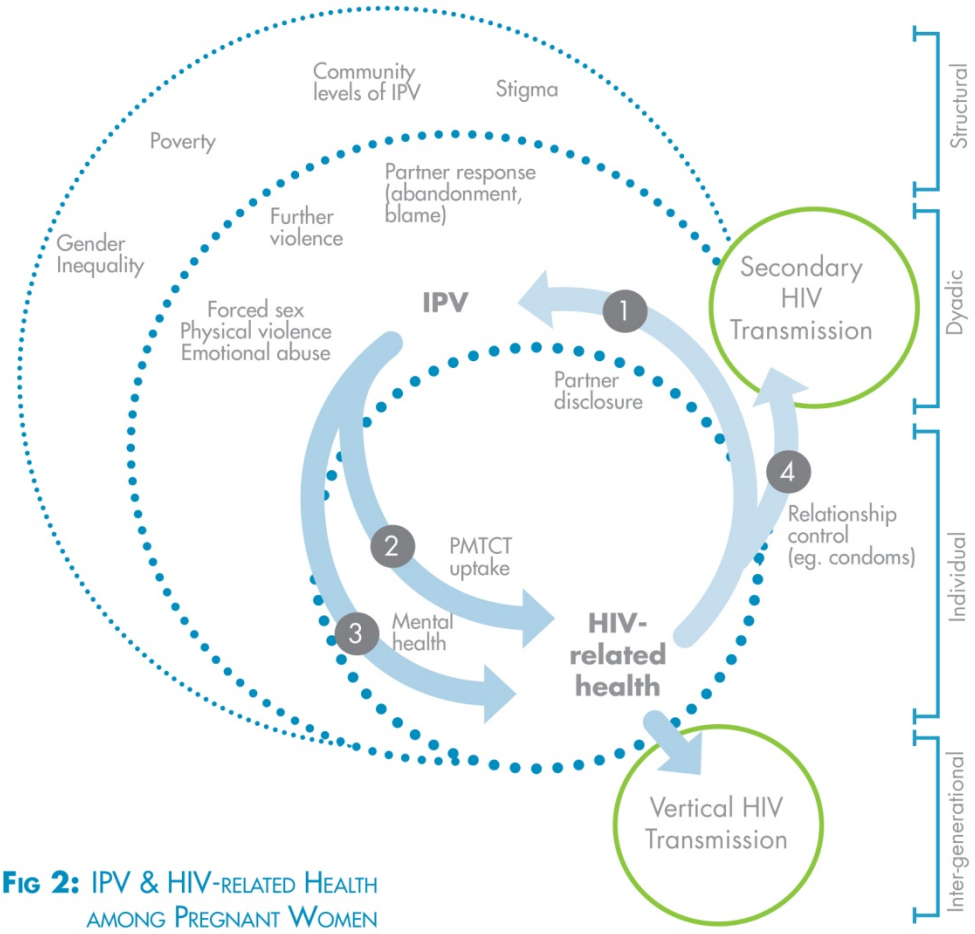


Figure 20. IPV and HIV-related health among pregnant women

Pathway 1: HIV diagnosis leads to IPV via partner disclosure

HIV diagnosis during pregnancy was noted to be a trigger of IPV. One pregnant woman described how severe violence began following her disclosure of her HIV positive status during pregnancy:

> *"He started telling me things, hurting me emotionally, telling me that I'm a fool, and stupid, I'm an idiot. And then he strangled me, That's when it started... Maybe it's pregnancy, I don't know. I told him that I am HIV positive, so I don't know if that's what made him to do all these things." - Pregnant abused woman 1*

HIV may lead to violence because it causes relationship conflict during the disclosure process. Usually, the conflict is related to perceived infidelity and blaming women for "bringing" the disease into the relationship:

"Yes, if you're HIV positive, you start blaming each other. Because maybe the husband will be saying the wife brought it. So sometime, there's a connection [between HIV and violence] because you end up blaming each other." –Pregnant woman, FGD 3

Because HIV testing is coupled with antenatal care, women often learn of their HIV-status in a clinic during access to health care during pregnancy. Within this healthcare context, women bear the brunt of disclosure to partners, who tend to use women's status as a "proxy" for their own.

In addition to physical violence, pregnant women described experiencing emotional abuse and abandonment following disclosure of HIV to a partner:

"I have a sister, she was pregnant, … then she came to be tested. When she tested she found out she is positive, and when she told her boyfriend everything turned around. And there was violence at home. He started coming late and when she started asking for things for her and the baby, he started to react badly up until he ended up leaving her." – Pregnant woman, FGD 2

Within a context where women fear violence, blame, and abandonment, it is perhaps not surprising that many pregnant women chose not to disclose their HIV status to partners. Several pregnant women spoke about the fear of partner disclosure when women live in violent relationships:

"Women who are in this abusive relationship, they do get HIV and they are scared what their partner will say." - Pregnant abused woman 1

Health workers talked about how women in violent relationships would be hesitant to disclose their status to partners,

"When you counsel them…after they have tested positive and when you have to issue the treatment she'll be saying, 'I am not going to disclose. I mustn't take this, I must hide it.' Then you find out is it a problem for her to disclose because there's some emotional abuse or physical abuse from the partner." – Female Health Worker 4

Thus, fear of partner disclosure may be an early warning sign that pregnant women are in violent or unsupportive relationships and require additional assistance during antenatal care.

Pathway 2: IPV worsens HIV-related health via non-adherence

For women in violent relationships, adherence to PMTCT services was challenging, since taking medication or accessing health services might unintentionally alert male partners of their HIV status.

Health workers noted that non-adherence also served as warning sign that HIV-positive patients were in a violent relationship:

> *"It was the very same patient that you had told she was HIV positive that was scared to go and disclose to their partner. It is the very same patient that will default on their medication because their partner does not know that they are taking the medication." – Policy Maker 9*

In the antenatal clinic, an HIV diagnosis in the context of living with violence may cause patients to default on clinic visits:

> *"But in your normal facility it is a bit difficult to avoid losing patients. I think we do. Especially the mere fact that you say to a patient, 'you are HIV positive.' And this is a patient who is facing domestic violence! Some will just disappear." -Policy maker 3*

Thus, the fear of being identified by a male partner as being HIV positive may preclude women from returning to clinic services that are essential for their health. While no participants mentioned this directly, it is important to note that non-adherence to PMTCT regimens greatly increases the risk that pregnant or breastfeeding women will transmit HIV to the infant.

Pathway 3: IPV worsens HIV-related health via mental health

Declines in mental health were noted in women experiencing IPV in pregnancy. In response to persistently violent relationships, women described internalizing the abuse and assuming that they had done something wrong to deserve it:

> *"He used to beat her while she was pregnant. She just accepted it, and sometime she'd blame herself. Saying maybe I'm the one who's wrong that's why he's beating me." –Pregnant woman, FGD 1*

Although IPV is associated with common mental health disorders in pregnancy, few patients or providers recognized these as having clinical implications. Most health providers equated mental health to severe cases of psychopathology and said they rarely encountered mental health disorders. For example, one health worker only considered mental health in relation to bipolar depression and pharmacologically treated patients:

> *Mental health, yes, I remember we've had three that we already on treatment, and will tell you, I have a bipolar patient.* –Health worker 8

We found that health workers often fail to notice the mental health dynamics of IPV in pregnancy, choosing instead to focus on physical health sequelae of pregnancy. For example, one

health provider was asked about stress related to IPV, but responded only in terms of how stress impacts hypertension while ignoring the relevant impact on a woman's mental health:

> *Stress is one of the predisposing factors to the development of hypertension. So it is still there, this stress, but as a predisposing factor. Sometimes because of the pregnancy itself, you can develop hypertension of pregnancy.* –Health worker 6

This tendency towards equating mental health with severe illness may be related to the lack of capacity within South Africa's public health system. As one policy maker explained, in overlooking mental health issues, current health systems make it unlikely that patients will receive the crucial support that they require:

> *No one has time for mental health because there are so many other crises in the health system that need to be addressed, that are much more manifested. So that means that things like depressive disorder or mental health disorders, they're not addressed - including partner depression, mental health and abuse and all of that. And people are not really encouraged to go and get support that they require.* –Policy Maker 9

The notion of overlooking mental health is illustrated in an interview with one pregnant, abused woman when she described severe physical violence as leading to a state of being 'a little depressed':

> *"Interviewer (I): Are you enjoying your pregnancy so far?*
> *Participant (P): Being honest, a little depressed but I'm enjoying it.*
> *I: Ok, so the depression is from what, if I may ask?*
> *P: From the father of the baby. We are having problems.*
> *I: What did he do, if you don't mind telling me.*
> *P: He strangled me and then he let his cousin beat me up." - Pregnant abused woman 1*

Not everyone in our sample ignored the impact of mental health on a woman's health and wellbeing. For example, poor mental health had concomitant effects on physical health for one HIV-positive participant, who described "going low" emotionally because of violence, and thereafter feeling worse physically:

> *"I'm HIV positive and I'm in this domestic violence. And if you are HIV positive and then you have a partner who is abusing you emotionally... or physically hits you, people can't talk. Maybe you can go low, maybe you can go sick." - Pregnant abused woman 3*

Pathway 4: IPV leads to secondary HIV risk via lack of relationship control

IPV led to secondary HIV risk when women were in relationships with forced sex or without power to negotiate condom use.

> *"When we are in relationships where our partner is abusive, sometimes we can't even negotiate things like using the condom. Let's say, for instance, you know that your partner is the kind of person that has other girlfriends, but because he uses power over you, you can't negotiate those things." –Pregnant woman, FGD 4*

Male partners used their control over the relationship to dictate the terms and timing of sexual activity. In one instance, a focus group discussion revealed a story about a newly-diagnosed HIV-positive woman whose partner insisted that she have sex without condoms:

> *There's a friend of mine that was tested alone and she had a lot of problems. The man said, I'm not HIV positive, so I'm not going to test. So the man forced her to sleep with him without a condom. And that man said 'No! Why? We've been sleeping without a condom, but because today you went to the clinic, you're telling me we've to use a condom?'" –Pregnant woman, FGD 1*

Pregnant women described balancing risks to physical safety (absence of physical harm to themselves or fetus) with health risks (of onwards HIV transmission to partners). They described making compromises between protecting themselves and the fetus and protecting themselves and partners from sexually transmitted infections:

> *"If you are not compromising at all and you start saying "let's use condom," he'll start having questions. Some things are better left unsaid, just for the safety part of it." – Pregnant woman, FGD 2*

Many preferred staying silent around condom negotiation, in order to stay physically safe during pregnancy.

Discussion

We found that IPV and HIV-related health were connected concerns in the lives of pregnant women in Johannesburg. IPV and HIV seemed to have distinct pathways linking them to one another within the context of pregnancy. The initial HIV disclosure could serve as a trigger for violence in pregnancy. IPV, in turn, worsened HIV-related health through key pathways of lack of adherence and poor mental health. Lastly, the experience of IPV led to secondary transmission risk behaviors – both in terms of vertical transmission due to PMTCT non-adherence or secondary transmission due to risky sex.

According to our participants, IPV shapes HIV-related health outcomes among pregnant women primarily because it leads to non-adherence. While the effect of IPV on adherence has been confirmed in small studies in the United States (Connors et al., 2012; Lopez et al., 2010; Rose et al., 2010a; Trimble et al., 2013; Zierler et al., 2000), this association is yet to be explored among pregnant women. Pregnant and postpartum women are a crucial population within which to understand IPV and adherence, since non-adherence leads not only to morbidity and mortality of the woman but risk of onwards HIV transmission to her infant (Lehman et al., 2009; Mofenson, 2010b). Antenatal care provides a crucial moment to enable adherence, since a pregnant woman accesses the health system routinely and this is when many are first diagnosed with HIV.

Poor adherence among pregnant women may relate to challenges around partner disclosure (Awiti Ujiji et al., 2011). In a recent systematic review of PMTCT, partner disclosure was associated with poor PMTCT uptake in a majority of both quantitative (6 of 9) and qualitative (17 of 24) studies (Gourlay et al., 2013a). We found that partner disclosure following HIV diagnosis in pregnancy led to enacted or feared violence. This aligns with extant literature, which suggests that fear of new or continued IPV may lead women to avoid disclosure of their status to male partners (Mepham et al., 2011). In one Nigerian study among HIV-positive pregnant women, the prevalence of IPV was 17% before HIV testing and increased to 63% after testing for HIV and disclosing status (Ezechi et al., 2009) A Zimbabwean study showed that risk of IPV in pregnancy was greatest among those women testing positive for HIV in antenatal care (Shamu et al., (in press)). Non-disclosure among pregnant women is a health risk in its own right, since it poses a risk for sexual transmission of HIV if the male partner is still HIV-negative (Bond, 2010; Desgrees-du-Lou et al., 2009; Katz et al., 2009; Orne-Gliemann & Desgrees-Du-Lou, 2008) and may have an impact on the implementation of PMTCT (Farquhar et al., 2004b).

A related but distinct pathway linking IPV to PMTCT uptake may be mental health. A growing body of literature shows that IPV leads to depression and anxiety among pregnant women (Beydoun et al., 2012; Groves et al., 2012; Urquia et al., 2011), yet this link has been largely unexplored in sub-Saharan Africa in HIV-positive populations. Our findings reflect those of a qualitative study in Zambia, in which IPV, mental health, and HIV are closely related in the experience of women (Murray et al., 2006). Such interrelated "syndemic" issues (Gielen et al., 2007) should be explored in future sub-Saharan African studies.

Existing research shows poor mental health has significant impact on ART adherence (Ammassari et al., 2004; Cook et al., 2002; Starace et al., 2002; Sumari-de Boer et al., 2011) and among pregnant women depressive symptoms are associated with HIV disease progression and

mortality (Antelman et al., 2007). It is possible that intimate partner violence is one condition exacerbating the relationship between mental health and HIV outcomes. Indeed, one new study suggests that the link between mental health and ART adherence may be partly driven by partner conflict (Malow et al., 2013). Despite high rates of common mental health disorders in antenatal care (Rochat et al., 2011), little screening or treatment exists in South Africa (Honikman et al., 2012). Mental health will be crucial to address among HIV-positive pregnant women because of its strong relationship to IPV and its association with uptake of PMTCT regimens (Colebunders & Myer, 2013).

Lastly, IPV may worsen secondary prevention behaviors in pregnancy. Non-adherence to PMTCT regimens greatly increases the risk that pregnant or breastfeeding women will transmit HIV to the infant (Cooper et al., 2002), potentially in drug-resistant form (Zeh et al., 2011). High viral loads related to non-adherence also increase the likelihood of secondary transmission to partners, particularly in the context of unsafe sex. Our findings echo existing knowledge by suggesting that IPV inhibits women's ability to negotiate condoms (Wingood & DiClemente, 1997). These findings explore such dynamics within the context of pregnancy, thereby suggesting a dual risk of mother-to-child infection and secondary transmission risk to a partner.

Our findings echo calls for addressing IPV in pregnancy (Shamu et al., 2013a). Scholars note that antenatal care provides an important "window of opportunity" for women who are regularly accessing the health system (Bacchus et al., 2004b). Although universal screening is not recommended in settings with limited referral options and overstretched providers (WHO, 2013b), some type of IPV assessment, provider training, and targeted response may be appropriate for South African antenatal care. Indeed, a comprehensive health response to IPV will likely require either screening or case-finding – both methods that may be acceptable in South African clinics (Christofides & Jewkes, 2010; Joyner & Mash, 2012).

Limitations

The findings of this formative research should be examined in light of several limitations. Firstly, this study is exploratory in nature, resulting in small sample sizes of each participant group. While analysis suggested that we began to reach saturation through FGDs with pregnant women, the IDIs with pregnant women experiencing IPV were not sufficient to reach thematic saturation (Morse, 1993). Secondly, the socio-ecological perspective was brought to the data analysis process after data collection. Ideally, this conceptual approach would have informed the entire data collection process, rather than simply guiding the final interpretation of findings. However, since this was a preliminary, exploratory study, it was designed to explore several intersecting

issues and we applied the conceptual framework during data analysis. Lastly, some of the findings may be applicable for any woman experiencing IPV, and do not necessarily highlight the specific context of pregnancy. Further research should explore the perinatal time-period in richer detail to determine whether the link between IPV and HIV is distinct during this life stage.

Conclusion

Intimate partner violence in pregnancy leads to declines in the physical and mental health of pregnant women. Our findings underscore the negative effects of IPV as a health issue in its own right and as a barrier to PMTCT. The connection between IPV and HIV adherence among pregnant women has yet to be explored quantitatively in sub-Saharan Africa. In future studies, it would be ideal to find systematic methods for recruiting more robust numbers of pregnant women who experience IPV and who are living with HIV. In the parent study (Woollett et al., 2014), we anticipate that by training health providers to ask about IPV confidentially and skillfully, it may be increasingly possible to reach this population.

Beyond its marked impact on physical and mental health of women, IPV in pregnancy may have important implications for Option B+, as current cost effectiveness models assume that women are willing and able to achieve 100% adherence (Gopalappa et al., 2014). If Option B+ is to be adopted more broadly, the effect of IPV on adherence and mental health should be carefully considered. Addressing the inter-related issues of violence and HIV will be crucial to ensure that goals of maternal and child health are met in the sub-Saharan African region.



Chapter 6. Qualitative Results (2)

Hatcher, A. M., H. Stockl, N. Christofides, N. Woollett, C. C. Pallitto, C. Garcia Moreno and J. M. Turan (2016). Mechanisms linking intimate partner violence and prevention of mother-to-child transmission of HIV: A qualitative study in South Africa. *Social Science & Medicine* 168: 130-139.

Photo credit: Abigail Hatcher, Sensitising health workers at a Safe & Sound clinic to the needs of patients experiencing IPV.

Introduction

Prevention of mother-to-child transmission (PMTCT) interventions have potential to eliminate vertical transmission of HIV from mothers to infants (Mofenson, 2010b). Yet, women's adherence to all the steps required for successful PMTCT is often low. Within 21 priority countries, an estimated 65% of eligible pregnant women access HIV treatment (WHO et al., 2013), and pooled analysis suggests that only half of women adhere to treatment postpartum (Nachega et al., 2012). Studies in sub-Saharan Africa suggest that partner relationship factors are among the most important barriers to pregnant women's acceptance of HIV testing and other PMTCT behaviors (Bwirire et al., 2008; Medley et al., 2004; Turan et al., 2011). Intimate partner violence (IPV) may be one important predictor of adherence to HIV medication in pregnancy and postpartum, yet this association has been understudied in the literature to date (Hatcher et al., 2015c).

Among non-pregnant women, IPV victimization is associated with worse HIV-related health outcomes, including higher odds of antiretroviral failure, weaker immune response, increases in opportunistic infections, and greater risk of mortality (Schafer et al., 2012; Weber et al., 2012). A recent meta-analysis suggested that women's experience of IPV was associated with 55% lower odds of self-reported adherence and 36% decreased odds of viral suppression (Hatcher et al., 2015c). However, of the thirteen included studies, none were based in sub-Saharan Africa or among pregnant women. Since publication of the meta-analysis, only a single study has examined the effect of IPV on adherence in pregnant women. This Zambian study showed that IPV victimization was associated with 74% lower odds of adherence in pregnancy and 89% lower odds of adherence postpartum (Hampanda, 2016). However, the quantitative methods used by this seminal paper preclude a deeper understanding of *how* partner violence alters PMTCT behaviors. This is a crucial dynamic to understand, particularly since many of the same countries in sub-Saharan Africa with the highest rates of mother-to-child transmission also have high prevalence of IPV (Devries et al., 2013b).

South Africa is one such sub-Saharan African setting where HIV and IPV are highly prevalent. An estimated 25 – 35% of South African pregnant women report recent physical and/or sexual IPV (Groves et al., 2012; Hoque et al., 2009). Similarly, antenatal HIV prevalence across South Africa is high, with estimates in Johannesburg reaching 29% (Department of Health, 2012). South Africa has made significant strides towards reducing mother-to-child transmission from 14% in 2009 to an estimated 5% in 2012 (UNAIDS, 2013). Yet, only 54-65% of South African pregnant women and infants complete all recommended PMTCT steps (Stringer et al., 2010; Technau et al., 2014).

Recent qualitative studies have explored the underlying dynamics of IPV among small samples of women living with HIV. Among eight women reporting violence after HIV disclosure, Colombini *et al.* (2016) learned that new HIV diagnosis was a trigger for violence, even in relationships with no prior history of IPV. Mulranen *et al.* (2015b) studied postpartum women living with HIV in Swaziland, of whom nine reported IPV following disclosure, and learned that violence resulted from acute triggers like HIV status disclosure and also from ongoing marital tensions around fertility. In a study of pregnant and postpartum HIV-positive women in the United States, Njie-Carr *et al.* (2012) found that three women with recent violence avoided partner disclosure because they feared a violent reaction. Illangesekare *et al.* (2014) identified mental health as a primary pathway linking IPV to non-adherence among HIV-positive women reporting lifetime partner violence, of whom three were currently living with IPV. Other qualitative research has broadly explored violence and HIV medication adherence, but not among women who present with both conditions (Hatcher et al., 2014; Zunner et al., 2015).

While extant qualitative literature offers preliminary understanding that perhaps violence and HIV behaviors are linked, samples sizes ranging from three to nine participants rule out the analytical rigor required to understand *why* IPV alters adherence. In-depth, qualitative elucidation of the specific mechanisms linking IPV and HIV adherence is necessary if we are to increase the proportion of women adhering to PMTCT interventions. We conducted in-depth qualitative research with 32 women living with HIV and reporting experience of IPV in Johannesburg, South Africa. The purpose of the research was to explore mechanisms linking these interconnected issues among pregnant and postpartum women.

Theoretical framework

This research was informed by an integrated socio-ecological, dyadic conceptual framework (Fig. 19). The socio-ecological model suggests that individual, relationship, and structural factors shape health outcomes (Heise, 1998), and is widely used in IPV research because it incorporates many complex factors that influence partner violence (WHO, 2010).

Within the ecological model, *individual* factors are the personal characteristics or behaviours that impact one's health. Previous literature has suggested that individual factors inhibiting PMTCT uptake include depression (Nachega et al., 2012; Turan et al., 2013), substance use (Nachega et al., 2012), internalized HIV stigma and shame (Turan et al., 2013), and costs associated with clinic attendance (Bwirire et al., 2008). *Partner relationship* factors are the dyadic partnership issues that frame health outcomes. Partner dynamics that worsen PMTCT behaviors include a lack of male involvement in antenatal care (Aluisio et al., 2011), non-

disclosure to a partner (Gourlay et al., 2013a; Myer, 2011), and threat of further violence (Antelman et al., 2001). The theory of gender and power (Connell, 1985), which postulates that unequal power dynamics limit the ability of women to exercise personal control in relationships (Amaro & Raj, 2000), provides a theoretical underpinning for the associations seen between partner factors and PMTCT uptake. *Structural* factors refer to the broader social or community factors that impact on health. In this sphere, previous studies have noted that PMTCT is adversely impacted by poverty (hIarlaithe et al., 2014), lack of social support (Kirsten et al., 2011), community stigma around HIV (Turan et al., 2011), and weak health systems (Bwirire et al., 2008). A socio-ecological framework recognises that similar structural factors underpin both violence and HIV (Maman et al., 2000) and that broader social and societal factors shape women's ability to adhere to HIV medication (Hirsch, 2007) and the extent to which they experience IPV (Heise, 1998).

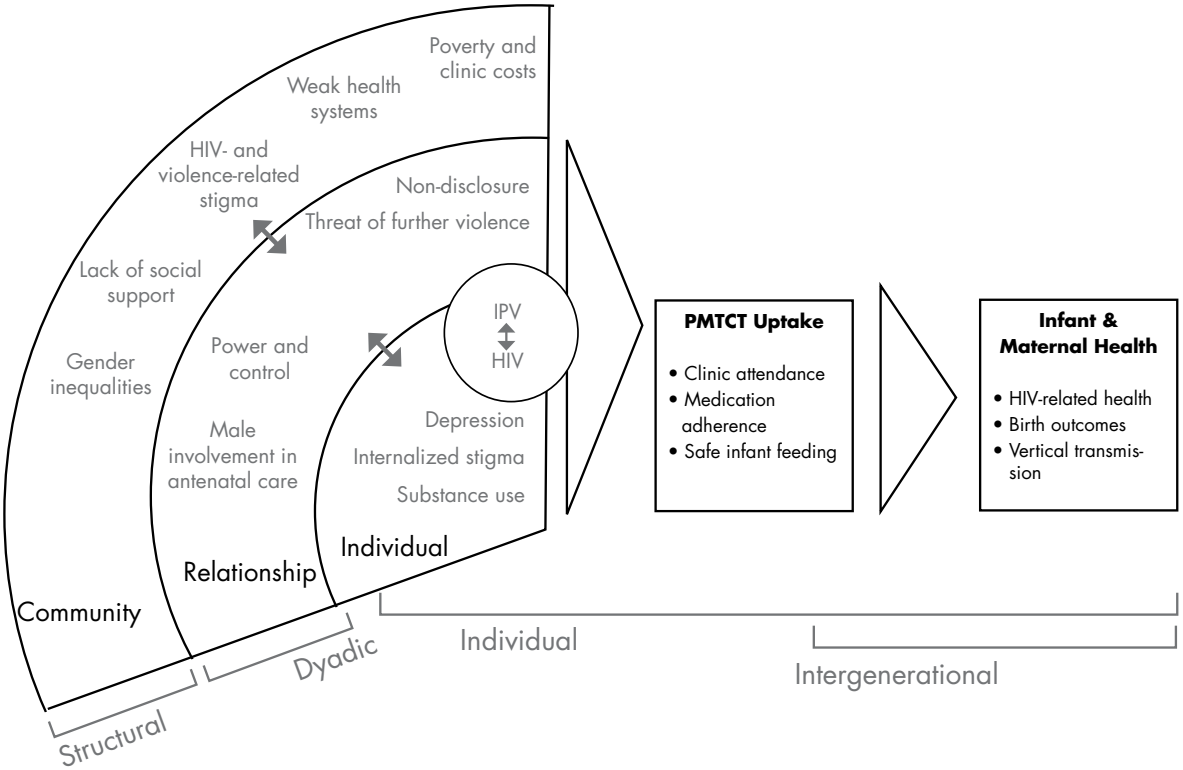


Figure 21. Socio-ecological framework linking IPV to HIV-related health

Methods

The goal of this qualitative research was to build understanding around why and how IPV influences PMTCT uptake and HIV-related health. This analysis is guided by our formative qualitative research with pregnant women and health providers (Hatcher et al., 2014). The formative research included no women living with both IPV and HIV, but instead asked participants to speculate about the links between violence and PMTCT. As an elucidation of mechanisms requires incorporation of the perspectives and knowledge of women who actually experience these health conditions, we now present data from in-depth interviews with a larger sample of women (*n*=32), all living with both IPV and HIV.

Qualitative research was nested within a randomised control trial testing an intervention for IPV in pregnancy (Pallitto et al., 2016). Called Safe & Sound, the trial recruited 1680 pregnant women from four antenatal clinics in Johannesburg to take part in baseline questionnaires. In the parent trial, women reporting recent (past-year) physical and/or sexual IPV (*n*=421) were randomised to a nurse-led empowerment counseling intervention or an enhanced control condition. This sub-study purposively selected the sample of 32 participants to take part in qualitative, in-depth interviews between May 2014–November 2015.

The methodology for this study was informed by *narrative, constructionist approaches* to researching IPV (Allen, 2011). The narrative element of this approach posits that discussing IPV experiences with skillful providers can be therapeutically beneficial and that the research process itself serves as a form of reflection for participants (Allen, 2011). *Narrative approaches* to research on violence acknowledge that women's stories help create coherence in otherwise chaotic, uncontrollable situations (Williamson, 2010). Narrative approaches use particular techniques during the interview process, such as validation, highlighting resistance strategies, and focusing on meaning and identity (Allen, 2011). The *social constructionist methodology* acknowledges that researchers are part of the research interaction and that their prior knowledge should be brought to light and examined (Charmaz, 2008).

Participant sampling and recruitment

We conducted qualitative research with 32 participants who were purposively selected from women taking part in baseline Safe & Sound trial questionnaires. Women recruited for this sample were living with HIV and experiencing IPV. In practice, this included women participating in the trial (ie. experiencing recent IPV), as well as women who were not eligible to enroll in the trial, but who had experienced IPV in their lifetime. These lifetime history participants had already completed a full study baseline questionnaire and agreed to be contacted

about further research. Study nurses guided the selection of participants based on their impression of women's willingness to take part in an additional interview, their knowledge of women's experiences of IPV, and women's HIV-positive status.

Initially, the sample size proposed for this qualitative study was 24 participants. Using the constant comparative method to understand the emerging constructs from the data (Charmaz, 2003), we found that upon completion of 18 interviews, theoretical saturation had not yet been reached. Data on our initial research question around links between violence and PMTCT lacked richness and women's stories failed to converge around specific pathways. We thus expanded the sample to reach 32 women using theoretical sampling to include additional women with recent IPV experiences. Theoretical sampling is a technique for using preliminary analysis to guide how data are collected further (Glaser, 1992). In this case, our initial analysis suggested that links between violence and PMTCT are best explored among participants with recent violence and with some challenges adhering to PMTCT behaviors. Displaying "challenges" with PMTCT was therefore used as a selection criteria for the next 14 participants. Additional women with these characteristics allowed us to further refine emergent concepts and test out initial impressions of the data with a more targeted group of participants.

Trained nurse researchers invited women to participate through follow-up phone calls using locator information. All participants contacted for this sub-study were reachable by phone, with 7 women refusing to take part (due to living outside the province, work commitments, or not desiring to take part in additional research). Male partners were never informed about a woman's participation in the research because of the potential for an abusive partner to react violently. To protect participants and reduce the risk that partners would overhear the conversation, nurses were trained to ask "is this a safe time to speak?" before continuing. A full distress protocol included appropriate researcher responses in cases of violence disclosure, psychological distress, high emotionality, or a need for referrals. Basic elements of the distress protocol were employed during most interviews included in this study: a calm, non-judgmental approach to inquiry; watching for signs of resistance when inquiring about violence to avoid re-traumatisation; offering tissues if participants cried; offering a break from the interview. In cases of severe distress, researchers were trained to invite participants to stop the interview, a technique that was used with one participant, and to offer supportive referrals. In the case of current suicidal thinking, researchers were trained to make a direct referral to a psychiatric ward of the nearest hospital. In this sample, no participants revealed current suicidal thinking but several participants recounted a history of suicidal ideation, for which researchers offered empathetic listening and referrals to a nearby community psychology counseling service.

Data collection

In-depth interviews were conducted face-to-face, in a private clinic room, at a convenient time for the woman. Interviews were conducted by the lead author and three other trained qualitative researchers. The trained researchers were comprised of two South African, female nurses and two non-South African, female researchers. This composition of the research team helped ensure that some of the positionality challenges associated with language and race were addressed. However, all researchers held positions of relative power compared to participants, a dynamic that was intentionally addressed through training on a humble, inquisitive approach and the ethos among the research team that participants were the 'experts' and researchers were the 'learners'. While this positionality could not be completely eliminated, the rich stories presented by most participants suggests comfort in sharing their stories through the research process.

Interviews were conducted in one of three South African languages (English, Sesotho, isiZulu) and digitally recorded. A semi-structured in-depth interview guide explored three themes: the perceived relationship between IPV and HIV in women's lives; women's perceptions of how violence may influence PMTCT uptake; and, potential mechanisms through which IPV may impact PMTCT-related health behaviors. Interviews lasted between 26 minutes and 1 hour 40 minutes (median 46 minutes).

Professional transcriptionists typed verbatim transcripts from the digital recordings. Each transcript was reviewed by a researcher to ensure clarity and for additional detail about tone and non-verbal cues. Interviews conducted in the local language (Sesotho or isiZulu) were translated directly to English and reviewed for translation errors by the researcher who led the interview. All data collection materials were stored in a locked file cabinet and electronic voice files and transcripts were password protected and stored on an encrypted server. At the point of transcription, the lead researcher assigned a pseudonym unrelated to the participant's real name for ease of analysis. The data presented here note the pseudonym, age, and whether the woman was pregnant or postpartum.

Data analysis

To ensure that interviews achieved adequate depth and richness, the first 6 transcripts were reviewed jointly to establish future questions, points of clarification, and initial themes. Researchers reviewed full transcripts and created detailed 'memos' to highlight initial impressions of the data. This review process was repeated at two other time-points (upon completion of 18 interviews and 28 interviews). Both reviews led to tweaking of the interview guides, with major themes retained but sub-questions altered to enhance probing and clarity. The team developed an

initial coding framework based on the preliminary review of 6 transcripts and "sensitizing concepts", or preliminary ideas around how to examine the data (Bowen, 2006).

The coding framework was applied to all transcripts by two researchers using Dedoose qualitative analytic software. The focus of double-coding was to ensure that code application was consistent across transcripts and that code definitions were robust. Rather than assessing inter-rater reliability, the team used a series of phone calls and in-person meetings to refine codes until consensus was reached. This process led to a refined set of thematic codes that comprised broad topics such as relationship characteristics, experience of violence, HIV diagnosis, PMTCT uptake, mental health, social support, partner HIV serostatus disclosure, and reflections on being asked about IPV in pregnancy. Next, the team established a system of fine codes that emerged inductively from the data. Fine codes were applied to a portion of transcripts by three researchers, ensuring that every transcript was double-coded. Examples of fine codes within the partner HIV disclosure section were: fear of partner response, reactive or polarized methods of disclosure, male partner denial of disclosure, concern for the child, supportive steps, displaced anger. During analysis, cases that did not fit the overall picture, called "exceptional cases", were actively sought out. Trustworthiness of findings was ensured by the team approach to data analysis, coding discussion meetings, and by presenting initial findings to groups of colleagues and peers.

Ethical and safety considerations

All participants provided written, informed consent. The parent trial received approval from the University of the Witwatersrand Human Research Ethics Committee (M121179) and World Health Organization Ethics Research Committee (RPC471). This qualitative substudy received additional secondary analysis approval from University of the Witwatersrand (M140451).

Given the special considerations around researching violence, all portions of this study were designed to adhere to the WHO ethical and safety guidance on IPV research (WHO, 2001). The research was presented broadly so that the specific nature of the study was not made public. Only when the participant and interviewer were alone, during the informed consent process, did the researcher provide further information that the nature of the study involved HIV and IPV. All qualitative researchers were intensively trained. A 30-hour technical training alongside weekly mentorship and debriefing by senior team members ensured all researchers had the knowledge and skills required to skillfully handle disclosure of violence (Reynolds, 2007).

Results

Sample characteristics

Of the 32 participants, 26 women reported IPV in pregnancy while 6 reported a prior history of IPV (see characteristics summarized in Table 10). The majority of participants (75%) reported physical and emotional violence, with several (16%) reporting physical, sexual, and emotional violence. Twelve participants (38%) reported that they were non-adherent to HIV medication during the time of pregnancy or were not on treatment.

Table 9. Descriptive statistics of sample (n=32)

Characteristics	Number or median	Percentage or IQR*
Sociodemographics		
Age	30 years	(26-32)
High School education	10	(31.3 %)
Employed	13	(40.6 %)
Country of origin		
South Africa	19	(59.4 %)
Zimbabwe	12	(37.5 %)
Malawi	1	(3.1 %)
Relationship characteristics		
Type of violence		
Emotional only	3	(9.4 %)
Physical and emotional	24	(75.0 %)
Physical, sexual, and emotional	5	(15.6 %)
Recent (vs. lifetime)	26	(81.3 %)
Living with partner	11	(34.4 %)
Partner age	34 years	(31-36)
Length of relationship	4.5 years	(2-5)
HIV-related characteristics		
Pregnant at time of interview	14	(43.8 %)
Time since HIV diagnosis	2 years	(1-5)
Non-adherent to ART in pregnancy	12	(37.5 %)

*IQR: interquartile range; ART: Antiretroviral Therapy

Links between violence and PMTCT adherence

We learned that four pathways linked women's experience of IPV with their adherence to PMTCT interventions. The first pathway was partner disclosure, with violent relationships framing a decision to hide one's HIV status. Some women were unable to maintain careful PMTCT behaviors without risking disclosure, so they opted to take treatment breaks or stop treatment altogether. A second pathway was mental health, as IPV resulted in depressive views

that "life is not worth living" and led to missing doses of medication. A third pathway was partner control and isolation, in which men limited participant access to friends and family, which precluded the social support required for good adherence. In a final, protective pathway, good PMTCT adherence seemed linked to women's identity as mothers, with the wellbeing of the baby framing decisions to stay attentive to medication.

Below, we present each pathway alongside illustrative quotes and case examples of participants. While it may appear that certain women 'belong' primarily to one single pathway, this was certainly not the case within the overall analysis. Participants often related stories that highlighted the complex relationship across the pathways.

Partner (Non) Disclosure: Hiding HIV from a partner

Of the 16 women who disclosed to partners, many experienced subsequent physical violence (n=6) and emotional violence (n=7) that they directly linked to the disclosure act. Participants recalled incidents of violence that started or worsened immediately following HIV testing. Lulama, who was 30 years old and pregnant with her second child, made a direct link between her HIV status and physical and emotional violence from her partner. The partner consistently blamed Lulama for "giving" him HIV, and would use threats of further physical violence to show his disdain for her status. Thuto, a 25-year-old postpartum participant, explained that the violence in her relationship started when she tested HIV-positive during her first pregnancy. Thereafter, a severe episode of physical violence in her third pregnancy was directly related to her HIV status: "He came back from the shebeen [local bar] and said I was a slut, and that's why I came with this disease."

Not all women experienced physical violence after disclosing their HIV status. A tension occurred in Leah's relationship that demonstrates the blurred lines between violence and partner support around HIV. As a 33-year-old pregnant participant, Leah's husband was broadly supportive of her taking medication, because Leah had carefully convinced him that PMTCT can prevent HIV in their infant. Leah's partner would even remind her of her treatment time. Yet, alongside this instrumental support, he was emotionally abusive and would remind her that HIV would lead to her death by stating, "You will die, your children will be alone."

In this context of violent or psychologically harmful reactions, it is perhaps not surprising that 16 women opted to keep their HIV status a secret. Participants described this choice as a reasoned response to a dangerous situation. Six participants feared that their partners would react to disclosure with physical violence. For Simphiwe, a 33-year-old woman who had been with her partner for five years, a history of physical violence led her to keep HIV a secret. Another

participant, Kandi, feared physical violence because her partner explicitly stated that he would hurt her should she test HIV-positive.

Fears of partner reaction led some women to be partially non-adherent to their HIV medications. One 32-year-old postpartum participant, Nomsa, described her fear that the father of her first child might murder her or the child as a response to HIV disclosure. Nomsa kept her status hidden by pretending the medication was for pregnancy, rather than for HIV, but admitted it was challenging to keep taking the pills after giving birth. Another participant, Thembi, was 26 years-old and postpartum when she recounted how she chose not to start HIV medication in pregnancy because she was frightened that her partner would be physically violent when she asked him to use a condom. Her (incorrect) understanding of treatment came from antenatal staff who often say that HIV medication must be accompanied by consistent condom use. Since Thembi knew she could not safely use condoms, she chose to avoid HIV medication altogether. Her non-uptake of treatment meant that her infant acquired HIV during the course of the study.

The act of hiding medication and withholding one's status from partners requires considerable foresight and care. Lulama, 30 years and pregnant during the interview, strategically took medication at a time when her husband was away from the house. At 34 years and pregnant, Ayanda changed the container of her HIV medication so that it would appear to be other routine medication. Other women like Mpefe also had to carefully navigate clinic visits and medication:

> *My boyfriend doesn't know about this. I just kept it to myself. So my treatments, when I would come and take my treatments here by the clinic, then I would hide it by my place. Even when I drink my tablets I would hide them. – Mpefe, 25 years, Pregnant*

When Mpefe noticed her partner was nearby, she would forgo treatment altogether. Eventually, Mpefe decided to move out so that she could easily take her treatment without worry that her boyfriend might see.

Similarly, Zama (25 years and pregnant) found it easier to adhere to medication once she moved out from her partner's place. Before she would wait until he fell asleep to take her daily prescription: "It was a little bit tricky because I had to hide the medication. And then at times he would be in the same bedroom where I hide it, so I can't take it." For Sonja, the original response to disclosure was threats of violence and forced eviction from the household. In this context, Sonja, 23-years-old and pregnant, carefully avoided taking medication in front of her partner, worrying that simply seeing the medicine might trigger a violent reaction. One day, her partner snuck up on her in the bathroom and caught her taking the treatment. While the response was not

physical violence, her partner disappeared and returned home in an agitated state after a bout of drinking.

A subtler rationale for hiding medication from violent partners was to withhold information from a person who had caused so much pain. For two women, this appeared to be a resistance strategy for proving to themselves that their own health was not within the realm of things men could control. Simphiwe professed that she made up her mind immediately after testing HIV positive, since "he was violent, hitting me and all that stuff. So I decided I'm not going to tell him." Similarly, Zinhile explained "If he was a proper person, then I would tell him that I'm HIV positive, let's go to the hospital together to test. But if he is going to put me at risk, why should I say that?" Zinhile met her partner's lack of care by stubbornly refusing to share anything about HIV with him:

> *I didn't want him to know I have gone to the clinic. I didn't even want him to know what I was doing in my life, in my future, because he didn't want to be close… I didn't even want him to see me taking the tablets, because he didn't want to know, he didn't want me. – Zinhle, 38 years, Postpartum*

Mental health: Poor adherence as a result of depression and anxiety

Several women related stories of non-adherent periods, many of which resulted from depressive episodes that followed phases of violence. At 24 years, Thuto had recently delivered her fourth child, and explained the tendency to feel despondent particularly after extremely violent episodes or when her husband refused to buy food for the family. Thuto sometimes struggled with staying adherent, and explained that she had given up hope: "Sometimes, when I'm stressed, I feel that its better I also died… I've just lost hope." Zama expressed a concern that her infant would test HIV-positive, since she herself had experienced adherence struggles. Similar to several other participants, Zama disclosed a desire to "end everything" as a method to reduce the distress she was feeling about the violent relationship:

> *When I was three months pregnant, that is when it started changing to being physical [violence]. At times I would just feel like ending everything, the stress and all that… I am very much worried about my baby being positive, especially with the fact that I was not able to take my medication as frequently as I was supposed to. –Zama, 25 years, Pregnant*

Ayanda's partner had been physically abusive the night before the interview. She described the physical violence alongside the overwhelming nature of coping with frequent abusive episodes and anticipating the arrival of a new baby. The stress related to the violence was a concern

because Ayanda realised how episodes of IPV took priority over remembering to take her medication:

> *You know what bothers me sometimes? That when he makes this thing [violence], I may forget to drink my medication. Then maybe I will just default [not comply with HIV visits and medications]. And what worries me is that I will default when I'm breastfeeding the child. –Ayanda, 34 years, Pregnant*

This notion of "forgetting" to take medication is perhaps more linked to how women are able to cope with various life challenges. When violence is more of a concern, or more 'top of mind', than HIV-related concerns, women may forgo the steps required for good HIV care. This finding denotes how subtle mental health considerations, like being too cognitively overwhelmed by the violence, may influence PMTCT uptake.

Six women described periods of stopping treatment altogether due to depressive and suicidal feelings. The underlying emotion of stopping treatment for these women was a desire to end their lives. One participant, Dova, named it a "death wish" and recounted the overwhelming feelings of hopelessness and failure that had led her to stop taking HIV treatment:

> *There was a time when I was really, really down, so I stopped taking my medication. I completely just stopped and I sort of had this death wish in me that if only this thing would, if HIV would work like really <u>for us</u> then it would just kill me. I stopped for three to four months without taking my medication. – Dova, 32 years, Pregnant*

Another participant, Dintle, had tried to commit suicide by drinking poison several weeks prior to the interview. Her husband had been extremely violent, hitting her in front of the neighbours, withholding food, and publicly shaming her. She explained in subtle terms (such as "stress" and "feeling bad") how her recent suicidal experience and anxiety symptoms would cause her to forgo treatment for periods of time:

> *Participant (P): Sometimes I forget to take my treatment. It happened two months ago. I had pills, but I just forgot dates to go fetch my treatment.*
> *Researcher (R): What led you to forget?*
> *P: Stress, I am always thinking.*
> *I: What were you thinking?*
> *P: I was thinking about the time he threatened me. I just end up thinking about too many things. By the time I remember it is too late, my days have passed. – Dintle, 30 years, Postpartum*

For Dintle, stopping treatment was a by-product of experiencing intense episodes of violence and concomitant mental health challenges. This suggests that in cases of severe depression, HIV treatment non-adherence can be both a mode of self-harm and a result of being overwhelmed at times of high distress.

Isolation and partner control: The hidden nature of IPV and HIV

In this sample, there were only a few examples of partners directly controlling the health of women through barring access to clinics or medication. At 38 years and postpartum, Zinhle feared blame associated with having HIV, but not necessarily a violent reprisal. Even still, the controlling behaviors her partner exhibited against the backdrop of physical and sexual violence meant that Zinhle would surreptitiously visit the clinic.

Yet, partner control did not always lead to poor adherence. For example, Kagiso's partner was suspicious when she went to the clinic, assuming she was cheating on him. At times, he would physically abuse her when she came home from the clinic, assuming she was unfaithful during her times away from home, but she described a stubborn dedication to continue seeking medical treatment:

> *Sometimes when I go to the clinic he say hey you are not going to the clinic. He asked me too many questions… But I refuse. I tell him I can't stop going to clinic because this is my life! I have children. I have to live to take care of my babies. Sometimes when I come back to the house he beats me, accusing that I'm not coming from the clinic. –Kagiso, 28 years, Postpartum*

For many women, violent partners did not actively bar access to clinics, but indirectly used isolation as a type of partner control. One example is found in Lulama's story about how returning from a normal day would often result in questions and threats: "He is always looking at what I do and wants to know what I get up to. He controls my life, he says I should always be at home." The outcome of these controlling behaviors was often immense isolation and mental health challenges for Lulama, who was 30 years and pregnant at time of interview.

For several participants, the feeling of isolation was pervasive, leaving them troubled and continually ruminating over difficult thoughts. Dova illustrated this by describing how thoughts of the violence were "stuck in her mind" and left her isolated and alone:

> *It is just basically stuck there in my mind - all these things that have been happening. When you are alone, you just sit and think about it and I don't have anyone. Sometimes I don't sleep the whole night I am thinking and thinking. – Dova, 32 years, Pregnant*

Another implicit trait of the partner control and isolation pathway is the hidden nature of both HIV and violence. Both HIV and IPV are stigmatised, which leads to a worsened ability among women to find support for either condition. Several women spoke of staying silent with their families about the violence in their relationships. As 30-year-old, pregnant Lulama noted, "whatever we fight about I keep to myself most of the time." For Neo, it was easier to pretend that things were fine than to disclose to her friends that she lived in a violent relationship:

> *It's hard to tell people I've got a problem, I'm not living a good life, with a partner that I'm worried, we're always fighting, things like that. You just pretend, like now pretending that I'm ok but I'm not ok. – Neo, 28 years, Pospartum*

Motherhood as a coping strategy: protective pathway

Despite immense challenges with HIV, violence, and pregnancy, many women in this sample exhibited unique coping strategies for adhering to treatment. For some women (n=8), the concept of motherhood was a source of resilience and helped them stick with HIV medications. At 32 years and postpartum, Nomsa struggled to find clothing and food for her children, but continually reminded herself that treatment was an essential part of being able to care for her children: "I'm drinking my tablets. I'm just telling myself that I must help myself and get help. I know I need to work for my kids rather than die."

Zama did have trouble with adhering to treatment, and considered suicide during phases when the physical violence was particularly bad. Yet, at 25 years and pregnant, the reminder of her new baby would often be enough to return her to thoughts of living and trying to provide for her baby: "Maybe after a fight, I will be crying, stressed and then I would be like, okay, let me just do this [commit suicide], then I would think, 'No, but let us give this baby a chance'." It is important to note that Zama exhibited these methods of "resilience" by focusing on her baby's wellbeing even as she struggled with suicidality and isolation. Her story illustrates the complex relationship within multiple pathways, and shows that IPV's influence can manifest in complicated ways.

Grace used the idea of caring for her children as a way to "move on with life" and leave her violent partner:

> *Like in future I was thinking like to move on with my life. Do something for my life and for my kids! That's what I want now because I'm done with living in the painful relationship. – Grace, 27 years, Postpartum*

Zethu's baby similarly helped her keep "priorities straight." As a 21-year-old pregnant woman, she boldly stated that HIV treatment was more important than her husband, and expressed how non-adherence was simply going to harm herself: "I'm doing it [PMTCT] for my baby. I don't

want to stress myself so that I leave the tablets - it's better to leave that husband and continue with my tablet." Beyond Zethu's commitment to protecting her baby, it appeared that taking care of her own HIV could be a subtle way to "leave that husband" and regain control over her own life.

Not every participant was able to use the notion of motherhood to feel more confident around HIV treatment. For example, Dova felt that the stress related to the violent relationship was making her a worse mother – a notion that she illustrated by describing how her suicidal thoughts were linked to potential infanticide:

> *I have suicidal thoughts because I don't have anyone. The only people I have are my kids. And the worst part is with these suicidal thoughts I am always saying, if I had to kill myself, I wouldn't leave my kids behind. I would take them with. If there is a method whereby I would kill me and my kids, I would do it. So it is just, it is not well. I am not even a good mother these days. –Dova, 32 years, Pregnant*

Dova's story reflects upon multiple pathways of mental health and isolation, suggesting again that pathways may have a dynamic relationship and do not necessarily stand alone as distinct situations.

Discussion

This is the first study, to our knowledge, to explore the relationship between violence and HIV adherence within a relatively robust qualitative sample of 32 pregnant and postpartum women reporting both HIV and IPV. It highlights that women living with HIV and IPV have unique challenges to maintaining healthy adherence behaviors around the time of pregnancy. Four key pathways emerged that link IPV to PMTCT: partner non-disclosure, poor mental health, isolation due to partner control, and motherhood.

As shown in Figure 20, pathways from IPV to PMTCT outcomes tend to intersect and collide. Rather than falling into distinct categories, participants often presented stories that fell within multiple pathways. The pathways seemed to be comprised of both positive and negative aspects of responding to IPV. So while mental health and partner control/isolation seemed to worsen HIV outcomes for women, pathways of motherhood and partner non-disclosure highlighted unique resilience strategies used by women. This nuanced understanding of the IPV–HIV adherence relationship can help contextualize recent conflicting evidence from sub-Saharan Africa. Whereas one study with pregnant women in Zambia showed that violence worsens HIV adherence (Hampanda, 2016), another in Kenya among female sex workers suggests that history of IPV actually improved odds of HIV-related health (Wilson et al., 2016). It is possible that

while experience of IPV may hinder women's ability to take HIV medication, it could alternately (or simultaneously) spur women towards persevering with HIV treatment.

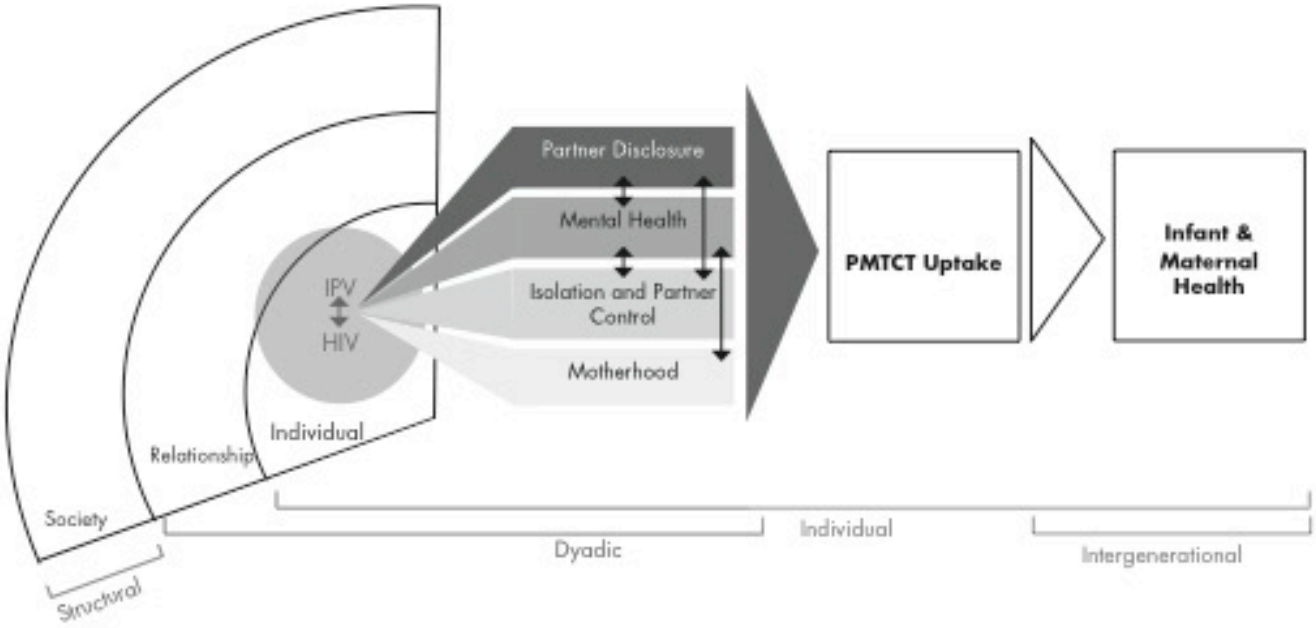


Figure 22. Pathways linking intimate partner violence to PMTCT uptake

While *motherhood* was a protective element and a resilience strategy for some participants, this finding contains critical contradictions. Our findings reflect that women's sense of self around the time of pregnancy can be grounded in the infant relationship (Bhandari et al., 2012), and that striving for motherhood may be an active coping strategy (Burnett et al., 2015; Foster et al., 2015). Motherhood can represent an important "turning point" when women start to consider leaving a violent relationship for the sake of the infant (Semaan et al., 2013: 74). However, there is a less positive aspect to the motherhood identity, as it necessarily expects that mothers will be the nurturing caretaker and sacrifice her own needs for that of her child (Hays, 1998). When, in the context of IPV, women may not be fully able to protect their infants from psychological and physical harm, they may be held responsible for failure to protect the child, even as they themselves require protection (Lapierre, 2008). The shame associated with both IPV and HIV may be compounded with the shame of being a 'bad mother', which could only worsen mental and physical health outcomes.

The pathway of partner non-disclosure seems to reveal both negative aspects of IPV as well as resilience strategies used by women. This tension between women being both constrained by the violence while also being agentic in their response has been highlighted in previous IPV literature (Campbell & Mannell, 2016; Turan et al., 2016). In our sample, partner non-disclosure

made it challenging for some women to take treatment openly and consistently (Awiti Ujiji et al., 2011; Sayles et al., 2006). Yet, for others, non-disclosure was an important safety strategy. Women in this sample made strategic choices to stay safe from violent reprisals by placing medication in other containers, taking it at times when partners would be away, and by moving out from home altogether. Importantly, non-disclosure was also a method for regaining control over chaotic lives. It is important to note that this 'agentic' finding around non-disclosure strategies may have emerged partly because of our narrative approach to data collection. Constructing meaning through narratives is a particularly useful approach to violence research, as it restores agency and power among a group that is often considered the "helpless victim" (Boonzaier & van Schalkwyk, 2011: 278). Notwithstanding the methodological considerations of this conclusion, the strong evidence from nine women in our cohort suggests that women do use important strategies to avoid partner disclosure while staying faithful to HIV medication adherence.

Pathways of partner control and mental health offered 'negative' influence on PMTCT behaviors. For several women, relationship control led to an inability to attend the clinic or take medication when desired (Lichtenstein, 2006). More often, however, partner control manifested as a sense of isolation and inability to define one's own choices about health, movement outside the home, or taking care of the infant. The isolation caused by severe partner control meant that women had little access to social resources to help them (Liang et al., 2005). Isolation also contributed towards the mental health pathway, with women reporting increased anxiety and distress due to being alone.

Our findings certainly support extant literature by suggesting that IPV leads to emotional trauma, anxiety, suicidal ideation, and depression among women, including in antenatal care (Ellsberg et al., 2008; Mahenge et al., 2013) and that poor mental health has onward impact on HIV medication adherence (Sumari-de Boer et al., 2012). We add to this evidence base by highlighting the complex underpinnings behind the IPV-mental health connection. On the more manageable side of the spectrum, women in violent relationships have stress and emotional concerns that take priority over the daily regimen of medication. For other women, on the more extreme side, a sense of hopelessness and being overwhelmed due to the extreme distress of violence led to the potential for self-harming behavior. In the six cases of women who described suicidal ideation, several used the act of stopping treatment as part of thoughts of ending their own lives. Others have noted that women's vulnerability to abuse may create a self-image of being damaged, inhibiting self-care and access to regular health services (Leenerts, 1999; Rothenberg & Paskey, 1995). Our findings go beyond this literature by noting that HIV

medication – due to its very necessity for good health – can be used in a self-harming manner through intentional treatment interruptions.

Limitations

The findings of this study should be viewed in light of several limitations. All participants were visiting antenatal care, limiting our ability to understand these dynamics among women who avoid healthcare in pregnancy. Similarly, participants in this sample all reported IPV victimization (a majority with recent violent episodes), limiting a comparison to women living without IPV. Purposive selection of participants preclude our ability to generalize these data to the entire parent trial cohort, a limitation of most qualitative research. The urban Johannesburg setting has distinctions from other sub-Saharan African health settings, which makes it challenging to compare findings. Our narrative, social constructionist approach to interviews intentionally focused on techniques like validation, highlighting resistance, and locating identity within participant stories. Therefore, our interpretations are likely to differ from that of a 'neutral observer', as utilized within a more positivist research paradigm. Nevertheless, this study provides initial impressions of violence among HIV-positive pregnant/postpartum women in a sample that is larger than the extant literature.

Implications for intervention, research & policy

Several intervention strategies emerge from these data. With appropriate training, supervision, and tools, health workers in antenatal settings could be the first point of contact for pregnant, abused women. The 'window of opportunity' in antenatal care, when women are repeatedly visiting the clinic, can ensure that violence and HIV considerations are jointly addressed– particularly through onwards referral to services that specialise in addressing violence. The current method of group-based PMTCT messaging should be refined towards an individually-tailored approach that truly addresses the concerns, confusions, and daily lives of pregnant and postpartum women. Open, honest discussions at this phase in a woman's life may have benefits for staying safe while adhering to crucial PMTCT interventions. The notion of 'striving for motherhood' can also be harnessed during this time, to help women prioritize their own health and safety as another form of commitment to the infant. It is clear that the intertwined issues of mental health and disclosure need to be incorporated into PMTCT services, and this can be achieved by training antenatal staff to implement brief mental health interventions or through referrals. Social support in the form of skillfully-facilitated peer support groups could assist women with the isolation pathway that is so pervasive in abusive partnerships.

These qualitative findings suggest several avenues for further research. Given the potential positive and negative ways that violence may impact HIV adherence, future quantitative research should extend beyond simplistic analytic techniques. To date, the literature has been limited to bivariate association between violence and HIV adherence. Simple regression techniques may fail to account for important meditational pathways between IPV and adherence. In one recent study, for example, the direct association between IPV and HIV adherence was non-significant, yet when mediated by mental health there was a strong negative path association (Malow et al., 2013). Specific pathways identified in this research should be explored and confirmed in a larger, quantitative sample using techniques that recognize the interrelated nature of pathways, such as structural equation modeling.

PMTCT policy could also benefit from these qualitative findings. Current South African PMTCT guidelines discuss the "benefits" of partner HIV disclosure and prompt health workers to "encourage" disclosure and "support…partner notification" (South African Department of Health, 2014: 37). However, no mention is made of the safety dilemmas that mothers may face in disclosing to a violent partner. We learned that partner non-disclosure is a strategic way to stay safe in a violent relationship, and that some women can manage to safely continue treatment without their partners finding out. Given that 25-35% of South African women experience IPV in pregnancy (Dunkle et al., 2004b; Groves et al., 2012), the omission of strategic non-disclosure in current guidelines is likely to burden health workers, who are currently unskilled at discussing partner dynamics.

Conclusion

IPV and HIV are strongly linked in the lives of childbearing women in many settings globally, and violence leads to adherence challenges that place maternal and infant health at risk. These intersecting issues deserve increased attention if we are to ensure elimination of vertical HIV transmission and protect the health of mothers globally. Current policy and intervention is sorely lacking, with little evidence that health workers and policy makers are alert to the considerations of violence within PMTCT programming. Pregnant and postpartum women will greatly benefit from antenatal care that recognizes the realities of living in violent relationships and emboldens women to prioritize their own health, as well as the health of their infants, during this critical phase.



Chapter 7. Quantitative Results

Hatcher, A. M., J. M. Turan, H. Stockl, N. Woollett, C. C. Pallitto, C. Garcia Moreno and N. Christofides (in draft). "Intimate partner violence, mental health, and adherence to HIV treatment in pregnancy and postpartum among South African women."

Photo credit: Fhatuwani Tshikororo, Safe & Sound Trial launch with local stakeholders.

Introduction

Prevention of mother-to-child transmission (PMTCT) interventions have potential to eliminate transmission of HIV from mothers to infants (Mofenson, 2010b). Yet, for a variety of reasons, women's adherence to all the steps required for successful PMTCT is often low. For example, only 65% of eligible pregnant women in priority countries are able to access HIV treatment (WHO et al., 2013) and half stay retained in HIV care throughout pregnancy (Sibanda et al., 2013). Pooled analysis shows that while 75% of pregnant women are adherent to antiretroviral treatment (ART) during pregnancy, only 53% adhere to treatment postpartum (Nachega et al., 2012).

Adherence to ART in pregnancy is associated with lower HIV viral loads in pregnant women (Bardeguez et al., 2008; Kiarie et al., 2003). The implications for maternal, infant, and paternal health are marked, since lower viral loads mean that women are healthier and they have lower risk of passing HIV to infants or partners (Cohen et al., 2011; Mugo et al., 2011; Volmink et al., 2007). Women who report at least 90% treatment adherence postpartum have 60% lower relative risk of transmitting HIV to their infants by 38 weeks of age (Davis et al., 2014). Despite these promising health gains associated with ART adherence, across sub-Saharan African settings adherence tends to worsen during the postpartum phase (Henegar et al., 2015; Ngarina et al., 2015).

Intimate partner violence (IPV) may be one important factor related to sub-optimal ART adherence in pregnancy and postpartum, yet this association has been understudied in the literature (Gari et al., 2013). Understanding the relationship between IPV and adherence has, to date, been limited to cross-sectional studies among non-pregnant women. A meta-analysis of this evidence base suggests that women's lifetime experience of IPV is associated with 55% lower odds of self-reported ART adherence and 36% decreased odds of viral suppression (Hatcher et al., 2015b). Following publication of the meta-analysis, one study showed that IPV victimization was correlated with non-adherence among pregnant, Zambian women (Hampanda, 2016). In that cross-sectional study, experience of lifetime IPV was associated with 74% lower odds of treatment adherence during pregnancy and 89% lower odds of adherence postpartum (Hampanda, 2016). No studies have explored the relationship between recent IPV and ART adherence, and no studies have, to our knowledge, employed a longitudinal design.

In order to fill the gaps in the literature around IPV and ART adherence, we conducted a cohort study with HIV-positive pregnant women in South Africa. Women were recruited during antenatal care and followed up to 24 weeks postpartum. We assessed longitudinal associations between experiencing recent (past 12-months) IPV at baseline and self-reported ART adherence

in the final month of pregnancy. We also assessed longitudinal associations between IPV during pregnancy and self-reported adherence postpartum. Lastly, we used structural equation modeling to examine pathways from recent IPV to ART adherence in pregnancy and postpartum.

Methods

This study was conducted in urban Johannesburg, South Africa, where HIV and IPV are highly prevalent. An estimated 25 – 35% of South African pregnant women report recent physical and/or sexual IPV (Groves et al., 2012; Hoque et al., 2009). Similarly, antenatal HIV prevalence across South Africa is high, with population-based surveys estimating 28.6% of pregnant women attending public clinics in Johannesburg are living with HIV (Wabiri et al., 2016). South Africa has made significant strides towards reducing mother-to-child transmission from 14% in 2009 to an estimated 5% in 2012 (UNAIDS, 2013), but only 54-65% of South African pregnant women and infants complete all recommended PMTCT steps (Clouse et al., 2013a; Technau et al., 2014; Woldesenbet et al., 2015).

Study Recruitment and Procedures

This analysis was nested within a randomised controlled trial testing an intervention for IPV in pregnancy (Pallitto et al., 2016). Called Safe & Sound, the trial recruited pregnant women (n=1543) from four antenatal clinics in Johannesburg to take part in baseline questionnaires. Women who reported any recent (past-year) physical and/or sexual IPV in the baseline questionnaire were invited to participate in the randomized controlled trial. For the current study, we followed all women randomised into the trial who were living with HIV and recent IPV (n=148) and we purposively followed a portion of those excluded from the trial (i.e. no recent physical or sexual IPV) but living with HIV (n=117), for a total of 265 women followed prospectively.

Data Collection and Measures

Data collection occurred at two timepoints: during the woman's first antenatal clinic visit (baseline) and during clinic visit when the infant was between 6 weeks and 24 weeks old (postpartum). Baseline and postpartum visits entailed a one-hour questionnaire administered by a trained nurse researcher. The questionnaire was completed on paper forms in English or the local language of the participant's choice (isiZulu or Sesotho).

Adherence to antiretroviral medication in pregnancy and postpartum was measured through self-report using a visual analog scale (VAS). The 30-day VAS has been validated in South Africa and elsewhere (Peltzer et al., 2010a; Walsh et al., 2002), and shows strong

correlation with measures such as electronic medication monitoring and unannounced pill counts (Kalichman et al., 2009). To use the VAS, participants mark a point along a continuum showing how much ART they took in the past month (Giordano et al., 2004). We asked women at follow-up to report on their adherence during the final month of pregnancy and during the past 30-days postpartum. For bivariate analysis, we dichotomized adherence at 90%, a cut-off point based on previous studies (Davis et al., 2014; Mepham et al., 2011; Simoni et al., 2006). For the final structural equation model, we analyzed VAS as a continuous variable (0 – 100% adherence).

Intimate partner violence was measured using 13 items from the IPV instrument of the WHO Multi-Country Study questionnaire (Garcia-Moreno et al., 2006). This instrument measures physical, sexual, and psychological IPV in the past year and has been used in sites globally to measure IPV prevalence, including in South African studies (Dunkle et al., 2004a; Jewkes et al., 2010; Jina et al., 2012; Townsend et al., 2011). Each item asks behaviorally-specific questions (e.g. "How often has your partner pushed you or shoved you or pulled your hair?") and responses were scored on a four-point Likert-type scale with choices of 1 ("never"), 2 ("once"), 3 ("a few times"), or 4 ("many times"). We added one additional question to account for psychological violence in the form of forced exile from the family home: "Has your partner ever forced you to leave the house?" The WHO instrument was analyzed as a dichotomous outcome (any physical and/or sexual IPV). We used Tsai et al.'s approach to generating an IPV intensity index from equally weighted averages of thirteen z-scores (for which each item was standardized to a mean of 0 and standard deviation of 1) (Tsai et al., 2016). Higher values of this index denote greater intensity of IPV. The measure loaded as a single factor during confirmatory factor analysis, and the index had good internal reliability (baseline Chronbach's $\boldsymbol{\alpha} = 0.86$; follow-up $\boldsymbol{\alpha} = 0.88$).

Mental health was conceptualized as including anxiety, depression, and post-traumatic stress. The Hospital Anxiety and Depression Scale was used as a brief screener of anxiety and depression (Zigmond & Snaith, 1983). Women are asked about 7 symptoms of anxiety and 7 symptoms of depression, and rate the frequency of experiencing each symptom over the past week on a 4-point likert scale. Summing the scores for seven anxiety items or seven depressive items gives an overall score for symptomology of each condition, and the scale demonstrated acceptable reliability (anxiety Cronbach's $\boldsymbol{\alpha} = 0.74$; depression Cronbach's $\boldsymbol{\alpha} = 0.84$). A score of ≥ 8 is considered clinically significant, though when possible we analyzed the scores as continuous variables. The Harvard Trauma Questionnaire asks women to rate on a 4-point likert scale how often they experience a set of 15 trauma symptoms in the past week (Mollica et al.,

1992). Mean scores ≥ 2.07 indicate probable PTSD in the South African setting (Myer et al., 2008) and the scale demonstrated strong reliability (Cronbach's $\alpha = 0.86$).

Controlling behaviors was measured using 5 items from the IPV instrument of the WHO Multi-Country Study questionnaire (Garcia-Moreno et al., 2006). These items ask whether the partner has used control in the form of telling a woman what to wear, who she can see, or has prohibited her access to friends and family. Partner's use of controlling behaviors were summed, for a total score of five if a partner used every form. As a scale, this measure demonstrated acceptable reliability (Cronbach's $\alpha = 0.79$). *ANC visits* were measured as a proxy for health care engagement. Using a single item asking women to self-report the number of ANC clinic visits at follow-up, we calculated this as a continuous variable. *Disclosure* was measured by two dichotomous items at baseline and follow-up: "Does your partner know your HIV status?", "Did you disclose it to him?". Partner disclosure was assessed as an affirmative response to both questions.

Socio-demographics included a range of self-reported measures. *Age* was measured in self-reported years. *Food insecurity* was measured using the 3-item, validated Household Hunger Scale (Deitchler et al., 2010), and a woman was considered food secure if she had no or little household hunger (score of ≤ 2). *Level of education* was measured using self-report of the highest grade completed. Other covariates included *time living with HIV, time on ART,* and *infant age at follow-up*. *Gravidity and parity* were measured by asking women two questions about previous pregnancies. *New HIV diagnosis* was assessed as women who test positive for the first time during this pregnancy. All socio-demographics were included in models as continuous variables. *Clinic site* refers to the site of antenatal care and clustering by clinic was accounted for in final models.

Data Analysis

We conducted all analyses in Stata 13.1 (StataCorp LLC, College Station, TX). We used Cronbach's alpha to test the internal consistency of included scales. We conducted bivariate analysis of the outcome variable (adherence in pregnancy or postpartum) and key predictors. Bivariate analyses (t-test, χ^2 test) were conducted to examine differences by adherence status for normally distributed variables. We assessed non-normally distributed study variables (parity, education, time with partner, time on ART, controlling behaviors, intensity of IPV, postpartum age at follow-up) using nonparametric bivariate analyses (Mann-Whitney U test).

To measure the association between recent IPV and adherence to HIV medication, we initially conducted bivariate logistic regression models. We then adjusted for socio-demographics

associated with adherence at $p \leq 0.20$, a method of ensuring conceptually important variables are retained in the final models. Using stepwise backwards elimination, we dropped variables with non-significant p-values. All odds ratios are reported at the significance level of 0.05.

We next conducted Structural Equation Modelling (SEM) to explore relationships between IPV, potential mediators, and HIV adherence. The method of SEM was maximum likelihood estimation. First we used exploratory factor analysis to determine the correct measurement model for the latent variables: IPV at baseline and IPV at follow-up. For indicators to be retained in the final latent variable, each observed variable needed to load with a factor loading of at least 0.40. In the case of IPV at follow-up, this requirement led to the dropping of three sexual violence items. Thus, IPV at follow-up specifically measures intensity of physical and psychological IPV only.

We then used bivariate regression and evidence from our previous qualitative work (Hatcher et al., 2016b; Hatcher et al., 2014) to guide preliminary model building. Model modifications were performed based on modification indices and theoretical plausibility. After deriving a path model solution, we regressed each observed and latent construct on the socio-demographic predictors that showed a bivariate association: age (years); food security (household hunger scale); education (years completed); time since ART initiation (days). Once model fit was satisfactory, we trimmed non-significant paths and redrew the final model.

The magnitudes of standardized parameters were assessed using Cohen's typology of small (≤0.10 or less), medium (0.30), and large (≥ 0.50) effect sizes (Cohen, 1977). Measures for model fit included an absolute measure (standardized root-mean-square residual (SRMR)), a parsimonious measure (root-mean-square error of approximation (RMSEA)) and an incremental measure (Bentler's comparative fit index (CFI)) (Bentler, 1990; Steiger, 1990). Acceptable model fit assumed the model met the following criteria: SRMR<0.08; RMSEA<0.08 for reasonable fit and <0.05 for good fit; and CFI≥0.90. We report on the χ^2 fit statistic but note that it is less valuable as a measure of model fit given its tendency to inflate in large sample sizes (Hooper et al., 2008).

Ethical and safety considerations

Participation in the research was contingent on written informed consent and participants were reimbursed for their transportation to the clinic (equivalent of US $7). The parent trial received approval from the University of the Witwatersrand Human Research Ethics Committee (M121179) and WHO Ethics Research Committee (RPC471).

Given the special considerations of researching IPV, all portions of this study were designed to adhere to the WHO ethical guidance on IPV research (WHO, 2001). The research was presented broadly so that the specific nature of the study was not made public. Only when the participant and interviewer were alone did the researcher provide further information that the nature of the study involved HIV and IPV. A 30-hour technical training alongside weekly mentorship and debriefing by senior team members ensured all nurse researchers had the technical knowledge and therapeutic insight required to contain disclosure of violence. Women were invited to participate in the longitudinal study through follow-up phone calls using information they provided on their locator form. Phone calls were initiated by the nurse who enrolled participants in the trial initially, in order to ensure participants felt safe and comfortable. Male partners were never informed about a woman's participation in the research because of the potential for an abusive partner to react violently. In the case of phoning participants, and the risk that partners will hear them, nurses were trained to ask "is this a safe time to speak?" before continuing. A full distress protocol included appropriate researcher responses in cases of violence disclosure, psychological distress, high emotionality, or a need for onwards referrals.

Results

Descriptive characteristics

The cohort was comprised of 265 pregnant women living with HIV. Because the follow-up was done purposively, it is not feasible to calculate a loss-to-follow-up rate for this cohort. Table 11 presents the distributions of each observed predictor variable, separately for adherent and non-adherent women. Participants were between 18 and 49 years old and just over one-third had high school education. Participants had a median of 1 child prior to this pregnancy and had, on average, been with their current partner for 4 years. At baseline, 64.5% of the sample had experienced at least one form of recent (past 12 months) physical, sexual, and/or psychological violence from a partner.

The majority of participants (92.8%) reported good ART adherence during the final month of pregnancy (taking ≥ 90% of treatment). Similarly, self-reported adherence during the postpartum period was high, with 94.3% reporting adherence during the past 30 days prior to postpartum follow-up visit. Many women in the cohort (58.9%) were diagnosed with HIV during the current pregnancy, and most had first initiated ART within the past year (median 259 days before follow-up visit). Most women (82.2%) had disclosed their HIV status to a male partner. The burden of disease related to mental health conditions was high. At baseline, 39.3% had

probable anxiety and half (50.9%) had probable depression. Probable PTSD occurred within one-quarter (26.8%) of the sample.

Bivariate results

Bivariate associations between potential predictors and adherence are presented alongside the relevant test statistic (Table 11). Socio-demographic characteristics associated with adherence during the final month of pregnancy included having a high school education, being food secure, and more time elapsed since ART initiation. Age was the only socio-demographic predictor associated with postpartum adherence, with older women being more/less likely to be adherent.

Potential mediators associated with adherence in bivariate analyses were related to healthcare utilization and mental health. Women reported a median of five ANC visits during the current pregnancy, with those reporting fewer ANC visits significantly more likely to fall into non-adherence groups in pregnancy and postpartum. At baseline, probable depression and anxiety were significantly associated with non-adherence to ART. At follow-up, only probable anxiety was associated with non-adherence.

As shown in Table 11, a significantly higher proportion of women in the non-adherent group experienced one or more forms of recent physical and/or sexual IPV at baseline (84.2% versus 47.6% in the adherent group, p=0.002). Similarly, non-adherent women were more likely to report any psychological violence at baseline and higher levels of controlling male partner behaviors at baseline (84.2%) than adherent women (55.7%, p=0.015). During the course of follow-up, non-adherent women were more likely to report additional incidents of physical and/or sexual IPV (46.7% versus 25.6% among adherent women), although this findings was only marginally significant (p=0.07). Non-adherent women were more likely to report new incidents of psychological violence during the follow-up period (66.7% versus 36.0% in adherent women, p=0.017).

Table 11: Bivariate association between predictors and adherence in pregnancy and postpartum n=265

	Total cohort	Adherence* in pregnancy			Adherence* postpartum		
		Non-adherent	Adherent	p value	Non-adherent	Adherent	p value
	Median (IQR) or Number (%)	n=246 Mean or %	n=19 Mean or %	(χ2, wilcoxon, or t-test)	n=250 Mean or %	n=15 Mean or %	(χ2, wilcoxon, or t-test)
Socio-demographics							
Age (years)	29 (25 - 33)	28.5	29.2	0.617	26.6	29.3	0.062
High school education	102 (38.5%)	15.8%	40.2%	0.040	26.7%	39.2%	0.330
Number of children	1 (1 - 2)	1.5	1.2	0.720	1.1	1.3	0.439
Time with partner (years)	4 (4 - 7)	4.6	5.0	0.943	4.2	5	0.849
Food secure	221 (83.4%)	57.9%	85.4%	0.002	73.3%	84.0%	0.281
HIV-related Characteristics							
Newly diagnosed	156 (58.9%)	63.2%	58.5%	0.693	46.7%	59.6%	0.323
Number of ANC visits	5 (4 - 6)	4.5	5.6	0.012	4.6	5.5	0.074
Time since ART initiation (days)	259 (197 - 816)	344	711	0.045	554	692	0.990
Disclosed to partner	218 (82.2%)	78.9%	82.5%	0.694	80.0%	82.4%	0.813
Postpartum duration (days)	55 (43 - 82)	-	-	-	68.8	66.7	0.854
Mental Health (at baseline)							
Probable depression	135 (50.9%)	73.7%	49.2%	0.040	60.0%	50.4%	0.470
Probable anxiety	104 (39.3%)	57.9%	37.8%	0.084	53.3%	38.4%	0.250
Probable PTSD	71 (26.8%)	31.6%	26.4%	0.625	40.0%	26.0%	0.234
Mental Health (at follow-up)							
Probable depression	96 (36.2%)	-	-	-	46.7%	35.6%	0.386
Probable anxiety	42 (15.9%)	-	-	-	33.3%	17.4%	0.056
Intimate partner violence (past 12-months at baseline)							
Any physical and/or sexual IPV	146 (55.1%)	84.2%	47.6%	0.002	80.0%	48.4%	0.017
Any psychological violence	153 (57.7%)	84.2%	55.7%	0.015	100.0%	55.2%	0.001
Number of controlling behaviors	2 (0 -3)	2.6	1.7	0.013	2.3	1.7	0.134
Intimate partner violence (between baseline and follow-up visits)							
Any physical and/or sexual IPV	31 (11.7%)	-	-	-	46.7%	25.6%	0.074
Any psychological violence	100 (37.7%)	-	-	-	66.7%	36.0%	0.017
Number of controlling behaviors	1 (0 - 2)	-	-	-	1.7	1.1	0.052

***** Adherence is defined as ≥90% self-reported adherence in final month of pregnancy and last 30 days postpartum
IQR: inter-quartile range; ANC: antenatal care; ART: antiretroviral treatment; PTSD: post-traumatic stress disorder

Table 11 presents the bivariate odds ratios for ART adherence, by reporting any physical and/or sexual violence at baseline. Women reporting IPV at baseline had 84% lower odds of adherence in the final month of pregnancy (odds ratio [OR]=0.16, 95% confidence interval [CI]=0.05-0.57) and 78% lower odds of adherence postpartum (OR=0.22, 95% CI=0.06-0.81).

Multivariate results

In Table 12, models are presented to explore multivariate logistic regression for adherence in pregnancy and postpartum. Model 1, for each adherence time-point, controls only for socio-demographics. During pregnancy, higher IPV intensity is associated with lower odds of adherence after controlling for education, food security, time on ART, and age (adjusted [A]OR=0.90, 95% CI=0.85-0.97). Higher IPV intensity at baseline is associated with lower odds of postpartum adherence after controlling for age (AOR=0.90, 95% CI=0.85-0.96).

Model 2 adds potential covariates of health care utilization and mental health into the logistic regression. In pregnancy, the odds of adherence are significantly lower as IPV intensity increases, even when controlling for symptoms of trauma, depressive symptoms, anxiety symptoms, and number of ANC visits (AOR=0.93, 95% CI=0.86-0.99). IPV intensity during the course of follow-up and IPV intensity at baseline also retain significant associations with worsened adherence postpartum (AOR=0.91, 95% CI=0.84-0.99). The relationship between IPV intensity at baseline and postpartum adherence is partially mediated by anxiety, with increased anxious symptomology worsening odds of adherence (AOR=0.68, 95% CI=0.53-0.87).

Table 12: Adjusted associations between IPV, mental health, and adherence

	Adherence in pregnancy			Adherence postpartum		
		Model 1	**Model 2**		**Model 1**	**Model 2**
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Any physical and/or sexual IPV at baseline	**0.16 (0.05 to 0.57)****			**0.22 (0.06 to 0.81)***		
Baseline predictors						
IPV intensity		**0.90 (0.85 to 0.97)****	**0.93 (0.86 to 0.99)***		**0.90 (0.85 to 0.96)****	**0.91 (0.84 to 0.99)***
Education		**2.24 (1.04 to 4.77)***	**2.56 (1.07 to 6.13)***		-	
Food security		**0.79 (0.65 to 0.96)***	**0.80 (0.64 to 0.99)***		-	
Time on ART		1.00 (0.99 to 1.00)	1.00 (0.99 to 1.22)		-	
Age		-	-		1.11 (1.00 to 1.25)	1.10 (0.98 to 1.24)
Baseline mediators						
Trauma symptomology		-	1.10 (0.99 to 1.22)		-	1.01 (0/92 to 1.12)
Depressive symptomology		-	0.90 (0.76 to 1.08)		-	1.11 (0.92 to 1.35)
Anxiety symptomology		-	0.83 (0.68 to 1.03)		-	0.84 (0.67 to 1.05)
Number of ANC visits			1.19 (0.86 to 1.65)			1.22 (0.84 to 1.78)
Follow-up mediators						
Depressive symptomology		-	-		-	1.22 (0.98 to 1.52)
Anxiety symptomology		-	-			**0.68 (0.53 to 0.87)****

* p<0.05, **p<0.01, ***p<0.001

OR: odds ratio; CI: confidence interval; IPV: intimate partner violence; ART: antiretroviral treatment; ANC: antenatal care

Structural equation models of adherence in pregnancy and postpartum

Figure 21 shows the final structural equation model for adherence in the final month of pregnancy. Controlling behaviors co-vary with IPV intensity, but do not independently predict adherence, mental health, or health care utilization. IPV intensity moderately worsens adherence in pregnancy.

IPV worsens adherence in pregnancy and also works through two mediating pathways. IPV considerably increases symptoms of anxiety, which in turn worsens adherence. It is important to note that anxiety co-varies to a strong degree with symptoms of depression and trauma. IPV has a strong effect on both depression and trauma symptomology. While depression does not directly impact on adherence, increased trauma symptomology in this sample improves adherence. IPV also moderately decreases the number of clinic visits, which are positively associated with adherence. The model fit for adherence in pregnancy was strong, as indicated by CFI, RMSEA and SRMR values (Goodness of model fit Chi-square=172.125 (df =139), p=0.03; CFI=0.981; RMSEA = 0.030; SRMR = 0.045). Table 3 presents the full measurement specifications of the final model.

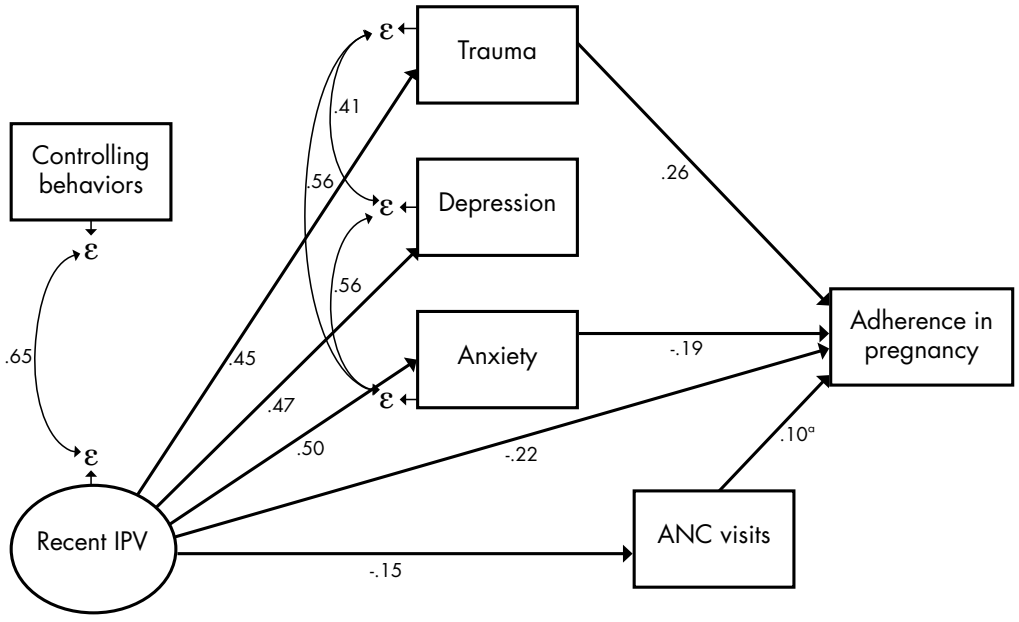


Figure 1. Final structural model of relationship between IPV, mental health, health care utilization, and adherence (n = 260). Relationships represented by standardized parameter estimates, with boxed indicating measured variables and oval representing latent variable. All relationships significant at the p<0.05 level unless noted. ª p=0.083. Model controls for education and food security.

IPV: intimate partner violence; ANC: antenatal care; ε: error term. Goodness of model fit Chi-square = 172.125 (df = 139) p = 0.03; CFI = 0.981; RMSEA = 0.030 (90% CI 0.010 - 0.040); SRMR = 0.045.

Figure 22 shows the final structural equation model for adherence postpartum. Mental health mediators are included in the model at both baseline and follow-up time points. Similarly, IPV and controlling behaviors are examined longitudinally, accounting for the fact that baseline propensity for these conditions will strongly influence follow-up experience. IPV intensity at baseline had a strong effect on anxiety symptomology at baseline, which independently predicted worse postpartum adherence. Anxiety at baseline worked through the pathway of continued anxiety symptoms at follow-up, which predicted worse adherence. Another important pathway was that IPV at baseline strongly predicted IPV at follow-up, which also led to anxiety and worsened adherence. There was no direct association between IPV at any stage and postpartum adherence, suggesting that the effect of IPV in the postpartum phase is fully mediated by mental health, specifically anxiety. The model fit for adherence postpartum was good, as indicated by acceptable values for CFI, RMSEA and SRMR (Goodness of model fit Chi-square=634.030 (df=361), p=0.00; CFI=0.918; RMSEA=0.054; SRMR=0.060). Table 3 presents the full measurement specifications of the final model.

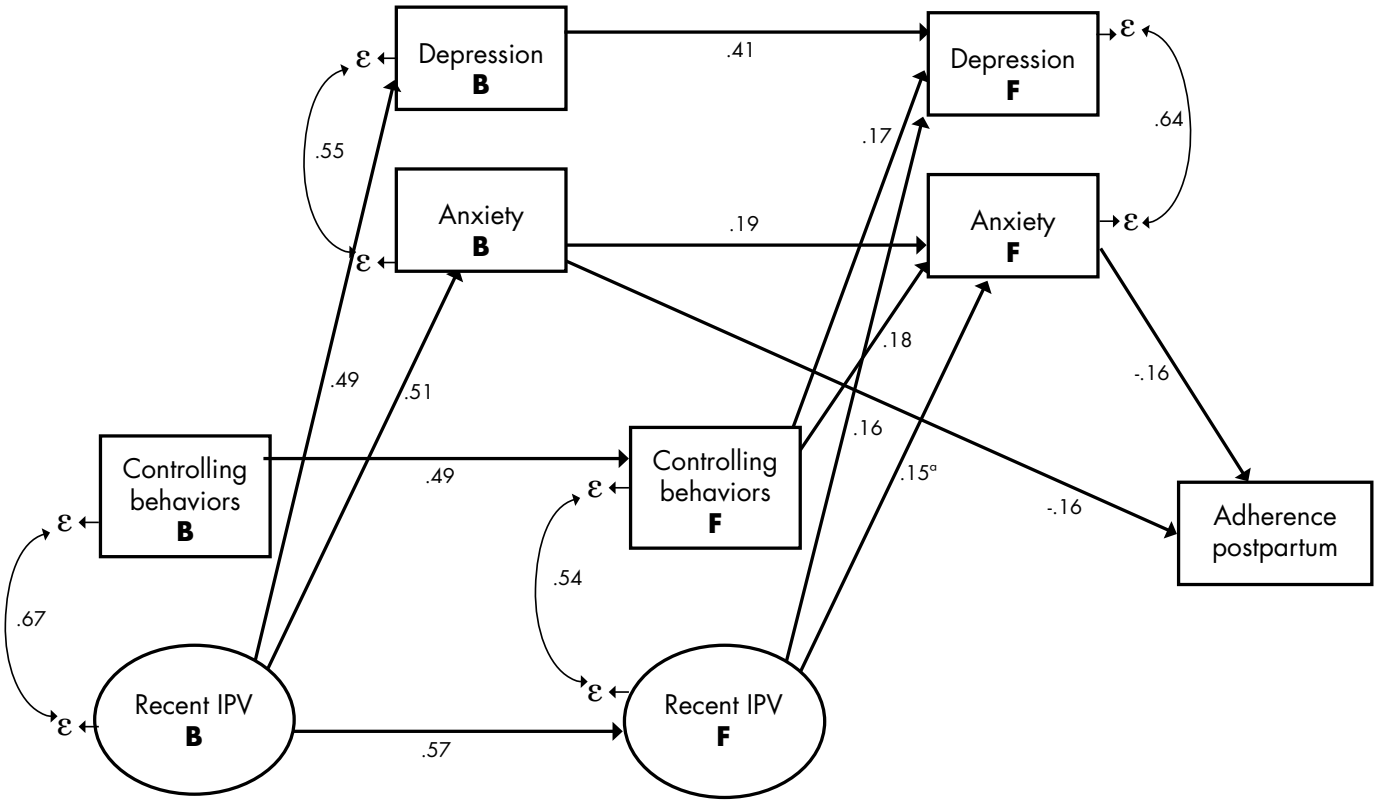


Figure 2. Final structural model of longitudinal relationship between IPV, mental health, and adherence (n = 261). Relationships represented by standardized parameter estimates, with boxed indicating measured variables and oval representing latent variable. All relationships significant at the p<0.05 level unless noted. ª p=0.059. Model controls for age, education, and food security.

IPV: intimate partner violence; B: baseline data; F: follow-up data ε: error term. Goodness of model fit Chi-square = 634.030 (df = 361) p = 0.00; CFI = 0.918; RMSEA = 0.054 (90% CI 0.047 - 0.061); SRMR = 0.060.

Figure 24. Structural model of longitudinal relationship between IPV, mental health, and adherence (n=260)

Table 13: Structural equation model measurement

	Adherence in pregnancy			Adherence postpartum		
	Standardised coefficient	**SE**	**p value**	**Standardised coefficient**	**SE**	**p value**
Depressive symptoms at baseline						
⇦IPV intensity at baseline	0.47 (0.36 to 0.58)	0.05	<0.001	0.49 (0.38 to 0.59)	0.05	<0.001
Anxiety symptoms at baseline						
⇦IPV intensity at baseline	0.50 (0.40 to 0.61)	0.05	<0.001	0.51 (0.42 to 0.61)	0.05	<0.001
Trauma symptoms at baseline						
⇦IPV intensity at baseline	0.45 (0.34 to 0.56)	0.06	<0.001	-	-	-
ANC Visits						
⇦IPV intensity at baseline	- 0.15 (-0.28 to -0.02)	0.07	0.025	-	-	-
Adherence in pregnancy						
⇦Trauma symptoms at baseline	0.25 (0.10 to 0.41)	0.08	0.001	-	-	-
⇦Anxiety symptoms at baseline	- 0.19 (-0.36 to -0.03)	0.08	0.018	-	-	-
⇦ANC visits	0.10 (-0.01 to 0.22)	0.06	0.083	-	-	-
⇦IPV intensity at baseline	- 0.22 (-0.38 to -0.06)	0.08	0.007	-	-	-
Depression at follow-up						
⇦Depression at baseline	-	-	-	0.41 (0.32 to 0.51)	0.05	<0.001
⇦Controlling behaviors at follow-up	-	-	-	0.17 (0.04 to 0.30)	0.07	0.008
⇦IPV intensity at follow-up	-	-	-	0.16 (0.02 to 0.31)	0.07	0.028
Anxiety at follow-up						
⇦Depression at baseline	-	-	-	0.19 (0.06 to 0.32)	0.07	0.003
⇦Anxiety at baseline	-	-	-	0.18 (0.08 to 0.30)	0.06	0.001
⇦Controlling behaviors at follow-up	-	-	-	0.18 (0.08 to 0.30)	0.06	0.01
⇦IPV intensity at follow-up	-	-	-	0.15 (0.00 to 0.30)	0.08	0.059
Adherence postpartum						
⇦Anxiety at follow-up	-	-	-	- 0.15 (-0.28 to -0.04)	0.06	0.012
⇦Anxiety at baseline	-	-	-	- 0.16 (-0.28 to -0.04)	0.06	0.009
Controlling behaviors at follow-up						
⇦Controlling behaviors at baseline	-	-	-	0.48 (0.40 to 0.57)	0.05	<0.001
IPV intensity at follow-up						
⇦IPV intensity at baseline	-	-	-	0.56 (0.46 to 0.67)	0.05	<0.001

Adjusted for age, food security, and education

SE:standard error; IPV: intimate partner violence; ANC: antenatal care

Discussion

Recent IPV identified during antenatal care was associated with lower odds of adherence to HIV medication in pregnancy and postpartum in an urban, South African cohort. This study is the first, to our knowledge, to longitudinally assess the effects of recent IPV on adherence to ART among pregnant or postpartum women. This association appears to be driven in part by mental health effects, with symptoms of anxiety mediating the relationship between IPV and HIV adherence. Even when accounting for mental health pathways, IPV retains a significant direct association with worsened ART adherence in pregnancy.

In bivariate analysis, we found that any recent physical and/or sexual violence from a partner was associated with 84% lower odds of good ART adherence in the final month of pregnancy and 78% lower odds of adherence postpartum. This association aligns with one previous Zambian study which showed similar marked effects of IPV on adherence in pregnancy (Hampanda, 2016). This association was retained in multivariate regression models, with greater IPV intensity worsening adherence in a dose-response effect.

In this study, IPV intensity independently worsened HIV adherence, but also worked through important mental health pathways. Anxiety, in particular, seems to act as the "pivot" around which IPV worsens adherence. Mental health had varied effects on adherence in our analyses, with anxiety worsening adherence, while trauma symptomology actually improved it. Post-traumatic stress symptoms may operate in an unexpected direction because clinical characteristics of this phenomenon may be linked to greater attention to treatment behaviors. For example, hyper-vigilance associated with trauma could lead someone to attentively (or obsessively) take pills at a certain time of day. Other literature on PTSD has suggested that ART adherence may be equivocal or even better in patients with traumatic symptomology (Nilsson Schonnesson et al., 2007; Sledjeski et al., 2005; Vranceanu et al., 2008). Trauma may worsen ART adherence only in certain cases, such as when patients dissociate from the traumatic event (Delahanty et al., 2004; Keuroghlian et al., 2011), whereas for others, symptoms of PTSD may lead towards self-protective behaviors or post-traumatic growth (personal resilience occurring after trauma) that actually improve adherence (Sherr et al., 2011). The magnitude of the effect of trauma on adherence is similar in the positive direction to that of anxiety in the negative direction, suggesting that these two mental health issues may possibly "cancel out" one another in traditional regression analysis.

Another potential mediating pathway identified in this analysis is health care utilization. Higher intensity of IPV was related to a lower number of ANC visits. In turn, fewer ANC visits were predictive of lower odds of adherence in pregnancy. This aligns with literature from

resource-rich settings suggesting that IPV may be associated with a woman postponing the start of antenatal care or avoiding it altogether (Diaz-Olavarrieta et al., 2007; Dietz et al., 1997; Thananowan & Heidrich, 2008). Longitudinal research from the U.S. suggests that IPV leads to twice the odds of missing antenatal care or delaying it until third trimester (Goodwin et al., 2000; Subramanian et al., 2012). Our study is the first, to our knowledge, that assesses IPV and health care utilization among pregnant, HIV-positive women in sub-Saharan Africa. In a setting like urban South Africa, where 87% of women access the recommended four antenatal visits (Shisana et al., 2010), it is possible that IPV is a marker for the small proportion of women who are unable to access ANC.

One theoretical reason for IPV's influence on reduced ANC use could be men's controlling behaviors, a pathway that has emerged in previous qualitative research (Hatcher et al., 2014; Lichtenstein, 2006)). One reason that partner control did not statistically impact on ART adherence may be that it is actually a form of IPV and should not be considered as a distinct pathway separate from partner violence (Heise & Garcia Moreno, 2002). Alternately, partner control may truly have less influence on adherence than we initially hypothesized, given that few women in this urban South African setting reported partners who interfere with access to clinic or medication, as we found in our previous qualitative research (Hatcher et al., 2016b).

Indeed, during the postpartum phase, many women seem to adhere to HIV treatment despite partner violence and controlling behaviors. Several explanations are worth exploring to make sense of this finding. Prevalence of both anxiety and depression declined in the postpartum period, which aligns with findings from other settings (Heron et al., 2004). IPV and controlling behaviors also declined postpartum, which confirms findings suggesting that IPV before pregnancy sometimes leads to subsequent declines in violence postpartum (Koenig et al., 2006; Salazar et al., 2009). As others have noted, reduced IPV postpartum may arise from enhanced engagement with family (Salazar et al., 2009). Many women return to their maternal home instead of staying with male partners in Johannesburg, which could be protective because of the safe physical space (as men are often barred from entering due to cultural taboos about this being a time for maternal family only). By living with her family, a woman may be able to access increased social support, which has been shown to help buffer the effects of ongoing stressors and mental health (Glazier et al., 2004). It is also possible that psychological resilience during the early weeks postpartum moderates the effects of violence and mental health on adherence. In our previous research, we revealed that the identity around motherhood provided a resilience strategy for many women in this setting, helping them adhere to ART as a method for reinforcing their strong bond with the infant (Hatcher et al., 2016b). Alternately, for women who do continue to

stay with partners postpartum, this time may represent a "honeymoon" phase if men are focused on the baby rather than controlling the woman.

Limitations

The sampling strategy recruited women in the context of a trial of IPV in pregnancy, which likely led to an over-sampling of women reporting recent violence. This sampling strategy precludes the ability to make assumptions around population prevalence of IPV or mental health. The study is also limited by its collection of self-report data ART adherence. Adherence data was self-reported and may be subject to social desirability bias (Mills et al., 2006), although some studies suggest that self-reported adherence is reliably predictive of positive clinical outcomes (Ferradini et al., 2006; Oyugi et al., 2004; van Oosterhout et al., 2005; Wools-Kaloustian et al., 2006). High adherence in this sample may demonstrate that women have better adherence around the time of pregnancy (Vaz et al., 2007; Zorrilla et al., 2003), or may suggest measurement bias. Nevertheless, the directionality of the relationship with IPV and adherence would trend towards the null if the entire cohort systematically over-reported good adherence.

Mental health screening tools developed primarily in resource-rich setting may be less appropriate for sub-Saharan African settings (Tsai et al., 2013). Given the challenges associated with identifying culturally-specific cut-points for depression, anxiety, and PTSD, we included these symptoms as continuous variables in the final models. This choice recognizes that even when symptomology fails to meet a clinical diagnosis, it can lead to psychosocial effects that are important to consider in public health programming (Judd et al., 1998). Our brief mental health screener, HADS, may be a better measure for general distress than either anxiety or depression alone (Norton et al., 2013), although confirmatory factor analysis in our sample did suggest a two-factor loading.

Implications for future research and programs

IPV is a driver of worsened ART adherence and poor mental health during antenatal care and postpartum for women living with HIV. It will be crucial for future interventions to achieve reductions in IPV alongside impacting inter-related mental health outcomes. Existing IPV interventions for antenatal care may be effective at reducing women's experience of further violence (Kiely et al., 2010; Tiwari et al., 2005). However, the field of antenatal IPV interventions is in its infancy and several trials have failed to show a reduction in violence (McFarlane et al., 2006; Parker et al., 1999; Sullivan et al., 1994). Group interpersonal therapy, as well as home visiting programs have been shown to improve perinatal mental health in other low-resource settings (Rahman et al., 2013), although only one such intervention has been effective

among HIV-positive, African populations (Nakimuli-Mpungu et al., 2015). A novel way to achieve violence, HIV, and mental health goals during antenatal care is to underpin an intervention with trauma-informed clinical care, an approach that our team is currently testing in Johannesburg (Woollett & Hatcher, 2016).

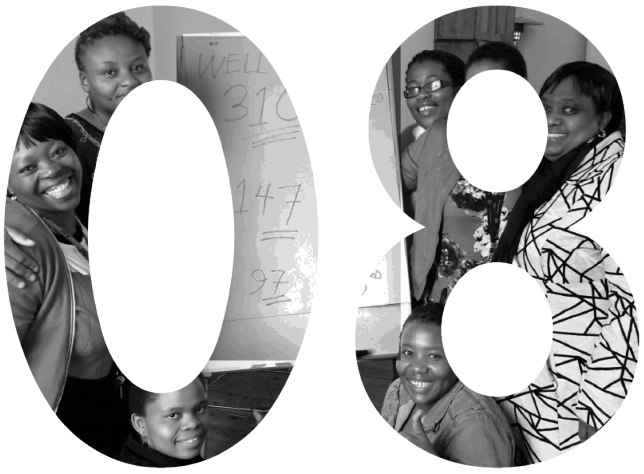
It is important to note that the same dynamics that make pregnancy an opportune moment for intervention – the frequent contact with the health system and regular medical services – also makes it a challenging phase in which to implement new interventions. Time constraints faced by health providers make it particularly challenging for them to ask patients about their violent relationships (O'Reilly et al., 2010; Roelens et al., 2006), even as women require repeated inquiry to gain comfort and disclose around this sensitive topic (Edin et al., 2010; Lutz, 2005). In our team's formative research, we learned that additional dedicated staff are needed to implement mental health-responsive IPV/HIV interventions in a busy antenatal clinic (Hatcher et al., 2016c), yet it may not be possible for clinics to add new staff or increase provider workloads. Health providers in urban Johannesburg express a desire for more guidance and training around addressing IPV (Sprague et al., 2015), but comprehensive staff support would require additional investment by a public health system already burdened by responding to high levels of HIV. One recommendation is to test the improvements in staff retention and morale that might occur following a mental health-responsive IPV/HIV intervention. If, like was the case during Safe & Sound, staff feel appreciated and supported through the intervention, they are likely to have improved productivity and longevity - elements that create a more efficient and high-quality health system. Economic costing of these types of interventions at a clinic level may actually suggest that they pay for themselves in the medium-term.

It will be important for future studies to follow women longer in the postpartum phase, after the "protective" period of the first three months has concluded. This period may vary across cultures, but in South Africa there is strong recognition that women are closer to the maternal family during this early postpartum time (Groves et al., 2014). In our sample, there seemed to be considerable resilience around HIV adherence during the early postpartum phase, although that finding should be viewed in light of other literature that shows adherence worsens later in the postpartum phase (Henegar et al., 2015; Ngarina et al., 2015). A longer follow-up period postpartum can answer these questions in future research. Future studies should also include measures of motivation, resilience, and motherhood identity to understand how these dynamics may improve women's adherence despite IPV.

Conclusion

IPV is an important predictor of women's ability to stay adherent to ART around the time of pregnancy. Yet, to date, few PMTCT programs consider couple-related factors when developing clinical protocols. For example, while global guidelines for HIV testing consider the role of IPV (World Health Organisation, 2012), the South African clinical guidelines for PMTCT fail to account for violent or non-supportive partners (Department of Health, 2014). Indeed, we found that health workers in urban Johannesburg know little about how to address IPV in pregnancy, despite a willingness to learn these skills (Hatcher et al., 2016c). The development of clinical guidelines can draw upon existing global guidance on IPV (WHO, 2016), or can adapt programs that successfully reduced women's IPV in the perinatal phase (Jack et al., 2012; Kiely et al., 2010; Tiwari et al., 2005).

One important caveat is that, to date, no efficacious interventions have been rigorously tested for reducing IPV in pregnancy in low- or middle-income settings (Ritter et al., 2016). This gap in the research deserves increased attention and funding if global commitments around maternal health and HIV-related outcomes are to be reached. If future PMTCT programs train health workers to assess and respond to IPV in pregnancy, they will ensure not only improved maternal and infant health but also increased adherence to essential HIV services.



Chapter 8. Discussion

Photo credit: Abigail Hatcher, Safe & Sound team celebrating successful recruitment of three-quarters of Trial participants.

A. Introduction

This dissertation aimed to explore the extent to which IPV influences adherence to PMTCT services. Specifically, it aimed to examine this association between IPV and adherence among pregnant and postpartum women living with HIV in inner-city Johannesburg. The doctoral work was designed to determine plausible mechanisms through which IPV may impact on ART adherence in pregnancy and postpartum. I used a mixed method approach that incorporated multiple points of interface between data methods to strengthen my ability to answer research aim. Four papers were drafted, of which three have been published:

Paper 1: Systematic review of IPV and adherence (AIDS, 2015)

Paper 2: Bidirectional links between IPV and PMTCT (JIAS, 2014)

Paper 3: Mechanisms linking IPV and PMTCT (SSM, 2016)

Paper 4: IPV, mental health, and adherence in pregnancy and postpartum (in draft)*

* The final paper will be submitted following submission of the main Safe & Sound Trial paper (likely late-2017)

Below, I synthesize the findings of the four papers in light of the current literature. I also suggest how the findings can inform future interventions and policy. I detail how this doctoral research can add to theoretical knowledge and suggest next steps for research.

B. Key findings

IPV impacts ART adherence among non-pregnant and pregnant women

Prior to undertaking this doctoral research, the literature around IPV and ART adherence was disparate and had yet to be examined systematically. Through the meta-analysis (Paper 1), our team confirmed that lifetime exposure to IPV was associated with half the odds of self-reported adherence and 36% lower odds of viral suppression. The meta-analysis was comprised of only cross-sectional papers from resource-rich settings, suggesting an important gap in understanding the IPV-adherence relationship in resource-constrained settings such as South Africa.

We bolstered the extant literature by examining recent IPV and its association with ART adherence in pregnant and postpartum women (Paper 2-4). Since the time of publication of the meta-analysis (Paper 1), a single peer-reviewed article had examined a similar dynamic in Zambia. Hampanda found that lifetime experience of IPV predicted 74% lower odds of ART adherence during pregnancy and 89% lower odds of adherence postpartum (Hampanda, 2016). However, Hampanda's study was cross-sectional in nature and only accounts for lifetime IPV, limiting the ability to confirm directionality of the association or to understand how recent violence is specifically related to adherence. Paper 4 adds to this literature by

finding a similar strong association between IPV and adherence (84% lower odds of adherence in the final month of pregnancy and 78% lower odds of adherence postpartum). However, once adjusting for key socio-demographics, IPV retains significance but the magnitude of effect is attenuated, suggesting that IPV may worsen adherence on its own and also be a marker for other predictive characteristics, such as education or food security.

Papers 2 and 3 offered a qualitative set of evidence to support the link between IPV and PMTCT behaviors. I learned that women do experience barriers to PMTCT due to current experience of IPV or fear of future partner violence. Together, Papers 2-4 confirm a main study hypothesis, that IPV is predictive of HIV care and treatment behaviors among pregnant and postpartum women. These three doctoral papers also complement the findings of Paper 1 by suggesting that associations between IPV and worsened adherence found in resource-rich settings may also exist in resource-constrained settings like urban South Africa.

Plausible mechanisms linking IPV to PMTCT adherence

The next important set of findings concerns the exploration of *why* IPV may be linked to non-adherence in pregnant and postpartum women. I identified several mechanisms through which IPV may influence non-adherence (Papers 2-4). The first pathway of mental health was hypothesized in our original conceptual framework and retained importance in both quantitative and qualitative analysis. Partner disclosure, while crucial in the qualitative findings, did not retain significance in quantitative results, suggesting a potential measurement error or shortcoming of operationalizing the construct. Two pathways were novel, and emerged from the qualitative research as potentially important for further exploration in the structural equation model: resilience and health care utilization. Our findings also raised analytical questions about the partner control pathway, as it showed less prominence in both qualitative and quantitative results.

Mental health is a prominent pathway linking violence to poor adherence

We learned through qualitative research with health workers and pregnant women that mental health is a major, if unaddressed, concern for patients experiencing IPV (Paper 2). I found the burden of mental health symptoms to be very high in our cohort of HIV-positive pregnant women (Paper 4). At baseline, 50.9% of the cohort had depressive symptoms, while postpartum this rate was 36.2%. These findings align with a meta-analysis of studies among HIV-positive pregnant women in sub-Saharan Africa, which showed a pooled antenatal depression prevalence of 42.5% and a pooled postnatal depression prevalence of 30.7% (Sowa et al., 2015). I also found high rates of probable anxiety (39.3%) and probable PTSD (26.8%) at baseline. No extant literature has measured anxiety symptomology in HIV-positive

pregnant women, but the rate of probable PTSD in our sample is double the rate seen in one similar study in Tanzania (Mahenge et al., 2013).

Women's experience of recent (past-year) IPV at baseline was strongly related to cross-sectional and incident mental health symptomology (Paper 4). In the quantitative cohort data, recent physical and/or sexual IPV at baseline tripled the odds of probable antenatal depression and doubled the odds of probable postpartum depression. Any physical and/or sexual IPV during the follow-up period was associated with doubled odds of probable postpartum depression. The strength of association in our study is stronger than that of meta-analyses from resource-rich settings that suggest IPV is related to a small increase in odds of antenatal depression and a 50% increased risk of postpartum depression (Beydoun et al., 2012; Lancaster et al., 2010). Our strength of association does align with longitudinal and cross-sectional research in sub-Saharan Africa that finds double to four-fold risk of depression for those women living with IPV (Abdelhai & Mosleh, 2015; Brittain et al., 2015; Kaaya et al., 2010; Mahenge et al., 2013; Ogbonnaya et al., 2013).

We learned that recent IPV doubled the odds of anxiety at both time points. While no evidence for anxiety is available, one cross-sectional study examined IPV and *psychological distress* specifically among HIV-infected pregnant women. The authors found that recent IPV was associated 3.6 times the odds of psychological distress even after controlling for other predictors (Bernstein et al., 2016). I also saw doubled odds of probable PTSD at baseline among women reporting recent IPV, aligning with cross-sectional Tanzanian data finding that recent IPV increased odds of PTSD during pregnancy 3-fold (Mahenge et al., 2013).

A novel contribution of this doctoral research is the finding that there may be a differential impact of depression, anxiety, and trauma on adherence. I found a significant bivariate association between antenatal depression and adherence to ART in pregnancy. This finding aligns with quantitative research among pregnant women, among whom depressive symptoms are associated with worse adherence, treatment failure, HIV disease progression and mortality (Antelman et al., 2007; Hoffmann et al., 2016; Psaros et al., 2014). However, in the structural equation model, depression was no longer significantly associated with adherence. Two other studies have found that composite measures of depression are not associated with adherence around the time of pregnancy (Bardeguez et al., 2008; Peltzer et al., 2011), suggesting that there may be something particular about the perinatal period that buffers the effect of depression on adherence.

Anxiety, on the other hand, had a consistent negative association with adherence in the structural equation models. In pregnancy, IPV led to increased anxiety, which in turn reduced pregnancy adherence. Postpartum, IPV at baseline strongly predicted baseline anxiety and IPV throughout the pregnancy predicted postpartum anxiety. Both of these anxious symptomology time-points had a small but persistent negative relationship with

postpartum adherence. PTSD symptoms, on the other hand, were associated with increased adherence in pregnancy. PTSD may operate in an unexpected direction because clinical characteristics of this phenomenon may lead towards self-protective behaviors or post-traumatic growth that actually improve adherence (Sherr et al., 2011). Other literature on PTSD has suggested that ART adherence may be equivocal or even better in patients with traumatic symptomology (Nilsson Schonnesson et al., 2007; Sledjeski et al., 2005; Vranceanu et al., 2008). This is an area for further research, particularly if interventions can be developed to bolster post-traumatic growth among women living with HIV and IPV.

Another important contribution is the exploration around *why* mental health might be so closely related to HIV behaviors and health outcomes. In deeper qualitative research (Paper 3), I found that stress and emotional concerns around IPV take priority over the daily regimen of medication – creating a strong rationale for why mental health may worsen adherence. For other women, hopelessness and being overwhelmed due to the extreme distress of violence created conditions for stopping medication. In qualitative research in Zambia, depression and hopelessness emerged as a major barrier to women's ART uptake – with much of this mental health-adherence relationship due to partner dynamics like IPV and abandonment (Murray et al., 2009). In Tanzania, feelings of hopelessness and the futility of staying adherent intensified after infants were 'saved' from HIV and weaned from breastfeeding (Ngarina et al., 2013). Our study offers additional nuance by highlighting that several women used the act of stopping treatment as part of a strategy to end their own lives. In other words, treatment interruptions were used as a self-harming technique in situations where women feel extremely distressed by violent partnerships. This tendency towards suicidal ideation aligns with other qualitative research showing that some women are so fearful of partner violence and abandonment that they would 'rather die' than risk losing their marriage (Nachega et al., 2006; Ware et al., 2009).

Women's resilience as a protective mechanism

We learned that a high proportion of women were adherent in pregnancy and postpartum despite experiencing recent IPV (Paper 4). An explanation for this finding can be drawn from Paper 3, where a number of women successfully navigated ART adherence in the context of a violent partnership. One reason for this strong adherence may be resilience, a factor starting to emerge as an important buffer limiting the effect of IPV on adherence. A longitudinal study in Kenya among 216 female sex workers found that past-year experience of IPV improved viral load outcomes (Wilson et al., 2016). Through qualitative interviews, Wilson *et al.* found that women were committed to taking ART despite IPV, and used personal health goals and social support as methods of resilience (Wilson et al., 2016). This qualitative finding aligns

with a growing quantitative literature on the importance of resilience in mitigating effects of factors like past trauma on HIV outcomes (Dale et al., 2014; Ironson et al., 2005).

A key driver of resilience in our cohort may have been the transition towards motherhood. A meta-synthesis of studies among HIV-positive women found that having a baby offered hope and a concrete reason for women to look to the future (Carlsson-Lalloo et al., 2016). The healing nature of motherhood may be particularly true of women who are newly-diagnosed in pregnancy. One interpretive qualitative study posited that the disruption of an HIV diagnosis can be transformed into 'continuity' when women focus on the arrival of the infant and the 'new story' of becoming a mother (Kelly et al., 2012). Women living with HIV may also use the transition to motherhood to recreate a sense of self that is focused on positive identity and being the 'good' mother (Sandelowski & Barroso, 2003; Sanders, 2008). Interestingly, this positive motherhood identity can be found in the IPV literature as well, with qualitative studies showing that amidst the chaos of a violent relationship, motherhood is often one aspect that women feel overwhelmingly positive about (Semaan et al., 2013b).

Beyond personal identity, there was also a strong emphasis among women in our qualitative research on protecting the health and wellbeing of the infant (Paper 3). This aligns with previous literature on motherhood and HIV, where women's concern about their children takes priority over other matters (Sandelowski & Barroso, 2003; Wesley et al., 2000). Similarly, IPV literature has shown that protecting children from an abusive partner is often a 'turning point' for women (Enander & Holmberg, 2008; O'Doherty et al., 2016). Qualitative studies from resource-rich settings describe how children are a powerful motivator for help-seeking on the part of women (Lutz, 2005; Meyer, 2010; Randell et al., 2012; Zink et al., 2003). Ours is the first study, to our knowledge, to explore this dynamic in sub-Saharan Africa among HIV-positive women. In our case, the help-seeking comprises the use of HIV care and treatment and safe feeding, with women aiming to protect infants from HIV infection despite the challenges of navigating PMTCT in a violent context.

There is a theoretical tension around over-emphasizing the 'motherhood' identity, because it reinforces the view that women are destined to be a nurturing caretaker who sacrifices her own needs for that of her child (Hays, 1998). As Semaan *et al.* explain, "while it is important to recognize the strength many battered women derive from motherhood, an overemphasis on motherhood as the main impetus for battered women's actions may make it difficult for them to recognize other sources of their power," (2013: 85). Similarly, the pressure to bear children can have gendered and oppressive undertones in many settings. Motherhood in sub-Saharan African settings often has deep associations with social status and becoming a 'full person' (Birks et al., 2013; Yeatman & Trinitapoli, 2013), a belief system that helps maintain the moral order of childbearing as an ethical principal (Chabal, 2009). Motherhood can also be seen as essential for cementing the marital relationship (Hollos &

Larsen, 2008; Yeatman & Trinitapoli, 2013), and there is a risk that motherhood may actually be operating to sustain the fundamentally patriarchal view of women (Chase & Rogers, 2001). Roles around motherhood and caring are complex, and scholars disagree as to how motherhood is oppressive or perhaps offers unique forms of relational control and agency (Jackson, 2015; Sen, 1987). Indeed, feminist theory has long critiqued motherhood as a societal means of institutionalizing an oppressive version of femininity (Connell, 2014). For this reason, it would be inconsistent with the theoretical underpinnings of IPV work to ask women to prioritize motherhood as a central rationale for adhering to PMTCT. A better method would be to ask women about their own priorities (be they around motherhood, longevity, emotional security, etc.) and then develop a tailored plan for reaching these. Harnessing women's modes of resilience – including that of motherhood – will have positive impact on their ability to adhere to PMTCT.

Antenatal clinic attendance may worsen for women with recent IPV

In the quantitative structural equation model (Paper 4), I showed that recent IPV was related to a lower number of ANC visits, which was in turn related to adherence. This finding is the first of its kind among HIV-positive women, but confirms previous research that IPV may be related to worsened uptake of antenatal care. In the U.S., extant literature suggests that IPV is associated with women delaying antenatal care or forgoing it altogether (Dietz et al., 1997; Goodwin et al., 2000; Subramanian et al., 2012; Thananowan & Heidrich, 2008).

Antenatal attendance was measured in relation to IPV in sub-Saharan Africa in a single population-based study, and found to be unrelated (Bitew et al., 2016). However, the related outcome of skilled birth attendance has been associated with women's exposure to IPV. In a prospective study in Kenya, experiencing IPV during pregnancy or postpartum halved the odds of delivery at a health facility (Turan et al., 2012), a finding confirmed by population-based data from other sub-Saharan African settings (Goo & Harlow, 2012; Ononokpono & Azfredrick, 2014; Refaat, 2013). Moreover, gender norms around IPV at the population level may impact on women's use of maternal health services. Demographic Health Survey data suggests that inequitable community-level beliefs around IPV reduce the odds of four antenatal visits in Tanzania and are associated with delayed start to prenatal visits in Ghana and in Uganda (Adjiwanou & LeGrand, 2014).

Partner non-disclosure as a qualitative pathway

In the qualitative research of this thesis (Papers 2 and 3), partner non-disclosure was another important pathways through which IPV influenced adherence. I found that pregnant and postpartum women who fear a violent reaction may choose not to disclose, a finding that is

congruous with other qualitative literature (Larsson et al., 2012; Lugalla et al., 2012; Njie-Carr et al., 2012; Rujumba et al., 2012). One reason that non-disclosure may be related to worsened adherence is that women who have not disclosed state they have difficulty taking medication openly at home (Paper 3). In our qualitative study, many women described using complex strategies to avoid their partner seeing them take ART. Similarly, in one longitudinal study in the U.S., women's inability to take medication openly at home halved the odds of being on HIV treatment at the time of follow-up (Sayles et al., 2006). Others point to the challenge of visiting the clinic without having disclosed (Awiti Ujiji et al., 2011), but around the time of pregnancy it is not challenging for women in our setting to regularly visit the clinic. It would be important to follow women longer postpartum to learn whether non-disclosure may constrain clinic visits once pregnancy was no longer the underlying medical condition for seeking care.

In our quantitative findings (Paper 4), partner non-disclosure was unrelated to ART adherence. This contradicts other research that suggests that partner disclosure has a strong positive impact on adherence (Hodgson et al., 2014; Jasseron et al., 2013; Medley et al., 2004; Spangler et al., 2014). There are multiple reasons why this may be the case. Disclosure is a widely varying and complex process that may have positive, negative, or neutral social outcomes (Parsons et al., 2004). If effects of non-disclosure have both positive and negative impacts on HIV adherence, this predictor may essentially "cancel itself out" in analysis. It is also possible that a dichotomous outcome (disclosed vs. not disclosed) is too crude to show effects on ART adherence. A number of nuances exist across the spectrum of disclosure decisions and outcomes, ranging from safe and supportive disclosure, to partner responses that are avoidant, to partner reactions that are severe or violent. Future studies would benefit from more robust measures that capture the range of women's experience with disclosure.

Partner control has less influence on adherence

Partner control was strongly correlated with IPV, but unrelated to adherence in the quantitative analysis (Paper 4). While the link between partner control and adherence is plausible based on previous literature (Lichtenstein, 2006; Wilson et al., 2007), it is possible that measurement error or operationalization of the construct in our study was insufficient to detect an association.I measured partner control only through 5 items on WHO Multi-country study instrument. This approach, as yet unvalidated, may not be sensitive enough to show a differential impact on adherence. Experiencing any controlling behaviors may be such a normal occurrence in settings like urban South Africa that it could be challenging to determine its effects on adherence. Another reason that partner control did not statistically impact on ART adherence may be that it is conceptually linked to IPV itself. Indeed, the

WHO definition of partner violence includes controlling behaviors as a form of IPV (Heise & Garcia Moreno, 2002).

Alternately, one reason to conclude that perhaps partner control is truly less impactful on adherence is that this pathway similarly did not emerge in qualitative research (Paper 3). While several participants shared stories of partners controlling their access to the clinic, most were able to move freely to and from medical services. This may be distinct around the time of pregnancy, particularly in a setting like urban South Africa where 87% of women access the recommended four antenatal visits (Shisana et al., 2010).

C. Future interventions

While much progress has been made in increasing access to and retention in PMTCT services in sub-Saharan Africa, the latest UNAIDS estimates show coverage to be 77% (UNAIDS, 2016b). To be certain, clinic-level interventions have demonstrated marked improvements in PMTCT coverage over the past decade (Ladner et al., 2015), but new interventions need to increase focus on the social and personal barriers to PMTCT adherence, particularly in the postpartum period.

One particular shortcoming in the current evidence base is the dearth of interventions addressing partner dynamics as a potential driver of poor PMTCT outcomes. A systematic review of PMTCT interventions identified no published trials aimed at the dyadic partnership level (Geldsetzer et al., 2016). Of ten included interventions, all focused solely on the individual woman (e.g. through text messages) or on the clinic (e.g. through task-shifting or integration of services). Two ongoing studies that anticipate results in 2017-2018 are exceptions to this gap in evidence. In Kenya, a pilot program aims to address PMTCT by providing couples a series of three home visits comprising guidance on infant development, HIV, and partner dynamics (Turan et al., 2015). In South Africa, a clinic-based series of three group sessions and three couples counseling sessions aims to improve PMTCT adherence and reduce transmission to infants (Jones et al., 2014). Both in-progress studies, however, exclude couples experiencing severe partner violence for ethical reasons related to protecting women from further IPV risk. This is consistent with many couples studies and presents complex questions about how to engage partners already in violent relationship in such interventions.

Despite our mixed findings on partner disclosure and its role in adherence around the time of pregnancy, disclosure has been shown to be an avenue for adherence interventions. A systematic review on the topic of women's HIV status disclosure identified two interventions to improve women's ability to safely disclose to partners from whom they feared violence (Kennedy et al., 2015). Wagman *et al.* found that by bolstering HIV testing and counselling protocols with skills for addressing IPV, non-pregnant women's experience of physical and

sexual violence reduced at 35 months (Wagman et al., 2015b). Maman *et al.* did not find significant IPV changes in their intervention training HIV counselors to explore safe partner disclosure or strategic non-disclosure among pregnant women (Maman et al., 2014). One important shortcoming of each of these interventions is that they focused on women alone.

Interventions working directly with male partners could offer important reductions in use of IPV and show PMTCT improvements. As others have noted, most PMTCT programs have left men out as the "forgotten half of the equation" (Mohlala et al., 2011; Morfaw et al., 2013). Men in some settings "test by proxy" and assume that a pregnant woman's HIV test matches their own serostatus (Morrill & Noland, 2006; Nachega et al., 2009). In the context of gender inequalities, this serves to place the responsibility of HIV testing and preventing infant infection *only* on the women's shoulders, thereby further entrenching existing gender inequities (Bourgois et al., 2009; Hampanda, 2012). Men's role in the perinatal phase needs to be framed carefully, with a constant eye towards the preferences of women themselves. Qualitative work in South Africa suggests that women are appreciative of instrumental and emotional support over and above partner attendance at ANC visits (Maman et al., 2011b).

Work with men clearly needs to shift beyond 'male involvement', since we know that some male involvement can be harmful or controlling (Paper 3). For example, I learned that violent partners can interfere with medication adherence as a way to shame women and maintain psychological control. As Maman *et al.* caution: "It is critical that we broaden the lens through which we consider male involvement… to acknowledge that male involvement may not always be in the best interest of women." (Maman et al., 2011b). Our research and others suggests that working towards 'positive male engagement' may be a more helpful framework than the more neutral term 'male involvement'. This would focus on the quality of engagement, rather than simply the fact that men attend clinic with their pregnant partner (Maman et al., 2011b). The Kenyan intervention by Turan *et al.* offers one model for this positive male engagement approach, by building on formative findings that show men themselves are often deeply committed to the health of the infant and the safety of the pregnancy (Musoke et al., 2015; Turan et al., 2015). The home-based intervention harnesses this keen interest in infant and family wellbeing to launch discussions of other important family health topics, including HIV and IPV.

This doctoral research also offers lessons for mental health interventions in South Africa. Despite high rates of common mental health disorders in antenatal care (Rochat et al., 2011), little screening or treatment exists in South Africa (Honikman et al., 2012). In the general South African population, there is a mental health treatment gap of 75% (Seedat et al., 2008), and experience from our clinics suggests the treatment gap may be even higher in urban, pregnant cohorts. A systematic review of 22 African studies on HIV-infected pregnant women and depression identified only two interventions for this group (Sowa et al., 2015). A

clinic-based peer-mentoring program combined with cognitive behavioral group intervention in Cape Town reduced depression among HIV-infected mothers at six months (Futterman et al., 2010). A perinatal home-visiting program in Cape Town learned that 12 home visits by a trained community health worker reduced depression among (HIV-infected and uninfected) mothers at 36 months (Tomlinson et al., 2016). Neither of these interventions had any clear component for the male partner. Tomlinson *et al.* measured IPV but found their intervention made no significant impact on this outcome, perhaps because there were no targeted materials during home visits that focused on IPV. Futterman *et al.* included IPV as a topic within the group curriculum, but did not measure the intervention effect on IPV. These examples suggest a need to both include IPV explicitly in future interventions and also the need to measure it as an intended outcome. Given the strong associations found in this doctoral research between IPV and adherence (Papers 1-4), promising approaches for addressing PMTCT need to include IPV as a central feature in future programming.

D. Policy implications

These findings can fill an important gap for policy makers, since they pointed to a robust and consistent association between violence and ART adherence. Small ripples in policy influence can be preliminarily assessed through citations of the published papers in this research. Paper 1 was cited in *The Greentree Report on Violence against Women and Girls and HIV*, where the authors used the evidence to call for programs that "address the ways that violence influences… the full continuum of [HIV] care: testing, linkage to care, retention in and adherence to treatment and outcomes related to disease progression" (Heise & McGrory, 2016). By November 2016, Paper 1 was cited by eleven peer-reviewed publications, including a high-level review of trauma-informed HIV care (Sales et al., 2016). Paper 2 was cited in a high-level review of the social and structural barriers to HIV prevention among young women (Harrison et al., 2015) and a review of trauma among HIV-infected individuals (LeGrand et al., 2015). By November 2016, Paper 2 was cited in eighteen peer-reviewed publications.

Going forward, policy makers need to consider IPV a central factor driving non-adherence and poor HIV-related health outcomes among pregnant and postpartum women. Policies around PMTCT, in particular, require revisions aligned with ensuring safety and human rights for women in violent relationships. Current WHO and South African PMTCT guidelines strongly encourage partner disclosure (Department of Health, 2014; World Health Organization, 2010), but I learned in the qualitative papers (Papers 2 and 3) that many women strategically choose to hide their status in order to stay safe from a violent reaction. In Paper 3, the majority of the women who had disclosed to male partners recounted a bad experience

following partner disclosure. This points to an urgent need to train health workers to help women identify safe strategies for choosing non-disclosure, delayed disclosure, or immediate disclosure, depending on their current relationship. A cadre of health workers trained in how to identify and respond to violence would improve the ability of women to make informed choices about disclosure, and about PMTCT adherence generally.

Policy makers have long known that investing in interventions that improve children's early years is likely to have cost-effective, long-term impact on the next generation's health (Heckman, 1995; Victora et al., 2008). One telling example comes from recent analysis of panel data for 54 low-income countries from the World Bank's World Development Indicators database (Hauck et al., 2016). Hauck *et al.* find that the greatest gains in life expectancy globally can be reach by reducing HIV prevalence among infants and advancing gender equality. It is clear that both IPV and maternal mental health may be strategic levers if we are to ensure maternal adherence to PMTCT and meet these noble goals of achieving better life expectancy, health, and wellbeing of women, men, and children.

E. Theoretical contributions

PMTCT literature to date has largely been informed by individual-level theory that fails to embrace key social and structural domains that effect women's health choices (Busza et al., 2012; Hampanda, 2012; Phillips & Pirkle, 2011). One example of an individual-level theory is Andersen's model of Health Care Utilization. This model, while useful, considers what each woman needs to personally motivate her to adhere to PMTCT treatment without doing justice to the broader social and structural drivers that may influence health behaviors.

To overcome this theoretical challenge, I adapted the Health Care Utilization model by blending it with Socio-ecological Theory. Socio-ecological Theory posits that health behaviors are deeply embedded within interpersonal, social, and structural contexts (Krieger, 2001). However, Socio-ecological Theory does not detail mechanisms for *how* IPV leads to challenges in HIV health behaviors. As Wingood *et al.* explain, "A greater understanding of the pathways through which IPV exerts its adverse impact [on HIV outcomes] would be valuable in designing more effective psychosocial interventions." (2013: 2).

The key theoretical contribution of this doctoral research is providing a richer evidence base for how IPV inhibits women's adherence to PMTCT. As shown in Figure 23, the main contribution of this research lies in deepening the understanding of relationship-level and personal factors that predict PMTCT uptake and adherence. I identified direct links between IPV and ART adherence (Papers 1 and 4), and began to tease out the mechanisms for why IPV might inhibit PMTCT behaviors (Papers 2, 3, and 4).

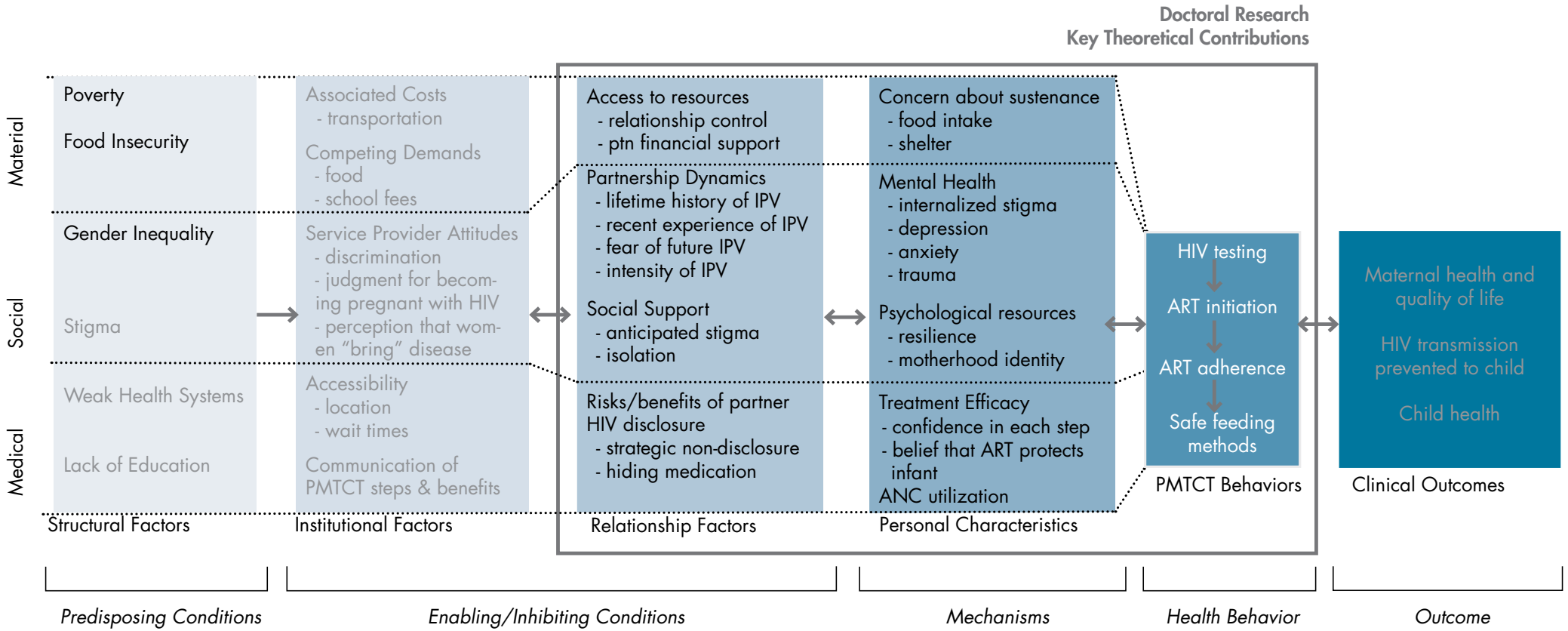


Figure 25. Theoretical contributions of the research

This doctoral research can improve theoretical underpinnings of PMTCT behaviors, which have focused on individual and institutional factors in the extant literature (Geldsetzer et al., 2016). A need to better emphasize social aspects of PMTCT aligns with meta-ethnographic work on HIV adherence highlighting how the social dimensions of adherence require greater attention (Merten et al., 2010). Merten *et al.* explain that "in societies where the self is experienced in terms of inherent connection with others (high interrelatedness)… efforts to maintain important relationships through constant investment and renegotiations" are of even greater importance (2010: 29-30). If programs are to meet global goals to "reach and sustain 95% of pregnant women living with HIV with lifelong HIV treatment by 2018," adding social and structural dimensions to PMTCT theory will be increasingly important (UNAIDS, 2016c).

The research findings also suggest several existing social and critical theories that would be useful to integrate into future thinking around PMTCT adherence. This step of incorporating additional theory may have been bolstered by the mixed method approach to research, which necessarily incorporates multiple perspectives around the same area of research inquiry. While a similar shift towards social and critical theories has already started to take place in the IPV literature (Kelly, 2011), it is newer to PMTCT literature (Hampanda, 2012). My research findings suggest that future scholars should consider the following theories as integral to understanding and intervening in PMTCT adherence:

- The *theory of gender and power* can help interpret the interpersonal and structural issues related to how IPV shapes PMTCT behaviors. Qualitative literature from sub-Saharan African settings has highlighted how important gender and power can be in understanding women's experience of HIV testing during antenatal care (Cummings et al., 2006; DiCarlo et al., 2014; Matovu et al., 2014). By placing onus of testing responsibility on women, clinics are essentially reinforcing existing gendered power structures (Risman, 2004). Gender and power undergirds many of the health decisions that a woman makes around the time of pregnancy. For women in violent relationships, HIV health decisions in particular can be framed by women's limited access to resources and decision-making power (Russell et al., 2013; Shamu et al., 2011). Keeping the theory of gender and power at the forefront of PMTCT theorization will better enable researchers to incorporate the structural drivers of IPV, namely gender inequality.
- *Feminist intersectionality* highlights the structural underpinnings that drive both IPV and HIV. Like the theory of gender and power, an intersectionality framework can help make sense of the ways that gender intersects with economic inequality or other structural factors to produce health inequality. Intersectionality is starting to be embraced by the

IPV field (Crenshaw, 1991; Sokoloff & Dupont, 2005), but has yet to be applied to PMTCT (an important exception being Rujumba et al., 2012). A key position of intersectionality is the assumption that all institutions have a tendency to recreate 'inequality regimes', or the many "interrelated practices, processes, actions, and meanings that result in and maintain class, gender, and racial inequalities," (Acker, 2006). This aligns with our findings around how women are often blamed by health care systems for their inability to adhere to PMTCT, rather than HIV behaviors being seen within a lens of gender inequality and IPV (Paper 3). Intersectionality often places emphasis on "giving voice" to those who are oppressed due to multiple intersecting forms of marginalization (Choo & Ferree, 2010; Hancock, 2007). This aligns with our approach to qualitative data collection during the in-depth research in Paper 3. Scholars call for mixed methods as a valid approach to understanding inequalities through an intersectional lens, since mixed methods necessarily look across levels of social organization to understand a research problem (Choo & Ferree, 2010). Lastly, intersectionality suggests that social identities are made up of multiple layers of women's lives and that women can resiliently navigate these (Zinn & Dill, 1996). Such a theoretical view fits well with our findings around resilience and motherhood (Papers 3 and 4), and suggest that women can draw upon multiple forms of resilience when thinking towards ensuring their own health in the context of HIV and IPV.

- *Life course theory* has been increasingly applied to how women respond to IPV, in recognition that certain "turning points" or periods of transition influence help-seeking (Khaw & Hardesty, 2007). Pregnancy is a unique time in the developmental life course of women. Pregnancy often entails more frequent visits to the health clinic than other phases of a woman's life (Gazmararian et al., 2000). This places antenatal providers in a position to build stronger relationships with pregnant women, creating what some have called a "window of opportunity" for intervening around IPV (Anderson et al., 2002b; O'Reilly et al., 2010). Because pregnancy is a "transition period", it may be a time of increased receptivity to healthy changes and interventions (Hatch, 2005). This is especially true since children seem to influence mothers' decisions to leave violent relationships (Davis, 2002; Meyer, 2011). As participants in the intervention have heightened awareness of the effects of IPV on unborn children, they may be willing to consider help-seeking in a new way (Meyer, 2010). Men are also more likely to be engaged and concerned about family health during the pregnancy and postpartum periods (Musoke et al., 2015), although it can also be a time of increased stress and IPV for some couples (Jasinski & Kantor,

2001b). Viewing the perinatal period as a specific time along the life course can improve PMTCT theory by adding a crucial time dimension to future research. This also distinguishes work around IPV and PMTCT from extant literature around HIV care and treatment in the general population – highlighting the unique contributions of childbearing to health decisions during this phase.

F. Limitations and Next Steps for Research

There are several important limitations of this research. Most limitations can be found in Chapter 3 and in the individual manuscripts, but several additional issues regarding the overall thesis deserve mention. These limitations can be addressed in future research studies.

We measured postpartum adherence relatively early after birth (at a median of 55 days postpartum). Given that adherence seems to decline at later stages postpartum (Henegar et al., 2015; Ngarina et al., 2015), it will be crucial to follow postpartum women for a longer period. This is particularly important in the South African setting, where the first three months after delivery seem protective against IPV because many women live with their maternal family and may have little contact with male partners. The cohort and qualitative subsample (Papers 3 and 4) were drawn from pregnant women recruited during routine antenatal care. This means that they may have important differences from the 8% of women who do not access ANC in the South African setting (Shisana et al., 2010). Because our quantitative sampling method first identified cohort members with recent IPV and then added additional HIV-positive women without IPV, our data cannot provide reliable estimates of prevalence for conditions like IPV or mental health. Confirmatory studies in other resource-constrained settings are urgently needed. Others have noted the need to better understand the clinical implications of IPV for women living with HIV in sub-Saharan Africa (Wingood et al., 2013a). Studies should include longitudinal examination of how IPV changes over the perinatal phase for HIV-positive women, particularly since HIV adherence behaviors are known to worsen in the later postpartum phase (Henegar et al., 2015; Ngarina et al., 2015). This will necessitate cohort studies that span the time period from pregnancy through the end of breastfeeding and a definitive infant HIV diagnosis.

Future studies should draw upon the use of validated measures of IPV, since these seem to be more sensitive to determining the true effect of violence on health outcomes (Jasinski & Kantor, 2001a; Sagrestano et al., 2002). It is possible that there may be differential effects of various types of violence on PMTCT uptake, and these can be examined with a comprehensive IPV measure like the WHO Instrument. However, the WHO Instrument has only been validated in one study , suggesting that additional work to understand the construct, sensitivity, and

specificity of this measure is warranted. An important shortcoming of the WHO Instrument is that it does not assess women's views of the perceived severity of various types of violence (Lindhorst & Tajima, 2008). Future studies should consider this relational and situational context to better understand how distinct intensity of IPV influences other health behaviors and outcomes.

Our use of ART adherence as a marker for PMTCT behaviors and desired outcomes is useful, but does not present a complete picture of the steps necessary for the prevention of infant HIV infections and the protection of maternal health. Future studies should broaden outcomes to measure the impact of IPV on the entire PMTCT cascade. This could include examining medical records for outcomes such as time to ART initiation, safe delivery in a health facility, exclusive breastfeeding practices, and infant HIV testing at all recommended time-points. In addition, future research should collect biomarkers for viral suppression (since this is a stronger indication of adherence than self-report).

Because mental health is conceptualized in this research as a pathway, it is necessarily theorized at the individual level of the socio-ecological framework. This framing aligns with most studies of HIV-positive women around the time of pregnancy (Kapetanovic et al., 2014) and of IPV in pregnancy (Devries et al., 2013a), but may underplay the role that mental health has with regards to social and structural drivers. Indeed, previous research has suggested that a sociological orientation is stronger than an individualist biomedical model for assessing mental health, since inner lives of many people are shaped more by their social and structural position than their own individual propensity for mental illness (Aneshensel et al., 1991). Nevertheless, here I position mental health as an individual-level health outcome that is deeply intertwined with the dyadic and social condition of IPV.

Our narrative, social constructionist approach to interviews intentionally focused on techniques like validation, highlighting resistance, and locating identity within participant stories (Paper 3). Therefore, our interpretations are likely to differ from that of a 'neutral observer', as utilized within a more positivist research paradigm. Nevertheless, this research provides important understandings of IPV among HIV-positive pregnant/postpartum women in a sample that is larger than the extant literature.

The urban Johannesburg setting has distinctions from other sub-Saharan African health settings, which makes it challenging to compare findings. However, the similar quantitative (Hampanda, 2016) and qualitative (Colombini et al., 2016; Mulrenan et al., 2015a) findings from other African settings suggest that the dynamics uncovered in this doctoral research may have commonalities with other locations. Moreover, the alignment of quantitative findings (Paper 4) with the meta-analytic findings in non-pregnant populations (Paper 1) suggest that around the

time pregnancy, IPV may have similar relationship with adherence among women living with HIV around the globe.

Lastly, this research was conducted within the context of a randomized control trial, which limits its application in routine clinic settings. The trial was conducted in public health antenatal clinics in urban Johannesburg, but it is possible that participants were different from other clinic patients because they were willing to take part in a trial. Also, there is a possibility that for participants in this research who were also randomized to the trial arm, the IPV intervention itself altered PMTCT behaviors. While the intervention was not targeted towards PMTCT, even slight alterations in women's ability to adhere to PMTCT may have influenced qualitative (Paper 3) or quantitative (Paper 4) findings. In Paper 4, I tested for this difference using $\chi 2$ difference test for two models, and found that final adherence models worked the same way for intervention and control participants. However, this is more challenging to tease out in qualitative research (Paper 3) and could have led, for example, for additional accounts of resiliency amongst participants who had access to the intervention.

Future studies should build in key risk factors beyond the partner, such as the structural or social dynamics that underpin both IPV and HIV. I learned that food security had a persistent and strong association with both IPV and HIV adherence behaviors (Paper 4). This type of socio-economic indicator will be important to include in future research. I also heard from women about the economic dependence that made them stay in abusive relationship despite risk to their (or children's) health and safety (Paper 3). This aligns with previous qualitative research suggesting that HIV and fear of violence intersect with economic dependency on men (Rujumba et al., 2012). Quantitative examination of economic dependence would be useful to include as a future area of research. Given that HIV-related stigma is shown to worsen PMTCT (Bwirire et al., 2008; Mepham et al., 2011; Turan & Nyblade, 2013; Watts et al., 2010), it will be important for future research on IPV to unpack how stigma from a partner operates within other partner dynamics to influence women's health behaviors.

Future research should focus on the intergenerational transmission of mental health (Herba et al., 2016) and intergenerational transmission of violence (Ehrensaft et al., 2003). Around the time of pregnancy, this view towards the next generation is particularly important. IPV experience and maternal mental health frame infant health outcomes. This occurs since a woman's own coping and mental health challenges may alter both epigenetic characteristics during pregnancy (such as alterations to the fetus' hypothalamic–pituitary–adrenal axis) and relational traits after birth (like insecure attachment) (Martinez-Torteya et al., 2016; Palma-Gudiel et al., 2015; Stein et al., 2014). One approach for addressing this important research gap

would be to identify a cohort of mother-infant dyads and examining the social, medical, and intergenerational context of health for both the woman and child.



Chapter 9. Recommendations & Conclusion

Photo credit: Abigail Hatcher, Safe & Sound team at a protest to urge South African government to establish a strategic plan to address gender-based violence.

A. Recommendations

The research findings suggest a number of important recommendations for the PMTCT field. Table 14 outlines gaps in the literature that existed prior to undertaking this doctoral research. The key findings from my research are then summarized with particular emphasis on how they speak to evidence gaps. Lastly, I present recommendations and suggest their relevance for policy, research, and/or clinical practice.

Table 14: Recommendations based on doctoral research findings

	Evidence Gap at start of doctoral research	**Key Findings** from doctoral research	**Recommendation** for policy, research, clinical practice, and theory	**Audience***		
1	Uncertainty on whether IPV is related to ART adherence among women	IPV is related to ART adherence among HIV-positive women in extant literature, with considerable impact on self-reported adherence and viral suppression	Efforts to improve ART adherence should address IPV . There is urgent need for better policy guidance and healthworker training around IPV within HIV care	Ⓟ		Ⓒ
			Additional funding for addressing IPV within HIV care and treatment could have important health impacts on the large proportion of HIV-positive women who report recent IPV	Ⓟ		
2	No quantitative evidence exists for IPV-PMTCT adherence in sub-Saharan Africa	In one of first of studies among women in SSA, I learned impact of IPV on PMTCT adherence is marked. This confirms one other study undertaken during PhD period (Hampanda, 2016)	PMTCT programming should include assessment of IPV during individualized, empathetic adherence counselling			Ⓒ
			Additional research should confirm these findings in larger, longitudinal cohorts		Ⓡ	
3	Rationale for why IPV may influence PMTCT is unclear	IPV influences PMTCT adherence through mental health. Anxiety, in particular, seems to worsen adherence	Mental health identification and treatment should inform clinical strategies to improve ART adherence			Ⓒ
		Partner non-disclosure due to IPV can impede adherence, or women can navigate it through "strategic non-disclosure"	Partner disclosure must be optional for women and counselling during ANC should provide various disclosure options: voluntary disclosure, assisted disclosure, delayed disclosure, or strategic non-disclosure	Ⓟ		Ⓒ
		Controlling behaviors may not be a pathway from IPV to adherence, partly because this could form an aspect of IPV itself	Controlling behaviors - an important aspect of the theory of gender and power - deserve increased attention but may not drive adherence in this setting		Ⓡ	
4	Extant literature around IPV within HIV-positive groups views abused women as necessarily victims	Women in our study were resilient and used strategies to adhere despite IPV Motherhood seems to be a central feature of women	Helping women remember their sources of resilience, be they motherhood, social networks, or personal efficacy, should form a large part of tailored PMTCT counseling	Ⓟ		Ⓒ

		who are resilient to the effects of IPV on adherence	PMTCT providers should pay close attention to women's adherence in the postpartum phasee, since they may feel less inclined to keep up health behaviors once the infant is "safe" from acquiring HIV			©
5	PMTCT remains largely atheorized and the research and intervention literature relies too heavily on individual-level theories	Partner-level drivers such as IPV likely drive persistent gaps in PMTCT coverage	Future scholars should consider partnership factors a central driver in PMTCT behaviors		®	
			Interventions addressing partner-level factors like IPV are urgently needed. These should prioritize male support for PMTCT (rather than simple 'male involvement') and should emphasize women's safety and choice		®	©
			Funding should be made available to develop and test interventions for IPV within HIV care and treatment, particularly around the perinatal phase	Ⓟ	®	

* Ⓟ = Policy-makers, ® = Researchers, © = Clinicians

B. Conclusion

This research aimed to explore how women's experience of IPV influences their ability to safely adhere to PMTCT recommendations. I used mixed method research strategies in four separate, but inter-related, studies to answer specific study objectives. Key findings can inform the literature around PMTCT and contain crucial evidence to inform future policy and practice. Future PMTCT research should incorporate social factors, such as IPV, into studies that develop and test PMTCT adherence interventions. HIV programming should recognize that partner-level dynamics such as IPV may drive persistent gaps in PMTCT coverage in areas of sub-Saharan Africa. Women who experience IPV around the time of pregnancy may have different needs from other HIV-positive patients, and it is crucial that HIV policy incorporate safety considerations for working with this group. Women living with recent or past IPV are highly resilient and often want to protect their own health and that of their children. Future PMTCT programs and studies may have the opportunity to harness this resilience, but only if researchers and health care providers are alert to the relationship dynamics that women face.

The United Nations and other policy makers recognize that eliminating new infant HIV infections is within reach (UNAIDS, 2016c). However, global goals around PMTCT are unlikely to be met by further tweaking to patient-level and institutional-level factors. To address the gap in women's access to PMTCT, future work must incorporate IPV as a key factor impacting women's ability to safely and consistently adhere to treatment. By including IPV in the HIV response, we can ensure not only the health of women themselves, but that of the next generation.

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Chapter 10. Appendices

Photo credit: Abigail Hatcher, Safe & Sound team at an annual team-building event.

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Outputs Generated

Peer-Reviewed Publications included in the Thesis

Hatcher, A.M., Smout, E.M., Turan, J.M., Christofides, N., & Stoeckl, H. (2015). Intimate partner violence and engagement in HIV care and treatment among women: A systematic review and meta-analysis. *AIDS*, 29, 2183-2194.

Hatcher, A.M., Woollett, N., Pallitto, C., Mokoatle, K., Delany-Moretlwe, S., Macphail, C., Stockl, H., Garcia-Moreno, C. (2014). Bidirectional links between HIV and intimate partner violence in pregnancy: Implications for prevention of mother-to-child transmission. *Journal of the International AIDS Society*, 17, e19233.

Hatcher, A.M., Stockl, H., Christofides, N., Woollett, N., Pallitto, C.C., Garcia Moreno, C., et al. (2016). Mechanisms linking intimate partner violence and prevention of mother-to-child transmission of HIV: A qualitative study in South Africa. *Social Science & Medicine*, 168, 130-139.

Hatcher, A. M., J. M. Turan, H. Stockl, N. Woollett, C. C. Pallitto, C. Garcia Moreno and N. Christofides (in draft). Intimate partner violence, mental health, and adherence to HIV treatment in pregnancy and postpartum among South African women.

Related Peer-Reviewed Publications

Hatcher, A.M., Woollett, N., Pallitto, C., Mokoatle, K., Stoeckl, H., & Garcia-Moreno, C. (2016). Willing but not able: Patient and provider receptiveness to addressing intimate partner violence in Johannesburg antenatal clinics. *Journal of Interpersonal Violence*, e1-22.

Woollett, N., **Hatcher, A.M.** (2016). Mental health, intimate partner violence and HIV. *South African Medical Journal,* 106(10): 969-972.

Pallitto C.C., Garcia-Moreno C., Stockl H., **Hatcher A.M.,** MacPhail C, Mokoatle K, Woollett N. (2016). Testing a counselling intervention in antenatal care for women experiencing partner violence: A study protocol for a randomized controlled trial in Johannesburg, South Africa. BMC *Health Services Research*, 16(630): e1-10.

Hatcher, A.M., Woollett, N., Pallitto, C., & Garcia Moreno, C. (in press). A conceptual framework and intervention approach for addressing intimate partner violence in pregnancy: The Safe and Sound Trial in South Africa. In S.M. Choudhury, J.T. Erausquin, & M. Withers (Eds.), *Global Perspectives on Women's Sexual and Reproductive Health across the Lifecourse*. New York: Springer.

Conference Presentations

Hatcher, A.M., Stockl, H., Christofides, N., Woollett, N., Pallitto, C.C., Garcia-Moreno, C., et al. (2016). Intimate partner violence and vertical HIV transmission: causal pathways and protective factors for PMTCT adherence. *South African Violence Conference*. Johannesburg.

Hatcher, A.M., Porter, O., Woollett, N., Pallitto, C.C., Stockl, H., Palanee, T., et al. (2015). Adaptation of nurse-led empowerment counseling for South African antenatal clinics: Lessons for clinical training and mentorship. *Nursing Network on Violence Against Women International (NNVAWI)*, Atlanta, Georgia.

Hatcher, A.M., Turan, J.M., Bukusi, E., Odero, M., Pallitto, C., Woollett, N., et al. (2014). Linking IPV Screening to Services & Care through Referral Networks. *Preventing Intimate Partner Violence in Uganda, Kenya, and Tanzania.* Kampala: Uganda National Academy of Sciences and Institute of Medicine.

Hatcher, A.M., Woollett, N., Pallitto, C., Goolam, A., Delany-Moretlwe, S., Macphail, C., et al. (2013). Bidirectional links between HIV and intimate partner violence in pregnancy: Implications for prevention of mother-to-child transmission. *The 3rd Structural Drivers of HIV Conference*. Cape Town, South Africa.

Hatcher, A.M., Woollett, N., Pallitto, C., Goolam, A., Delany-Moretlwe, S., Macphail, C., et al. (2013). Patient and provider perspectives on addressing intimate partner violence in Johannesburg antenatal clinics. *International Conference on AIDS and STIs in Africa (ICASA).* Cape Town, South Africa.

Hatcher, A.M., Woollett, N., Pallitto, C., Goolam, A., Delany-Moretlwe, S., Macphail, C., et al. (2013). "Willing but not able": High acceptability of addressing intimate partner violence in antenatal care is hindered by persistent gaps in policy and resources. *Sexual Violence Research Initiative*. Bangkok, Thailand.

Hatcher, A.M., Mokoatle, K., Ngoma, B., Stockl, H., MacPhail, C., Delany-Moretlwe, S., et al. (2013). Types and impact of intimate partner violence among pregnant women: Patient and provider perspectives from two Johannesburg antenatal clinics (MCH02). *Johannesburg Health District Research Conference*. Johannesburg, South Africa.

van Eck L.A., Woollett N., Pallitto C.C., Garcia-Moreno C., **Hatcher A.M.** (2016) "I stuck it out as a woman": Why women tolerate, accept, and normalise abuse. *South African Violence Conference,* Johannesburg.

Mphahlele R.S., Woollett N., Pallitto C.C., Garcia-Moreno C., **Hatcher A.M.** (2016) Unplanned pregnancy as a driver of IPV among HIV positive women. *South African Violence Conference,* Johannesburg.

Awards

Special Achiever, Wits Faculty of Health Sciences	2015
Young Researcher Runner-Up, SVRI Forum	2015
PLoS Early Career Travel Award	2015
We Share Science, Short Film Audience Award	2014
GBV Science Fair, Short Film Third Place	2014

Supervision of Masters students

Knowles, G. (2015). Exploring mental health as a pathway linking intimate partner violence to HIV related health. Masters in Infectious Disease. London: London School of Hygiene and Tropical Medicine.

Porter, O. (2014). Supporting an Effective Health Worker Respose to Intimate Partner Violence during Pregnancy: Qualitative findings from the Safe and Sound Intervention, South Africa. Masters in International Development. Edinburgh: University of Edinburgh.

Smout, E. (2014). The influence of disclosure of HIV serostatus on PMTCT uptake in HIV-positive women experiencing intimate partner violence. Masters in Infectious Disease. London: London School of Hygiene and Tropical Medicine.

Appendix B

Doctoral Research Ethical Approval

R14/49 Ms Abigail M Hatcher and Ms Natally Woollett

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M140451

NAME: (Principal Investigator)	Ms Abigail M Hatcher and Ms Natally Woollett
DEPARTMENT:	School of Public Health Hillbrow
PROJECT TITLE:	Exploring the effects of Intimate Partner Violance on Prevention of Mother to Child Transmission (PMTCT) Service Uptake: A Nested Cohort Study
DATE CONSIDERED:	25/04/2014
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Nicola Christofides
APPROVED BY:	Professor P Cleaton-Jones, Co-Chairperson, HREC (Medical)
DATE OF APPROVAL:	26/06/2014

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

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.
I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Safe & Sound Trial Ethical Approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Ms Natally Woollett

CLEARANCE CERTIFICATE	**M121179**
PROJECT	Addressing Violence against women in Antenatal Care: Testing an Intervention in South Africa (Phase 1)
INVESTIGATORS	Ms Natally Woollett.
DEPARTMENT	Department of Medicine
DATE CONSIDERED	30/11/2012
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 31/05/2013 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Ms N Woollett

DECLARATION OF INVESTIGATOR(S)
To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

Letter of support from World Health Organization (parent study funders)

School of Public Health
University of the Witwatersrand
27 St Andrews Road
Parktown 2193
South Africa

16 July 2013

To Whom It May Concern:

Please find this letter as a signal of our support for Abigail Hatcher to conduct proposed PhD research, entitled: "Exploring the effects of Intimate Partner Violence on prevention of mother-to-child transmission (PMTCT) service uptake: A nested cohort study."

Ms. Hatcher is a Co-Investigator on the WHO-supported randomized control trial to test an intervention for pregnant women experiencing intimate partner violence (IPV). She brings to the study a strong understanding of IPV in pregnancy, experience in conducting IPV-related research, and a willingness to take on the leadership responsibilities associated with conducting a trial. Alongside our investigative team, Ms. Hatcher has helped lead the recruitment and training of Nurse Researchers, managed the practical considerations of working in antenatal clinics, and assisted in conducting formative research to lay the groundwork for the trial.

We have reviewed the proposed PhD research, and feel it is aligned with the main outcomes of our trial. Answering questions around PMTCT will complement our understanding of the impact of IPV in a setting with high prevalence of HIV. It also contributes to the broader literature on the links between violence and HIV.

We are supportive of her access to and analysis of data generated through the parent study, in accordance with the terms agreed between the IWHR and the Special Programme of Research, Research Development and Training in human reproduction (HRP), and would be pleased to serve as advisors at key stages of the research and collaborators in written outputs.

Sincerely,

C. Garcia-Moreno

Dr. Claudia Garcia-Moreno
Dept of Reproductive Health and Research
World Health Organization
1211, Geneva, Switzerland

p.p.

Christina C. Pallitto, PhD
Dept of Reproductive Health and Research
World Health Organization
1211, Geneva, Switzerland

Referral List for Participants Experiencing IPV

WITS REPRODUCTIVE HEALTH & HIV INSTITUTE
+27 11 358 5300
www.wrhi.ac.za

Mental Health and Trauma
Tara Hospital
50 Saxon Road, Hurlingham
011 535 3000

Akeso Psychiatric Response Unit
010 040 4357

Charlotte Maxeke Academic Hospital
Parktown
011 435 0022

Medico Legal Clinic
Corner Klein & Smit St
011 694 3803

Legal Assistance
Saturday Clinic
Wits RHI steps
Nurina 071 862 0076

Legal Resources Centre
Bram Fisher Tower, 20 Albert
Michael@LRC.org.za
011 836 9831
M, W, Th 9h00-16h00

Legal Aid
41 Fox Street, Edura House
Braamfontein, 011 870 1480

Office 403 & 411 A, Maponya Mall,
Chris Hani Road, 011 938 3547

Lawyers vs Abuse
Shayda Vance
011 711 8601

SASSA (Social grants)
Harrison Street
011 241 8300
0800 601 011

Counseling
Lifeline/Victim Empowerment
Booysens
Sgt. Mothibi 011 433 5386
Sinenhlanhla (social worker)
sinenhlanhla@lifelinejhb.org.za
011 728 1331

FAMSA
Elof & Commissioner Street
Thuli, city@familylife.co.za
011 833 2057 (City Centre)

Emthonjeni Center
Wits University
Parktown
011 717 4513

Sophiatown Counseling
011 614 5242
Johanna 083 561 5011

JHB Parent & Child
Yeoville
011 484 1734

SANCA
011 892 3139
Cathy Vos

The South African Depression and Anxiety Group
011- 262-6396

Shelters (Adult)
Bethany House
Bertrams
011 614 3245
Bridgit Edwards 082 462 6495

Are ageng
Monica 071 880 6129
Tebogo 074 661 8529

Hotel Hope Ministries
Ruth Nkosi
083 712 7904

Eldorado Park Women's Forum
Eldorado Park
011 945 6433
Evans Gassi 072 950 7626

Amcare
Alberton
011 869 5856
Nadine Mason 079 500 8011

Bombani
Alexandra
011 443 3247
Deborah Francisco 083 953 5714

POWA
Berea
011 642 4345
Tiny, Katlehong 083 280 2334
Evaton 083 959 3762
Vosloorus 081 280 7696
Bara 011 933 2333

Ikhaya Lethemba
Braamfontein
011 242 3000
Connie Ramatabele 083 286 7948

NISAA
Lenasia
011 854 5804/5
Babs 079 354 8789
Romilla Pillay 083 298 8672

Shelters (Youth)
The House Shelter
Berea, Hillbrow
011 680 2913
Anna- Maria Nkwana 074 587 7060

Usindiso Ministries
Johannesburg
011 334 1143
Jay Bradley 082 902 4611

Hotlines

Suicide Crisis Line
0800 567 567
SMS 31393

Lifeline
0861 322 322

DSD Substance Abuse Line
0800 12 13 14
SMS 32312

Childline
08000 55555

POSTAL ADDRESS
P.O Box 18512 | Hillbrow 2038
Johannesburg, South Africa

PHYSICAL ADDRESS
University of the Witwatersrand | Hillbrow Health Precinct | Hugh Solomon Building
Corner Esselen Street and Klein Street, Hillbrow 2001

Appendix F

Formative Research Interview Guides (Paper 2)

Focus Group Discussion with pregnant women

To start the conversation, each woman is asked the following questions:

1. How many months pregnant are you? Is this your first pregnancy?
2. Have you been to the health clinic for antenatal care?
    a. If so, when did you go for the first time?

Then the facilitator asks the group the following questions:

1. What usually happens during antenatal care visits? What are your experiences with the services? Is there anything else (other services)? How are the service providers? Are you comfortable with the waiting periods? (*Ask about services provided, information or referrals received, HIV testing etc.)*

   Are there any other issues about the ANC clinic?
2. Are you able to keep your appointments as recommended by the provider?
    a. If not, please explain the reasons why?
3. Where do you plan to deliver your baby? If not in the clinic, is there any reason why not?
4. When you went to the health clinic, did anyone offer you an HIV test and give you information on HIV? How did you feel about it? How and when was it done? Did you feel you were given a choice? Can you give reasons of not testing?
5. Do you see any connections between partner violence and HIV? Has bringing up HIV testing ever caused conflict at home? For example if you disclose your HIV status to your does it put you at risk of violence? How comfortable are you to negotiate condom use with your partner?
6. Do you know anyone who has experienced violence by her partner?
    a. If yes, how did she handle it? For example, who did she talk to?

b. What do you think she could have done as well?

c. What kind of assistance should have been available to her?

7. Do you know anyone who is pregnant and have experienced violence by her partner?

    a. In your view does violence stay the same or increase during pregnancy?

    b. What is it about pregnancy that triggers violence? Depending on the answer given

    c. For a pregnant woman how does she handle this?

8. How do communities respond to partner violence? Does everyone respond in the same way? (*Probe: Problem or normal? Do people talk about it openly?*)

9. What resources are available in your communities to pregnant/women who experienced partner violence? (*Probe: Where could they go? Who offers help? What resources are available to her? What are the responses?*)

    a. What are the limitations of these resources?

10. What kind of services do you believe abused women need and should be offered to them?

11. What would be ideal intervention to be delivered to abused women in antenatal care? (Probe: When? Where? Under which circumstances? How? And what would they expect from such an intervention?)

Thank you

Guide for interviews with pregnant abused women

1. How far along are you in your pregnancy ?

2. Is this your first pregnancy?

3. We are aware that you in an abusive relationship and it is possible that your partner may have hurt you recently. Would you mind telling us what has happened?

4. From your experience, what do you believe are the reasons for partner violence during pregnancy?

Probe: What do you think are the main reasons why your partner hurts you?

Probe: Why do you think it happens among others you know?

Probe: What is people's attitude towards partner violence?)

5. Do you think that partner violence increases your chances of contracting HIV?

If yes, how?

Have you ever told anyone else about the violence you experienced?

a. If **Yes**, who did you tell and what was their reaction?
b. If **No**, why not?

6. What kind of help is available for women who experience partner violence in the community?

7. Have you told anyone at the health clinic that you have been hurt by your partner or a family member?

a. If Yes, how was their response?

b. Probe: How did the health care provider react?

c. Would the woman have preferred a different reaction?

d. How did it make her feel?)

e. **If No**, why not?

8. When you went to the health clinic did anyone ask you whether you have been hurt by your partner or family member?
   a. **If yes**, how did the question make you feel?
   b. If **No**, how would you feel about antenatal care providers asking about this?

Probe: if providers ask about partner violence how should it be done?

Probe:Who should ask?

Probe:In which environment should they ask and under which circumstances?

What do you think the study want to get from asking questions on partner violence?

After shortly outlining the intervention:

9. When during antenatal care do you think the intervention should take place ?

(*Probe: e.g. first appointment, HIV testing?*

Do you think it should be done only once or more often?

Why? How well do you think does the intervention address the needs of abused pregnant women?

(*Probe: What aspects are most helpful and why?*

Is something missing?

Is something not helpful or confusing?)

After showing them the study instruments:

10. How could the questions on intimate partner violence be changed to represent/capture your experiences?
11. Are the questions on women's mental and physical health clear?

Do you find it easy to understand their meaning?

11. What other safety behaviours or community resources do you think we should include?

Guide for interviews with health care providers

Good day, and thank you for taking the time to meet today.

1. What is your role at the clinic? How long have you been working here?
2. How big is your clinic in terms of staff? What are the hours of the clinic?
    a. On an average day, how many patients are seen at the clinic? What is the average length of a routine patient visit?.
    b. Please tell me about what happens when a patient visits the clinic, for example, what is the order of services?
    c. Please describe your responsibilities and day to day work.
3. Which communities are served by the health clinic?
    a. What are the main health problems you observe in your patients?
4. Please describe the HIV testing and counseling procedures.
5. Have you ever observed or had to care for women who have been hurt by their partners, family members, or others? If yes, how did you handle the case/these cases?
6. What are existing policies if any to respond to violence against women?
7. Do practitioners at this clinic ever ask women about experiencing violence?
    a. If NO, why do you think this is the case?
    b. If YES, how do they go about it?
    c. Is there anything that prompts them to ask about violence?
    d. Is it a routine service with every patient, or just certain ones?

e. Are there any existing tools, such as a list of questions to ask?

8. What type of training, if any, have practitioners at this clinic received on how to deal with cases of violence?

9. What do you think about asking women routinely about violence in your clinical setting and providing them with a counseling session of about 20 minutes?
   Probing questions:

a) Would it be feasible?

   a. Time constraints?

   b. Staffing constraints?

   c. Staff training and capability?

   d. Staff attitudes?

   e. Patient attitudes?

   f. Any other issues that would make feasibility a concern?

b) Do you think it would be important?

   a. Is this service valuable for patients? If yes, how?

   b. Is this service valuable for the clinic? If yes, how?

   c. In your view, is asking and responding to cases of violence a health sector responsibility? If yes, why? If no, who would be better capable to deal with this?

c) Any other challenges you think there can be to doing this?

d) How would you personally feel about asking women about violence?

   a. Are there aspects of this that may feel uncomfortable?

   b. Are there aspects that may make you feel satisfied or confident?

10. What opportunities do you see for integrating violence screening and counseling into existing processes in your clinic?

11. Can this be incorporated into the existing antenatal care routine?

12. Are there organizations where women can seek help in the case of violence by a partner? (in the clinic and outside)
13. Have you ever referred anyone there?
    a. If yes what has been your experience in referring a woman to one of them?

Participant Information Leaflet and Informed consent to participate in the formative research interviews for the antenatal care study on women's health and life experiences: Key Informants, Community Members, NGOs

Every participant must receive, read and understand this document before any procedure of the study

STUDY NUMBER:

VERSION : 0.1

STUDY TITLE: "Addressing violence against women in antenatal care: testing an intervention in South Africa and Mozambique"**.**

AN ABBREVIATED NAME FOR THIS STUDY: Violence Against Women (VAW)

FUNDED BY: World Health Organization

PRINCIPAL INVESTIGATORS: Dr Sinead Delany-Moretlwe

To a participant: this informed consent may contain words that you may not understand. Kindly ask study staff to explain these words or anything that you do not understand. You may go home with a copy that was not signed to think about it or discuss with family or friends before you decide.

DATE AND START TIME OF THE INFORMED CONSENT DISCUSSION

			:	
Date	**Month**	**Year**	**Time**	

Introduction:

Hi, my name is Abigail Hatcher. I am working for the Wits Reproductive Health and HIV Institute (WRHI). WRHI is conducting research in reproductive health, including HIV. We are doing research on women's health and life experiences including violence against women. We are talking to people knowledgeable about the health care system in our country, women's health, reproductive health or HIV and domestic violence. The research will involve answering some questions about your experiences and knowledge about the topic.

WRHI would like to invite you to participate in the formative research interview today. Violence against women is very common in this country, and violence during pregnancy can be especially dangerous for women's health and the health of their babies. First let me give you some information about the study and then you can decide if you are willing to participate. The aim of our study is to develop and test a counselling intervention for abused pregnant women receiving antenatal care in Southern Africa that could be incorporated into routine antenatal clinic. We would like to ask some questions about the health care system in the country to better understand how this intervention might best be integrated into existing antenatal care programmes.

PURPOSE OF THE STUDY

WRHI is part of a group of research scientists who are trying to test an intervention addressing violence against pregnant women in antenatal care. We are trying to find ways to discuss violence with women coming for antenatal care visits. If you decide to participate in this project, your responses will help us to improve the treatment of pregnant women who have experienced violence.

This study is taking place in South Africa and Mozambique. We would like to ask some questions today. Some of the questions relate to sensitive topics that some people find difficult to discuss. All the information you give is voluntary which means you are not obligated to participate. This phase is a small study where we will interview a variety of people, some from the Department of Health, Non-Governmental Organizations, health care workers, community members, and pregnant women. We estimate that the interview will take approximately 30-40 minutes. Your knowledge and insights will help us to improve our intervention and therefore the care of women who have experienced violence.

The researcher will make a sound recording of your conversation. After the discussion, someone will type a transcription of what is on the tape and will remove any mention of names. The sound recording will be stored for 2 years after the data is published or for 6 years if the data is not published. Recordings will be stored on password protected computers with access limited to senior members of the study team.

If you decide to participate in this study, you will be asked to sign or make your mark on this document to make sure that you understand the study. You will be given a copy to keep.

RISKS and/ or DISCOMFORTS:

We will be asking you questions about your professional engagement with the issue of the provision of antenatal care for pregnant women and issues related to their care. We do not believe that these questions will cause you any distress. If for some reason you feel uncomfortable, you may chose not to answer or chose to stop participating in the discussion at any point. All of the information that you provide is voluntary; you may say as much as you are comfortable saying. If these questions cause you distress for any reason, we can refer you to a counsellor or other local services that can provide you with assistance.

POTENTIAL BENEFITS

There may be no direct benefits to you from this study. However, you and others may benefit in the future from research done in this study because we will learn more about addressing violence in pregnant women and maybe incorporate it in the antenatal package of care.

COSTS AND COMPENSATION

There is no cost to you for being in this study. At the end of this visit, you will be reimbursed R50.00 to compensate you for your travel costs.

CONFIDENTIALITY

We will not record your name or any other identifying information on any study documents other than this consent form. We have been trained to respect the privacy of participants and the information you provide us will remain confidential. All discussions take place in a

private room and the information we collect will be stored in a locked cabinet, in a locked room and will only be accessed by the researchers in this study. Your interview may also be looked at by people from National Health Institute (NIH), the World Health Organization (WHO), Institutional Review Boards (IRB's), and monitors/auditors. These people are trained to maintain confidentiality and would review your interview to ensure that the study is conducted to the highest quality. You will not be identified by name in any of the reports or publications of this study or its results.

All the information you provide is voluntary, which means that you are not obligated to participate and if you do, you can say as much as you are comfortable saying. You are free to stop the interview at any point or not answer any of the questions that we ask. If you agree to participate, all the information you provide will be kept confidential.

If you have any further questions about this study, please contact the people listed below:

Dr Catherine MacPhail Principal Investigator WRHI, Hugh Solomon Building Corner of Esselen and Klein Hillbrow Tel: 013 735 0293 Mobile Number : 083 441 5415	Prof Helen Rees Executive Director/ Co-Investigator WRHI, Hugh Solomon Building Esselen Street, Hillbrow Tel: 011 358 5300 Fax 011 358 5400

This study is conducted in accordance with the Department of Health Guidelines for the Good Practice in the Conduct of Clinical Trials in Human Participants in South Africa (2006), and has received ethical approval from the University of the Witwatersrand. If you have questions about your rights as a research participant or complaints about the manner in which you were treated, or feel that study has caused you harm, please contact:	
Prof. Peter Cleaton-Jones Chairperson for the Committee for Human Research Ethics Committee University of the Witwatersrand Tel: 011 717 2301	

INFORMED CONSENT:

We would appreciate your participation and your insights are very important.

Do you have any questions about any of the information I have provided?

Yes_____ No_____

Do you understand you are not obligated to participate?

Yes_____ No_____

Do you agree to be interviewed?

Yes_____ No_____

To be completed by researcher:

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Signature of Volunteer:

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

Signature of Witness: (if necessary)

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

Signature of Study Staff taking consent:

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

Permission provided by participant for recording of Interview

Signature of Volunteer:

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

Signature of Witness: (if necessary)

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

Signature of Study Staff taking consent:

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

In-depth Interview Guide (Paper 3)

Thank you for taking the time to speak with me today. We will talk for about 45 minutes about your pregnancy, and we can take a break whenever you would like.

Are you ready to begin?

Background (for postpartum women only)

1) When did you deliver your baby?
    i) How was your delivery? Did you have a boy or girl?
    ii) Do you have other children?

2) How has the infant been doing so far? How are you coping with a new baby in the house?

3) How is the father doing?

Background (for pregnant women only)

4) When did you learn that you were pregnant?

5) How did you feel about the new pregnancy? Was it something you were hoping for or was it more of a surprise?

6) Was your partner aware of your pregnancy? How did he respond?

Partner disclosure

7) May I ask if you know your HIV status?

8) When did you learn about being positive? How did you feel?

9) How did your relationship change, if at all, by the HIV diagnosis?

    i) For example, did it get worse or better after you learned you were positive?

    ii) Probe for stories

10) Have you started taking HIV medication (ART)?

    i) Are you taking one tablet each day (FDC)?

    ii) Does your doctor say you'll carry on taking medicine – or will you stop after breastfeeding?

    iii) Some women are asked to stop after breastfeeding – how do you feel about the idea of stopping?

    iv) How do you feel about taking medication for your lifetime?

11) How is it going with your HIV treatment – is it easy to manage or somewhat tricky?

    i) Probe: Taking your medication on-time

    ii) Probe: Giving your infant syrup

    iii) Probe: Getting your infant tested

12) Did your partner know about what you had to do to take up HIV medication?
    i) If yes, was he supportive?

    ii) If no, did you decide not to tell him for a certain reason?

13) *For those who DID disclose:* May we talk about how you shared your status with your partner?
    i) How did he respond to the disclosure?

    ii) Probe for denial / acceptance / violence

14) *For those who DID NOT disclose:* Why did you chose not to tell your partner?

    i) Did he ever find out some other way?

    ii) Probe for fears around denial / rejection / violence

Relationship control

15) Does your partner know that you are taking medication for HIV?

    i) Do you ever have to hide your meds?

    ii) How would your partner respond if he found the medication?

16) Sometimes partners ask women not to go to clinic. Has this ever happened to you?

17) Does your partner ever like to know what you are doing or who you are seeing?

18) How do you respond when your partner controls where you go or who you see?

IPV

19) How is your relationship since the pregnancy / delivery?

20) Many women have violence in relationships. Has something like that ever happened to you?

    i) Has it been going on for a long time?

    ii) Did it seem to get worse during pregnancy and/or after baby's birth?

    Note: Probe gently here, as it may not feel good for participant to share details

21) Was there ever a time when the violence in your relationship made you worry about taking HIV medication?

    i) Why? *(probe for stories).*

Mental health

22) How do you think violence may be harming your health?
    i) *Probe for physical health*

    ii) Probe for mental / emotional health

23) How are you coping with the violence? Who did you lean on for support?

24) When you are feeling worried or depressed, does that ever change how you are able to stick with HIV medicines?
    i) Probe for stories.

Infant feeding & health

25) How has your infant been doing in terms of health?

26) Did you ever worry that the violence in your relationship was affecting the infant?

    i) Probe for stories.

27) How is your baby eating?

   i) What does your baby eat? *(probe for water, breastfeeding, bottle)*

   ii) Is there anything about feeding your baby that you worry about? Does HIV and feeding worry you?

   iii) Was feeding ever a point of conflict in your relationship?

Next steps and closure

28) How are you feeling about the next stage (delivering the baby; raising the infant)?

   i) *Affirm: "You are caring for your infant in the midst of difficult challenges"*

29) May I look over my paper to see that I've covered everything?

30) Is there anything else you'd like to talk about today?

   i) If appropriate, offer assistance in referrals via Research Nurse

I really appreciate you sharing these stories with me, and I hope that your experience helps us create better services for pregnant women in the future.

You have navigated many difficult steps so far, and I know you will be able to take on the next steps. Thank you very much for your time.

Participant Information Sheet and Informed consent for participation in Safe & Sound in-depth interviews

Every participant must receive, read and understand this document before any procedure of the study

STUDY NUMBER: A65780

VERSION: 1

STUDY TITLE: "Promoting safety in antenatal care among women: testing an intervention in South Africa"**.**

AN ABBREVIATED NAME FOR THIS STUDY: Safe & Sound

FUNDED BY: World Health Organization

PRINCIPAL INVESTIGATOR: Nataly Woollett

To a participant: this informed consent may contain words that you may not understand. Kindly ask study staff to explain these words or anything that you do not understand. You may go home with a copy that was not signed to think about it or discuss with family or friends before you decide.

DATE AND START TIME OF THE INFORMED CONSENT DISCUSSION

			:	
Date	**Month**	**Year**	**Time**	

INTRODUCTION

Hi, my name is _____. I am working for the Wits Reproductive Health and HIV Institute (Wits RHI). Wits RHI is conducting research in reproductive health, including HIV. We are doing research on women's health and life experiences during pregnancy.

Part of what we would like to learn about is women's safety during pregnancy. This is because many women around the globe experience violence during pregnancy. This violence can be bad for women's health and the health of their babies. We are trying to find ways to address safety with women coming for antenatal care visits. That is why our project is called Safe & Sound.

INVITATION

We are inviting you to take part in another part of Safe & Sound. It is your choice if you would like to participate in this extra portion of research.

ABOUT THE STUDY

In this extra part, we are speaking to women for 30 to 45 minutes about their experiences with pregnancy. We are especially interested to learn about how women cope with violence and how that may influence their uptake of HIV services.

The questions ask about sensitive topics that some women find difficult to discuss, and sometimes the questions can bring up emotions. We will ask about your emotions, your experiences with violence, and about HIV services like medication and breastfeeding. I will give you the names of some organizations that you can contact for more support in dealing with emotional issues if you feel that you need to do so.

I will not ask you any questions about child abuse, because that is not the purpose of us talking today. However, I do need to let you know that because I'm a health care professional, if you do tell me that you or someone else is hurting your child, I must report it to the authorities. Again, I do not intend to discuss that part of your life with you today, but would prefer to focus on your own health and safety during the pregnancy.

All the information you provide is voluntary, which means that you are not forced to participate, and you can say as much as you are comfortable saying.

We would appreciate your participation because we believe this research will help us improve the services offered in antenatal care for pregnant women.

WITHDRAWAL

You are free to stop the interview, not to answer any of the questions that we ask, and withdraw from the study at any point. You will receive the same services from the clinic and from the Safe & Sound staff whether or not you participate in the study.

POTENTIAL BENEFITS

There may be no direct benefits to you from this study. However, you may benefit from discussing your experiences with a professional like myself. You and others may benefit in the future from research done in this study because we will learn more about addressing violence and HIV and maybe incorporate it in the antenatal package of care.

COSTS AND COMPENSATION

There is no cost to you for being in this study. At the end of this visit, you will be given R100 to compensate you for your travel costs.

CONFIDENTIALITY

If you agree to participate, all the information you provide will be kept confidential and secret. We will not record your name or any other identifying information on any study documents other than this consent form. We have been trained to respect the privacy of participants and the information you provide us will remain confidential. All discussions take place in a private room and the information we collect will be stored in a locked cabinet, in a locked room and will only be accessed by the researchers in this study.

I would like to record your interview. This way, I can ask someone who is not familiar with this study to type up everything we talk about today. This helps me make sure I capture all of your insights without having to right them down right now.

Once your interview is typed, we will remove all names – including your name and my name. They typed interview will only be looked at by people from our research team or ethics boards/monitors. These people are trained to maintain confidentiality and would review your data to ensure that the study is conducted to the highest quality. You will not be identified by name in any of the reports or publications of this study or its results because we will always report about the group as a whole, which is a total of 20 women.

If you have any further questions about this study, please contact the people listed below:

Nataly Woollett Principal Investigator WRHI, Hugh Solomon Building Esselen Street, Hillbrow Tel: 011 358 5573 Mobile Number : 0766380564	Abigail Hatcher Senior Researcher WRHI, Hugh Solomon Building Esselen Street, Hillbrow Tel: 011 358 5489 Mobile Number: 084 406 7773

This study is conducted in accordance with the Department of Health Guidelines for the Good Practice in the Conduct of Clinical Trials in Human Participants in South Africa (2006), and has received ethical approval from the University of the Witwatersrand. If you have questions about your rights as a research participant or complaints about the manner in which you were treated, or feel that study has caused you harm, please contact:	
Prof. Peter Cleaton-Jones Chairperson for the Committee for Human Research Ethics Committee University of the Witwatersrand Tel: 011 717 2301	

INFORMED CONSENT:

We would appreciate your participation and your insights are very important.

Do you have any questions about any of the information I have provided?

Yes_____ No_____

Do you understand you are not obligated to participate?

Yes_____ No_____

Do you agree to be interviewed?

Yes_____ No_____

Do you agree to be recorded using this tape recorder?

Yes_____ No_____

To be completed by researcher:

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Signature of Volunteer:

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

Signature of Witness: (if necessary)

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

Signature of Study Staff taking consent:

Signature/mark or thumbprint		Date signed	dd	mm	yyyy
Print name		Time signed	:		

	A65780 - SAFE & SOUND STUDY **Addressing violence against women in antenatal care: testing an intervention in South Africa** **SOCIO-DEMOGRAPHIC AT ADMISSION**	**SDA (2)** Page 1/3 **V7 (20 May 2014)**

Centre number ☐☐☐☐ Hospital record number ☐☐☐☐☐☐☐☐☐☐

Screening number ☐☐☐☐

SOCIO-DEMOGRAPHIC

Thank you, I am now going to ask you a few questions to learn more about you, can we continue?

1. What race group do you consider yourself? ☐
   - 1= Black/African
   - 2= Coloured
   - 3= White
   - 4= Asian/Indian
   - 5= Other, please specify _____

2. What is your home language (the one you grew up speaking with your family)? ☐☐
   - 01= English
   - 02= Zulu
   - 03= S. Sotho
   - 04= Xhosa
   - 05= Tswana
   - 06= Shangaan/Tsonga
   - 07= Afrikaans
   - 08= Ndebele
   - 09= Pedi/N.Sotho
   - 10= Venda
   - 11= Swazi
   - 12= Other, please specify _____

3. What is your age today in years? ☐☐

4. What type of home do you live in, is it a house, a townhouse, a flat, single room or a shack? ☐
   - 1= Free standing house
   - 2= Townhouse
   - 3= Flat
   - 4= Single room
   - 5= Shack
   - 6= Other, please specify _____

5. How many people live in your household? ☐☐

6. How many children live in your household who are under the age of 6 years? ☐☐

	Never	Rarely	Sometimes	Often	Refused	Don't know
7. In the past [4 weeks], did it happen that there was no food to eat of any kind in your house, because of lack of resources to get food	☐	☐	☐	☐	☐	☐
8. In the past [4 weeks], did it happen that you or any household member went to sleep at night hungry because there was not enough food	☐	☐	☐	☐	☐	☐
9. In the past [4 weeks], did it happen that you or any household member went a whole day and night without eating anything at all because there was not enough food?	☐	☐	☐	☐	☐	☐

Centre number ☐☐☐☐ Hospital record number ☐☐☐☐☐☐☐☐☐☐

Screening number ☐☐☐☐

SOCIO-DEMOGRAPHIC

10. In which country were you born? ☐☐

01= South Africa
02= Mozambique
03= Zimbabwe
04= Malawi
05= Namibia
06= Lesotho
07= Swaziland
08= DRC
09= Congo
10= Nigeria
11= Kenya
12= Other, please specify _____

If Q10= 1, complete Q11

11. In which province of South Africa were you born? ☐☐

01= Gauteng
02= Northwest
03= Mpumalanga
04= Free State
05= Limpopo
06= KZN
07= Eastern Cape
08= Western Cape
09= Northern Cape
10= Other, please specify _____

12. How long have you lived in Johannesburg? Years ☐☐ Months ☐☐

If < 1 year then enter 0 in years. If < 30 days then enter 0 in Months.

13. What is your current relationship status? ☐

0= No current partner
1= Married (incl. traditional), living together
2= Married (incl. traditional), not living together
3= Boy/Girlfriend, living together
4= Boy/Girlfriend, not living together
5= Casual partner

If No current partner, go to Q17

14. How long have you been with your current partner? Years ☐☐ Months ☐☐

If < 1 year then enter 0 in years. If < 30 days then enter 0 in Months.

15. How old is your current partner (in years) ☐☐

If Don't know then enter 99

16. In which country was your current partner born? ☐☐

01= South Africa
02= Mozambique
03= Zimbabwe
04= Malawi
05= Namibia
06= Lesotho
07= Swaziland
08= DRC
09= Congo
10= Nigeria
11= Kenya
12= Other, please specify _____

If Don't know then enter 99

17. What is your highest level of education? ☐

1= Never attended school
2= Less than high school
3= Some high school
4= Completed high school
5= More than high school

18. In the last 3 months, have you done any work for pay? ☐

1= No
2= Yes
8= Refused
9= Don't know

Centre number ☐☐☐☐ Hospital record number ☐☐☐☐☐☐☐☐☐☐

Screening number ☐☐☐☐

SOCIO-DEMOGRAPHIC

19. What is your main source of income? ☐

1= Self-employed
2= Income from full-time employment
3= Income from part-time employment
4= Social Grant
5= Partner support
6= Family support (parents/grandparents)
7= Other, please specify _____

20. Is this your first pregnancy? ☐

1= No
2= Yes
If Yes, go to Q24

21. How many pregnancies have you had, including current pregnancy? ☐☐

22. How many live births have you had? ☐☐

23. How many living children do you have? ☐☐

24. How many weeks are you into your pregnancy? Weeks ☐☐

25. How many times have you visited ANC before today, during this pregnancy? ☐

Interviewer's Initials: _____ Interviewer's signature: _____

Date SDA completed:

Day		Month			Year				

Centre number ☐☐☐☐ Screening number ☐☐☐☐

ABUSE ASSESSMENT SCREENING

1= No
2= Yes
8= Refused
9= Don't know

	No	Yes		
	1	2	8	9
1. Within the last year, have you been hit, slapped, kicked or otherwise physically hurt by your partner	☐	☐	☐	☐
2. Within the last year, has your partner forced you to have sexual activities?	☐	☐	☐	☐
3. Since this pregnancy started, have you been hit, slapped, kicked or otherwise physically hurt by your partner?	☐	☐	☐	☐
4. Since this pregnancy started, has your partner forced you to have sexual activities?	☐	☐	☐	☐
5. Are you afraid of your partner?	☐	☐	☐	☐

Interviewer's Initials: _____ Interviewer's signature: _____

Date AAA completed:

Day		Month			Year				

Centre number ☐☐☐☐ Screening number ☐☐☐☐

INTIMATE PARTNER VIOLENCE

The next questions are about things that happen to many women, and that your current partner, or any other partner might have done to you.

Has your current husband/partner, or any other partner ever …

1= No 8= Refused
2= Yes 9= Don't know **[These response options apply to Q1 -13 a, b, d]**

1. a) Insulted you or made you feel bad about yourself? (***if No or Refused or Don't know, go to Q2***) ☐

   b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q2***) ☐

   c) In the past 12 months has this happened: ☐
   1= one time 8= Refused
   2= a few times 9= Don't know
   3= many times

   d) Has this happened during this pregnancy? ☐

2. a) Belittled or humiliated you in front of other people? (***if No or Refused or Don't know, go to Q3***) ☐

   b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q3***) ☐

   c) In the past 12 months has this happened: ☐
   1= one time 8= Refused
   2= a few times 9= Don't know
   3= many times

   d) Has this happened during this pregnancy? ☐

3. a) Done things to scare or intimidate you on purpose (e.g. by the way he looked at you, by yelling and smashing things)? (***if No or Refused or Don't know, go to Q4***) ☐

   b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q4***) ☐

   c) In the past 12 months has this happened: ☐
   1= one time 8= Refused
   2= a few times 9= Don't know
   3= many times

   d) Has this happened during this pregnancy? ☐

Centre number ☐☐☐☐ Screening number ☐☐☐☐

INTIMATE PARTNER VIOLENCE (Continued)

Has your <u>current</u> husband/partner, or <u>any</u> other <u>partner</u> ever ...

1= No
2= Yes
8= Refused
9= Don't know

4. a) Threatened to hurt you or someone you care about? (***if No or Refused or Don't know, go to Q5***) ☐

b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q5***) ☐

c) In the past 12 months has this happened: ☐
1= one time
2= a few times
3= many times
8= Refused
9= Don't know

d) Has this happened during <u>this</u> pregnancy? ☐

5. a) Slapped you or thrown something at you that could hurt you? No ☐ 1 Yes ☐ 2 ☐ 8 ☐ 9
(if No or Refused or Don't know, go to Q6)

b) Has this happened in the past 12 months? No ☐ 1 Yes ☐ 2 ☐ 8 ☐ 9
(if No or Refused or Don't know, go to Q6)

c) In the past 12 months has this happened: ☐
1= one time
2= a few times
3= many times
8= Refused
9= Don't know

d) Has this happened during <u>this</u> pregnancy? No ☐ 1 Yes ☐ 2 ☐ 8 ☐ 9

6. a) Pushed you or shoved you or pulled your hair? No ☐ 1 Yes ☐ 2 ☐ 8 ☐ 9
(if No or Refused or Don't know, go to Q7)

b) Has this happened in the past 12 months? No ☐ 1 Yes ☐ 2 ☐ 8 ☐ 9
(if No or Refused or Don't know, go to Q7)

c) In the past 12 months has this happened: ☐
1= one time
2= a few times
3= many times
8= Refused
9= Don't know

d) Has this happened during <u>this</u> pregnancy? No ☐ 1 Yes ☐ 2 ☐ 8 ☐ 9

Centre number ☐☐☐☐ Screening number ☐☐☐☐

INTIMATE PARTNER VIOLENCE (Continued)

Has your <u>current</u> husband/partner, or <u>any</u> other <u>partner</u> ever ...

1= No 8= Refused
2= Yes 9= Don't know

7. a) Hit you with his fist or with something else that could hurt you? (No ☐1 Yes ☐2 ☐8 ☐9)
(if No or Refused or Don't know, go to Q8)

b) Has this happened in the past 12 months? (No ☐1 Yes ☐2 ☐8 ☐9)
(if No or Refused or Don't know, go to Q8)

c) In the past 12 months has this happened: ☐
1= one time 8= Refused
2= a few times 9= Don't know
3= many times

d) Has this happened during <u>this</u> pregnancy? (No ☐1 Yes ☐2 ☐8 ☐9)

8. a) Kicked you, dragged you or beaten you up? (No ☐1 Yes ☐2 ☐8 ☐9)
(if No or Refused or Don't know, go to Q9)

b) Has this happened in the past 12 months? (No ☐1 Yes ☐2 ☐8 ☐9)
(if No or Refused or Don't know, go to Q9)

c) In the past 12 months has this happened: ☐
1= one time 8= Refused
2= a few times 9= Don't know
3= many times

d) Has this happened during <u>this</u> pregnancy? (No ☐1 Yes ☐2 ☐8 ☐9)

9. a) Choked or burnt you on purpose? (***if No or Refused or Don't know, go to Q10***) (No ☐1 Yes ☐2 ☐8 ☐9)

b) Has this happened in the past 12 months? (No ☐1 Yes ☐2 ☐8 ☐9)
(if No or Refused or Don't know, go to Q10)

c) In the past 12 months has this happened: ☐
1= one time 8= Refused
2= a few times 9= Don't know
3= many times

d) Has this happened during <u>this</u> pregnancy? (No ☐1 Yes ☐2 ☐8 ☐9)

Centre number ☐☐☐☐ Screening number ☐☐☐☐

INTIMATE PARTNER VIOLENCE (Continued)

Has your <u>current</u> husband/partner, or <u>any</u> other <u>partner</u> ever ...

1= No 8= Refused
2= Yes 9= Don't know

10. a) Threatened to use or actually used a gun, knife or other weapon against you? (***if No or Refused or Don't know, go to Q11***) — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q11***) — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

c) In the past 12 months has this happened: ☐
1= one time 8= Refused
2= a few times 9= Don't know
3= many times

d) Has this happened during <u>this</u> pregnancy? — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

11. a) Did your <u>current husband/partner or any other partner</u> ever force you to have sexual intercourse by threatening you, holding you down or hurting you in some way? (***if No or Refused or Don't know, go to Q12***) — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

b) Has this happened in the past 12 months? (if No or Refused or Don't know, go to Q12) — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

c) In the past 12 months has this happened: ☐
1= one time 8= Refused
2= a few times 9= Don't know
3= many times

d) Has this happened during <u>this</u> pregnancy? — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

12. a) Did you ever agree to have intercourse when you did not want to because you were afraid of what your husband/ partner might do if you refused? (***if No or Refused or Don't know, go to Q13***) — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q13***) — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

c) In the past 12 months has this happened: ☐
1= one time 8= Refused
2= a few times 9= Don't know
3= many times

d) Has this happened during <u>this</u> pregnancy? — No ☐ (1) Yes ☐ (2) ☐ (8) ☐ (9)

Centre number ☐☐☐☐ Screening number ☐☐☐☐

INTIMATE PARTNER VIOLENCE (Continued)

13. a) Did your current husband/partner or any other partner ever force you to do something sexual (besides vaginal intercourse) that you did not want to do? ***(if No or Refused or Don't know, go to Q14)***

No	Yes		
☐ 1	☐ 2	☐ 8	☐ 9

b) Has this happened in the past 12 months? ***(if No or Refused or Don't know, go to Q14)***

No	Yes		
☐ 1	☐ 2	☐ 8	☐ 9

c) In the past 12 months has this happened: ☐

1= one time
2= a few times
3= many times
8= Refused
9= Don't know

d) Has this happened during this pregnancy?

No	Yes		
☐ 1	☐ 2	☐ 8	☐ 9

(Q14: ONLY asked of women who had any shaded responses on any question in Q5-Q13)

14. Compared to before you were pregnant, did the physical and/or sexual violence get less, stay about the same, or get worse whilst you were pregnant? ☐

1= got less
2= stayed about the same
3= got worse
8= Refused
9= Don't know

I am now going to ask you about some situations that are true for many women. Thinking about your (current or most recent) husband/partner, would you say it is generally true that he:

1= No
2= Yes
8= Refused
9= Don't know

15. a) Has tried to keep you from seeing your friends? (***if No or Refused or Don't know, go to Q16***) ☐

b) Has this happened in the past 12 months? ***(if No or Refused or Don't know, go to Q16)*** ☐

c) Has this happened during this pregnancy? ☐

16. a) Has tried to restrict contact with your family of birth? (***if No or Refused or Don't know, go to Q17***) ☐

b) Has this happened in the past 12 months? ***(if No or Refused or Don't know, go to Q17)*** ☐

c) Has this happened during this pregnancy? ☐

17. a) Has insisted on knowing where you are all the time? (***if No or Refused or Don't know, go to Q18***) ☐

b) Has this happened in the past 12 months? ***(if No or Refused or Don't know, go to Q18)*** ☐

c) Has this happened during this pregnancy? ☐

Centre number ☐☐☐☐ Screening number ☐☐☐☐

INTIMATE PARTNER VIOLENCE (Continued)

1= No 8= Refused
2= Yes 9= Don't know

18. a) Has been jealous and gotten angry if you spoke with another man? ☐
(if No or Refused or Don't know, go to Q19)

b) Has this happened in the past 12 months? ***(if No or Refused or Don't know, go to Q19)*** ☐

c) Has this happened during this pregnancy? ☐

19. a) Has often been suspicious that you are unfaithful? (***if No or Refused or Don't know, go to Q20***) ☐

b) Has this happened in the past 12 months? ***(if No or Refused or Don't know, go to Q20)*** ☐

c) Has this happened during this pregnancy? ☐

20. a) Has your husband/partner ever taken your earnings or savings from you against your will? ☐
(***if No or Not Applicable or Refused or Don't know, go to Q21***)

1= No 8= Refused
2= Yes 9= Don't know
7= Not applicable

b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q21***) ☐

c) In the past 12 months has this happened: ☐
1= one time 8= Refused
2= a few times 9= Don't know
3= many times

d) Has this happened during this pregnancy? ☐

21. a) Has your husband/partner ever refused to contribute money for household expenses, ☐
even when he has money for other things? (***if No or Not Applicable or Refused or Don't know, go to Q22)***

1= No 8= Refused
2= Yes 9= Don't know
7= Not applicable

b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q22)*** ☐

c) In the past 12 months has this happened: ☐
1= one time 8= Refused
2= a few times 9= Don't know
3= many times

d) Has this happened during this pregnancy? ☐

Centre number ☐☐☐☐ Screening number ☐☐☐☐

INTIMATE PARTNER VIOLENCE (Continued)

22. a) Has your husband/partner ever hurt your child/children? ☐

(if No or Not Applicable or Refused or Don't know, go to Q23)

1= No
2= Yes
7= Not applicable
8= Refused
9= Don't know

b) Has this happened in the past 12 months? ***(if No or Refused or Don't know, go to Q23)*** ☐

c) In the past 12 months has this happened: ☐

1= one time
2= a few times
3= many times
8= Refused
9= Don't know

d) Has this happened during this pregnancy? ☐

23. a) Has your husband/partner ever threatened to forcefully remove you from the home? ☐

(***if No or Not applicable or Refused or Don't know, go to Q24***)

1= No
2= Yes
7= Not applicable
8= Refused
9= Don't know

b) Has this happened in the past 12 months? (***if No or Refused or Don't know, go to Q24***) ☐

c) In the past 12 months has this happened: ☐

1= one time
2= a few times
3= many times
8= Refused
9= Don't know

d) Has this happened during this pregnancy? ☐

24. Do you and your husband/partner share household expenses? ☐

1= No
2= Yes
7= Not Applicable
8= Refused
9= Don't know

Centre number ☐☐☐☐ Screening number ☐☐☐☐

INTIMATE PARTNER VIOLENCE (Continued)

Review responses to Q5-Q13 in this PVA section. Review responses to Q1-Q4 in AAA.

If any responses in Q5-Q13 in this PVA section fall into shaded boxes, or if any responses in Q1-Q4 in the AAA section fall into shaded boxes, this respondent is considered IPV-positive.

If none of the responses in Q5-Q13 in this PVA section and none of the responses in Q1-Q4 in the AAA section fall into shaded boxes, this respondent is considered IPV-negative.

25. What is the IPV status of participant? ☐
1= Negative
2= Positive

Interviewer's Initials: _____ Interviewer's signature: _____

Date PVA completed:

Day		Month			Year				

Centre number ☐☐☐☐ Screening number ☐☐☐☐

EXCLUSION AND ELIGIBILITY

1. Do you fear that your current or most recent partner may take your life? (No 1 / Yes 2)
If response is **YES** to the above, probe to assess if participant is in **imminent danger**

2. Do you fear that your partner may take your child/children's life? (No 1 / Yes 2 / Not Applicable 7)

3. a) Are you currently thinking of hurting yourself? (***if No, go to Q4***) (No 1 / Yes 2)

b) Have you made any plans? (No 1 / Yes 2)

Please check if any of the above shaded boxes are ticked.

4. Are *any* of the shaded boxes above ticked? (No 1 / Yes 2)

5. What is the IPV status of the participant? (***Look at the answer to Q25 in PVA***) (**Negative** 1 / **Positive** 2)

**** If responses to Q4 and Q5 above fall into the shaded boxes, then the woman is Eligible for the study and should be randomized. Complete Q6= Eligible.***

***** If response to Q4 falls into the shaded box but the response to Q5 does not, the woman is Not Eligible for the study and will not be randomized but can complete the next sections of the questionnaire. Complete Q6= Not Eligible, can continue***

****** If response to Q4= Yes, the woman is Not Eligible for the study and should be immediately referred for mental health or ChildLine services. Complete Q6= Not Eligible.***

6. Is the woman eligible for the study? ☐
1= Not eligible (***End questionnaire***)
2= Eligible (***Go to Q7***)
3= Not eligible, can continue (***Continue with GEA questionnaire***)

Only complete Q7 & Q8 if Eligible

7. Subject number ☐☐☐ - ☐

8. Randomization group ☐
1= Control
2= Intervention

Interviewer's Initials: _____ Interviewer's signature: _____

Date EEA completed:

Day	Month	Year
☐☐	☐☐	☐☐☐☐

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐-☐

GENERAL SELF-EFFICACY SCALE

I will read you a set of questions, and you will tell me how true each one is as it applies to you.
(Give participant "GEA visual aid")

	Strongly agree	Agree	Disagree	Strongly disagree	Refused	Don't know
1. I can always manage to solve difficult problems if I try hard enough.	☐	☐	☐	☐	☐	☐
2. If someone opposes me, I can find the means and ways to get what I want.	☐	☐	☐	☐	☐	☐
3. It is easy for me to stick to my aims and accomplish my goals.	☐	☐	☐	☐	☐	☐
4. I am confident that I could deal efficiently with unexpected events.	☐	☐	☐	☐	☐	☐
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	☐	☐	☐	☐	☐	☐
6. I can solve most problems if I invest the necessary effort.	☐	☐	☐	☐	☐	☐
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	☐	☐	☐	☐	☐	☐
8. When I am confronted with a problem I can usually find several solutions.	☐	☐	☐	☐	☐	☐
9. If I am in trouble, I can usually think of a solution	☐	☐	☐	☐	☐	☐
10. I can usually handle whatever comes my way.	☐	☐	☐	☐	☐	☐

Interviewer's Initials: _____ Interviewer's signature: _____

Date GEA completed:

Day	Month	Year
☐☐	☐☐	☐☐☐☐

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

HOSPITAL ANXIETY AND DEPRESSION SCALE

Thank you, I am now going to ask you a few questions to learn more about your mood and feelings
(Give participant "HAA visual aid")
Below is a list of some of the ways you may have felt. Please indicate which answer describes best how you have felt during the past week.

(Read each item to respondent and mark the appropriate response. Please repeat this for all items)

During the past week,	Not at all (0 days)	Sometimes (1-3 days)	Often (4-5 days)	Most of the time (every day of past week or 6 days)	Refused	Don't know
1. I feel tense or wound up	☐ 0	☐ 1	☐ 2	☐ 3	☐ 8	☐ 9
2. I still enjoy the things I used to enjoy	☐ 3	☐ 2	☐ 1	☐ 0	☐ 8	☐ 9
3. I get a sort of frightened feeling as if something bad is about to happen	☐ 0	☐ 1	☐ 2	☐ 3	☐ 8	☐ 9
4. I can laugh and see the funny side of things	☐ 3	☐ 2	☐ 1	☐ 0	☐ 8	☐ 9
5. Worrying thoughts go through my mind	☐ 0	☐ 1	☐ 2	☐ 3	☐ 8	☐ 9
6. I feel cheerful	☐ 3	☐ 2	☐ 1	☐ 0	☐ 8	☐ 9
7. I can sit at ease and feel relaxed	☐ 3	☐ 2	☐ 1	☐ 0	☐ 8	☐ 9
8. I feel like I am slowed down	☐ 0	☐ 1	☐ 2	☐ 3	☐ 8	☐ 9
9. I get a sort of frightened feeling like butterflies in the stomach	☐ 0	☐ 1	☐ 2	☐ 3	☐ 8	☐ 9
10. I have lost interest in my appearance	☐ 0	☐ 1	☐ 2	☐ 3	☐ 8	☐ 9
11. I feel restless and have to be on the move	☐ 0	☐ 1	☐ 2	☐ 3	☐ 8	☐ 9
12. I look forward with enjoyment to things	☐ 3	☐ 2	☐ 1	☐ 0	☐ 8	☐ 9
13. I get sudden feelings of panic	☐ 0	☐ 1	☐ 2	☐ 3	☐ 8	☐ 9
14. I can enjoy a good book or radio or TV programme	☐ 3	☐ 2	☐ 1	☐ 0	☐ 8	☐ 9

Interviewer's Initials: _____ Interviewer's signature: _____

Date HAA completed:

Day	Month	Year
☐☐	☐☐	☐☐☐☐

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

SEXUAL BEHAVIOUR AND PMTCT

Thank you, I am now going to ask you a few questions about your sexual experience and health, can we continue?

1. Was your first sexual act forced? ☐
(***"forced"*** means he/multiple perpetrators physically held you down or threatened to harm you if you did not perform a sexual act)
1= No 8= Refused
2= Yes 9= Don't know

2. What was your age at your first sexual act in years? ☐☐

3. Was your first sexual act coerced? ☐
(***"Coercion"*** means feelings of being violated - for example you felt extreme pressure, he threatened to start rumours, badgering, and bribing, including the use of his physical size)
1= No 8= Refused
2= Yes 9= Don't know

4. Do you have more than one sexual partner? ☐
1= No 8= Refused
2= Yes 9= Don't know

5. a) Do you know or suspect that your current or most recent partner has had other sexual partners in the past 3 months? ☐
(if No, Refused or Don't know, go to Q6)
1= No 8= Refused
2= Yes 9= Don't know

b) ***If Yes,*** how many? ☐
1= one 8= Refused
2= more than one 9= Don't know

6. When you last had sex, did you use a condom? ☐
1= No 8= Refused
2= Yes 9= Don't know

7. Have you had sex while under the influence of alcohol or drugs in the past 3 months? ☐
1= No 8= Refused
2= Yes 9= Don't know

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

SEXUAL BEHAVIOUR AND PMTCT (Continued)

HIV counselling, testing and PMTCT adherence questions

8. Have you ever tested for HIV before today (***If No, Refused or Don't know, go to Q10***)? ☐

1= No 8= Refused
2= Yes 9= Don't know

9. When was your last HIV test? Month ☐☐☐ Year ☐☐☐☐

(999 in Month, 9999 in Year If does not remember)

10. a) Do you know your current or most recent partner's HIV status? ☐

(If No, Refused or Don't know, go to Q11)

1= No 8= Refused
2= Yes 9= Don't know

b) As far as you know, is your partner living with HIV? ☐

1= No 8= Refused
2= Yes 9= Don't know

11. May I please ask your HIV status? As far as you know today, are you living with HIV? ☐

(If No, Refused or Don't know, go to Q19)

1= No 8= Refused
2= Yes 9= Don't know

12. Does your current or most recent partner know your HIV status? ☐

(If No, Refused or Don't know, go to Q15)

1= No 8= Refused
2= Yes 9= Don't know

13. May I please ask how did he learn about your HIV status? ☐

1= You disclosed your status
2= Someone from the clinic disclosed your status to him
3= Someone else disclosed your status to him
4= He discovered it on his own
8= Refused
9= Don't know

14. May I please ask how did he react to learning your status? ☐

1= He was supportive and understanding
2= He reacted severely and was physically or sexually violent
3= He reacted severely in some other way
4= He denied or ignored it
8= Refused
9= Don't know

Now I am going to ask you about antiretroviral drugs to prevent mother-to-child-transmisson during pregnancy.

15. Are you enrolled at an HIV clinic? ***(If No, Refused, go to Q19)*** ☐

1= No 8= Refused
2= Yes

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

SEXUAL BEHAVIOUR AND PMTCT (continued)

1= No
2= Yes
7= Not Applicable
8= Refused
9= Don't know

16. Have you taken these medications during your previous pregnancies? ☐

17. Have you taken antiretroviral medication during this pregnancy? ☐

18. ***If Q16= Yes and/or Q17= Yes*** , Have you ever had to hide your medication from your partner? ☐

19. Did your partner attend ANC with you today? (***if No, not applicable, refused or don't know, go to Q21***) ☐

20. Did you have to use your partner for translation in ANC? ☐

21. Do you have any reason to think your partner may be upset because you are speaking with me today? ☐

(Ask participant to look at "option set 1" of SBA visual aid). Q22 - Q45 refer to current or most recent partner

Sexual Relationship Power Scale Relationship Control Subscale

	Strongly agree	Agree	Disagree	Strongly disagree	Refused	Don't know
22. If I asked my partner to use a condom, he would get angry.	☐	☐	☐	☐	☐	☐
23. If I asked my partner to use a condom, he would get violent.	☐	☐	☐	☐	☐	☐
24. Most of the time, we do what my partner wants to do.	☐	☐	☐	☐	☐	☐
25. My partner won't let me wear certain things.	☐	☐	☐	☐	☐	☐
26. When my partner and I are together I'm pretty quiet.	☐	☐	☐	☐	☐	☐
27. My partner has more say than I do about important decisions that affect us.	☐	☐	☐	☐	☐	☐
28. My partner tells me who I can spend time with.	☐	☐	☐	☐	☐	☐
29. If I asked my partner to use a condom, he would think I'm having sex with other people.	☐	☐	☐	☐	☐	☐
30. I feel trapped or stuck in our relationship.	☐	☐	☐	☐	☐	☐
31. My partner does what he wants, even if I do not want him to.	☐	☐	☐	☐	☐	☐

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

SEXUAL BEHAVIOUR AND PMTCT (continued)

	Strongly agree	Agree	Disagree	Strongly disagree	Refused	Don't know
32. I am more committed to our relationship than my partner is.	☐	☐	☐	☐	☐	☐
33. When my partner and I disagree, he gets his way most of the time.	☐	☐	☐	☐	☐	☐
34. My partner gets more out of our relationship than I do.	☐	☐	☐	☐	☐	☐
35. My partner always wants to know where I am.	☐	☐	☐	☐	☐	☐
36. My partner might be having sex with someone else.	☐	☐	☐	☐	☐	☐

Ask participant to look at "option set 2" Decision-Making Dominance Subscale

1= Your partner
2= Both of you equally
3= You
8= Refused
9= Don't know

37. Who usually has more say about whose friends to go out with? ☐

38. Who usually has more say about whether you have sex? ☐

39. Who usually has more say about what you do together? ☐

40. Who usually has more say about how often you see one another? ☐

41. Who usually has more say about when you talk about serious things? ☐

42. In general, who do you think has more power in your relationship? ☐

43. Who usually has more say about whether you use condoms? ☐

44. Who usually has more say about what types of sexual acts you do? ☐

45. Who had more say around you getting pregnant? ☐

Interviewer's Initials: _____ Interviewer's signature: _____

Date SBA completed:

Day		Month			Year			

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

HARVARD TRAUMA QUESTIONNAIRE SHORT VERSION

Now I am going to ask about the types of violent things that sometimes happen in our communities. I will ask about experiences that might have happened to you, your family, people you know and strangers. Can we continue? Please take your time to decide how much the statement applies to you.

1. I feel safe:

a) when I am at work ☐
1= No 8= Refused
2= Yes 9= Don't know
7= Not applicable

b) outside my home ☐
1= No 8= Refused
2= Yes 9= Don't know

c) in my home ☐
1= No 8= Refused
2= Yes 9= Don't know

2. I have seen:
1= No 8= Refused
2= Yes 9= Don't know

a) a stranger being beaten up. ☐

b) someone I know (not a family member) being beaten up ☐

c) a member of my family (other than a partner) being beaten up ☐

3. I have been beaten up:
1= No 8= Refused
2= Yes 9= Don't know

a) by a stranger ☐

b) by someone I know (not a family member or partner) ☐

c) by a member of my family (other than a partner) ☐

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

HARVARD TRAUMA QUESTIONNAIRE SHORT VERSION

1= No 8= Refused
2= Yes 9= Don't know

4. I have seen:
   a) a stranger get stabbed or shot ☐
   b) someone I know (not a family member) get stabbed or shot ☐
   c) a member of my family (other than a partner) get stabbed or shot ☐

5. Someone has threatened to stab me or shoot me. ***(if No, Refused or Don't know, go to Q6)*** ☐
   If Yes , please tell me who this was (*more than one response possible*):
   a) a stranger ☐
   b) someone I know (not a family member or partner) ☐
   c) a member of my family (other than a partner) ☐

6. Someone has actually stabbed me or shot me. (***if No, Refused or Don't know, go to Q7***) ☐
   If Yes , please tell me who this was:
   a) a stranger ☐
   b) someone I know (not a family member or partner) ☐
   c) a member of my family (other than a partner) ☐

7. Someone has *tried* to force me or has actually forced me to have sex or do something sexual against my will me or has actually raped me. (***if No, Refused or Don't know, go to Q8***) ☐
   If Yes , please tell me who this was:
   a) a stranger ☐
   b) someone I know (not a family member or partner) ☐
   c) a member of my family (other than a partner) ☐

8. When I was young, grown-ups in my home used to:
   a) hit each other ☐
   b) scream at each other ☐
   c) hit me ☐
   d) scream at me ☐
   e) withhold essentials as punishment (like food) ☐

The following are symptoms that people sometimes have after experiencing hurtful or terrifying events in their lives.

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

HARVARD TRAUMA QUESTIONNAIRE SHORT VERSION

I am going to read a set of statements, please decide how much the symptoms bothered you in the past week (give participant "HTA visual aid - Option set 2")

	Not at all (0 days)	Sometimes (1-3 days)	Often (4-5 days)	Most of the time (every day of past week or 6 days)	Refused	Don't know
9. Recurrent thoughts or memories of the most hurtful or terrifying events	☐	☐	☐	☐	☐	☐
10. Feeling as though the event is happening again	☐	☐	☐	☐	☐	☐
11. Recurrent nightmares	☐	☐	☐	☐	☐	☐
12. Feeling detached or withdrawn from people	☐	☐	☐	☐	☐	☐
13. Unable to feel emotions	☐	☐	☐	☐	☐	☐
14. Feeling jumpy, easily startled	☐	☐	☐	☐	☐	☐
15. Difficulty concentrating	☐	☐	☐	☐	☐	☐
16. Trouble sleeping	☐	☐	☐	☐	☐	☐
17. Feeling on guard	☐	☐	☐	☐	☐	☐
18. Feeling irritable or having outbursts of anger	☐	☐	☐	☐	☐	☐
19. Avoiding activities that remind you of the traumatic or hurtful event	☐	☐	☐	☐	☐	☐
20. Inability to remember parts of the most traumatic or hurtful events	☐	☐	☐	☐	☐	☐
21. Less interest in daily activities	☐	☐	☐	☐	☐	☐
22. Feeling as if you don't have a future	☐	☐	☐	☐	☐	☐
23. Avoiding thoughts or feelings associated with the traumatic or hurtful experience	☐	☐	☐	☐	☐	☐

End here if IPV-NEGATIVE (Look at Q25 in PVA)

Interviewer's Initials: _____ Interviewer's signature: _____

Date HTA completed: Day ☐☐ Month ☐☐ Year ☐☐☐☐

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

SAFETY BEHAVIOUR CHECKLIST

This section should not be included among IPV-negative women

Now I will ask you about certain actions that some women take when they feel that they are in danger from a partner

1= No
2= Yes
7= Not applicable
8= Refused
9= Don't know

Have you ever,

1. Hidden money? ☐
2. Changed door locks in one or some of the bedrooms for safety? ☐
3. Established code with family or friends? e.g. send SOS texts/sms to family or friends ☐
4. Asked neighbours to call police if violence begins? ☐
5. Made sure to have your cellular phone charged at all times in case of escalating violence? ☐
6. Ran to a neighbour's, family or friend's house for safety? ☐
7. Locked yourself in one of the rooms for safety? ☐
8. Removed weapons? ☐

Do you have the following items easily accessible to you and in your possession:

9. Social grant bank card? ☐
10. Title deed of the house you live in ? ☐

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

SAFETY BEHAVIOUR CHECKLIST (Continued)

11. Birth certificates (yours and children)? ☐
12. Identity document? ☐
13. Secret bank account? ☐
14. Insurance policies and numbers? ☐
15. Marriage certificate or customary marriage negotiations documents? ☐
16. Extra cash/money? ☐
17. Important phone numbers? e.g. POWA, SAPS, Family, Friend ☐
18. Hidden bag with extra clothing? ☐

Now I will ask you a few questions about your household, can we continue?

19. Is the home you are living in registered in your name? ☐
20. Do you have children under the age of 16 years living with you? ☐
(If No, go to 22a)
21. a) Do you have children under the age of 6 years living with you? ☐

b) If ***Yes*** , how many? ☐☐

22. a) Are social grants (foster care, child support) registered in your name? ☐

b) If ***No*** , then in whose name: ☐

1= Partner
2= Mum/Dad
3= Aunt/Uncle
4= Partner's Parents
5= Other _____

Interviewer's Initials: _____ Interviewer's signature: _____

Date BCA completed:

Day		Month			Year			

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

COMMUNITY RESOURCES

Thank you, I am now going to ask you a few questions to learn more about the community resources you have accessed, can we continue?

Have you ever USED any of the following support systems to deal with violence from your partner?

1. a) Legal or advocacy organization, e.g. POWA, Tshwaranang etc. (***if No, Refused or Don't know, go to Q2***) ☐

1= No 8= Refused
2= Yes 9= Don't know

b) How many times? ☐

1= one time 8= Refused
2= a few times (2-3 times) 9= Don't know
3= many times (4+ times)

c) How effective (helpful) were they in dealing with the abuse ☐

1= Not Helpful 8= Refused
2= Helpful 9= Don't know

2. a) Shelter/Safe house e.g. Bombani safe house (***if No, Refused or Don't know, go to Q3***) ☐

1= No 8= Refused
2= Yes 9= Don't know

b) How many times? ☐

1= one time 8= Refused
2= a few times (2-3 times) 9= Don't know
3= many times (4+ times)

c) How effective (helpful) were they in dealing with the abuse ☐

1= Not Helpful 8= Refused
2= Helpful 9= Don't know

3. a) South African Police Services (SAPS) (***if No, Refused or Don't know, go to Q4***) ☐

1= No 8= Refused
2= Yes 9= Don't know

b) How many times? ☐

1= one time 8= Refused
2= a few times (2-3 times) 9= Don't know
3= many times (4+ times)

c) How effective (helpful) were they in dealing with the abuse ☐

1= Not Helpful 8= Refused
2= Helpful 9= Don't know

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

COMMUNITY RESOURCES

4. a) Magistrate Court for Protection Orders (***if No, Refused or Don't know, go to Q5***) ☐

1= No 8= Refused
2= Yes 9= Don't know

b) How many times? ☐

1= one time 8= Refused
2= a few times (2-3 times) 9= Don't know
3= many times (4+ times)

c) How effective (helpful) were they in dealing with the abuse ☐

1= Not Helpful 8= Refused
2= Helpful 9= Don't know

5. a) Legal services and/or children's court (i.e. divorce, child custody or visitation) ☐
(if No, Refused or Don't know, go to Q6)

1= No 8= Refused
2= Yes 9= Don't know

b) How many times? ☐

1= one time 8= Refused
2= a few times (2-3 times) 9= Don't know
3= many times (4+ times)

c) How effective (helpful) were they in dealing with the abuse ☐

1= Not Helpful 8= Refused
2= Helpful 9= Don't know

6. a) Faith Community (i.e., church, pastor, imam) (***if No, Refused or Don't know, go to Q7***) ☐

1= No 8= Refused
2= Yes 9= Don't know

b) How many times? ☐

1= one time 8= Refused
2= a few times (2-3 times) 9= Don't know
3= many times (4+ times)

c) How effective (helpful) were they in dealing with the abuse ☐

1= Not Helpful 8= Refused
2= Helpful 9= Don't know

7. a) Social Welfare (Social Workers) (***if No, Refused or Don't know, go to Q8***) ☐

1= No 8= Refused
2= Yes 9= Don't know

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

COMMUNITY RESOURCES

b) How many times? ☐
1= one time
2= a few times (2-3 times)
3= many times (4+ times)
8= Refused
9= Don't know

c) How effective (helpful) were they in dealing with the abuse ☐
1= Not Helpful
2= Helpful
8= Refused
9= Don't know

8. a) Health Care Services (Clinic, Rape crisis centres) (***if No, Refused or Don't know, go to Q9***) ☐
1= No
2= Yes
8= Refused to answer
9= Don't know

b) How many times? ☐
1= one time
2= a few times (2-3 times)
3= many times (4+ times)
8= Refused
9= Don't know

c) How effective (helpful) were they in dealing with the abuse ☐
1= Not Helpful
2= Helpful
8= Refused
9= Don't know

9. a) Close friends or neighbours (***if No, Refused or Don't know, go to Q10***) ☐
1= No
2= Yes
8= Refused
9= Don't know

b) How many times? ☐
1= one time
2= a few times (2-3 times)
3= many times (4+ times)
8= Refused
9= Don't know

c) How effective (helpful) were they in dealing with the abuse ☐
1= Not Helpful
2= Helpful
8= Refused
9= Don't know

10. a) Partner's parents/In-laws (including sisters-in-law and brothers-in-law) ☐
(if No, Refused or Don't know, go to Q11)
1= No
2= Yes
8= Refused
9= Don't know

b) How many times? ☐
1= one time
2= a few times (2-3 times)
3= many times (4+ times)
8= Refused
9= Don't know

Centre number ☐☐☐☐ Screening Number ☐☐☐☐ Subject number ☐☐☐ - ☐

COMMUNITY RESOURCES

c) How effective (helpful) were they in dealing with the abuse ☐

1= Not Helpful
2= Helpful
8= Refused
9= Don't know

11. a) Your own extended family ☐

1= No
2= Yes
8= Refused
9= Don't know

b) How many times? ☐

1= one time
2= a few times (2-3 times)
3= many times (4+ times)
8= Refused
9= Don't know

c) How effective (helpful) were they in dealing with the abuse ☐

1= Not Helpful
2= Helpful
8= Refused
9= Don't know

Thank you very much for your patience and taking part in the study, do you have any questions?

Interviewer's Initials: _____ Interviewer's signature: _____

Date CRA completed:

Day	Month	Year

Participant Informed consent for participation in the Safe & Sound study on women's health and life experiences

Every participant must receive, read and understand this document before any procedure of the study

STUDY NUMBER: M121179

VERSION: 1

STUDY TITLE: "Promoting safety in antenatal care among women: testing an intervention in South Africa"**.**

AN ABBREVIATED NAME FOR THIS STUDY: Safe & Sound

FUNDED BY: World Health Organization

PRINCIPAL INVESTIGATORS: Nataly Woollett

To a participant: this informed consent may contain words that you may not understand. Kindly ask study staff to explain these words or anything that you do not understand. You may go home with a copy that was not signed to think about it or discuss with family or friends before you decide.

DATE AND START TIME OF THE INFORMED CONSENT DISCUSSION

			:	
Date	**Month**	**Year**	**Time**	

INTRODUCTION

Hi, my name is _____. I am working for the Wits Reproductive Health and HIV Institute (Wits RHI). Wits RHI is conducting research in reproductive health, including HIV. We are doing research on women's health and life experiences during pregnancy. We are inviting all women to who come to the antenatal clinic if they would like to participate in this study. The research will involve answering some questions about your experiences, your health, and your feelings.

Part of what we would like to learn about is women's safety during pregnancy. This is because many women around the globe experience violence during pregnancy. This violence can be bad for women's health and the health of their babies. We are trying to find ways to address safety with women coming for antenatal care visits. That is why our project is called Safe & Sound. If you decide to participate in this study, your responses will help us to improve the treatment of pregnant women who come to antenatal care.

First let me give you some more information about the study and then you can tell me if you are willing to participate.

Our study aims to test a counselling intervention for pregnant women receiving antenatal care in South Africa. We would like to ask you some questions today and again at another time. As part of the study we want to test if talking to a nurse for approximately 30 minutes is beneficial for women who have experienced or are still experiencing violence by their partner. Therefore, some women will be given an opportunity to talk to their antenatal care nurse in more detail about their experiences in their relationship and having to do with violence.

Whether or not you will be given this extra counseling opportunity will be decided by chance (like a lottery).

All women I speak to, whether or not they get to take part in the counseling, will be invited to answer questions. The questions will take approximately 45 minutes to complete, and I will read them to you and ask your answers. There are no right or wrong answers, but we are trying to learn more about your experience while being pregnant.

Then, if you have been chosen by chance to receive the intervention, you will be invited to chat a bit longer (an extra 30 minutes) either today or at your next clinic visit. This chat will be between you and myself, a trained nurse, and we will discuss your relationship and things you can do to keep yourself and your baby safe. Then, after you deliver your baby and you come for your six weeks post-partum visit, we would like to spend another 30 minutes asking you some questions again. If you go elsewhere for your post- partum visit, we would like to contact you via mobile phone, if that is fine and safe for you.

The questions ask about sensitive topics that some women find difficult to discuss, and sometimes the questions can bring up difficult emotions. We will ask about your emotions, your experiences with violence, and about sexual behaviour. I will give you the names of some organizations that you can contact for more support in dealing with emotional issues if you feel that you need to do so. I will also give you the name of a person you can contact if you have additional questions after you leave here today.

I will not ask you any questions about child abuse, because that is not the purpose of us talking today. However, I do need to let you know that because I'm a nurse, if you do tell me that you or someone else is hurting your child, I must report it to the authorities. Again, I do not intend to discuss that part of your life with you today, but would prefer to focus on your health and safety during the pregnancy.

All the information you provide is voluntary, which means that you are not forced to participate, and if you do participate, you can say as much as you are comfortable saying.
We would appreciate your participation because we believe this research will help us improve the services offered in antenatal care for pregnant women.

WITHDRAWAL

You are free to stop the interview, not to answer any of the questions that we ask, and withdraw from the study at any point. You will receive the same services from the clinic whether or not you participate in the study.

POTENTIAL BENEFITS

There may be no direct benefits to you from this study. However, you may benefit from discussing your experiences with a nurse like myself. You and others may benefit in the

future from research done in this study because we will learn more about addressing violence in pregnant women and maybe incorporate it in the antenatal package of care.

COSTS AND COMPENSATION

There is no cost to you for being in this study. At the end of this visit, you will be given R100 to compensate you for your travel costs. At the postpartum visit, six weeks after you deliver you will receive R100 for a total of R200.

CONFIDENTIALITY

If you agree to participate, all the information you provide will be kept confidential and secret. We will not record your name or any other identifying information on any study documents other than this consent form which will be stored separate from your clinic records and other information. We have been trained to respect the privacy of participants and the information you provide us will remain confidential. All discussions take place in a private room and the information we collect will be stored in a locked cabinet, in a locked room and will only be accessed by the researchers in this study. For your safety, we recommend that you keep your participation in this study to yourself, or if you do choose to talk about it please explain that it is a women's health study.

Your interview may also be looked at by people from the World Health Organization (WHO), Institutional Review Boards (IRB's) and monitors/auditors. These people are trained to maintain confidentiality and would review your data to ensure that the study is conducted to the highest quality. You will not be identified by name in any of the reports or publications of this study or its results because we will always report about the group as a whole, which is a total of 1,350 women.

If you have any further questions about this study, please contact the people listed below:

Nataly Woollett Principal Investigator WRHI, Hugh Solomon Building Corner of Esselen and Klein Hillbrow Tel: 011 358 5573 Mobile Number : 0766380564	Abigail Hatcher Senior Researcher WRHI, Hugh Solomon Building Esselen Street, Hillbrow Tel: 011 358 5489 Mobile Number: 084 406 7773

This study is conducted in accordance with the Department of Health Guidelines for the Good Practice in the Conduct of Clinical Trials in Human Participants in South Africa (2006), and has received ethical approval from the University of the Witwatersrand. If you have questions about your rights as a research participant or complaints about the manner in which you were treated, or feel that study has caused you harm, please contact:	
Prof. Peter Cleaton-Jones Chairperson for the Committee for Human Research Ethics Committee University of the Witwatersrand Tel: 011 717 2301	

Participant questions/comments: _____

_____

_____

_____

_____

_____

Interviewer responses:

_____

_____

_____

_____

_____

Comprehension ckecklist:

True or False

1. Some women will receive a counselling intervention and some will not

2. You will not receive the same standard of care at this clinic if you do not take part in this study

3. When are you due for a follow-up visit with me?

a) 6 days postpartum

b) 6 weeks postpartum

c) 6 months postpartum

INFORMED CONSENT:

We would appreciate your participation and your insights are very important.

Do you have any questions about any of the information I have provided?

Yes_____ No_____

Do you understand you are not obligated to participate?

Yes_____ No_____

Do you agree to be interviewed?

Yes_____ No_____

Do you agree to be randomised into the brief intervention?

Yes_____ No_____

To be completed by researcher:

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Signature of Volunteer:

Signature/mark or thumbprint		Date signed			
			dd	mm	yyyy
Print name		Time signed		:	

Signature of Witness: (if necessary)

Signature/mark or thumbprint		Date signed			
			dd	mm	yyyy
Print name		Time signed		:	

Signature of Study Staff taking consent:

Signature/mark or thumbprint		Date signed			
			dd	mm	yyyy
Print name		Time signed		:	

Intimate partner violence and engagement in HIV care and treatment among women: a systematic review and meta-analysis

Abigail M. Hatcher[a,b], Elizabeth M. Smout[c], Janet M. Turan[d], Nicola Christofides[b] and Heidi Stöckl[c]

Objective: We aimed to estimate the odds of engagement in HIV care and treatment among HIV-positive women reporting intimate partner violence (IPV).

Design: We systematically reviewed the literature on the association between IPV and engagement in care. Data sources included searches of electronic databases (PubMed, Web of Science, CINAHL and PsychoInfo), hand searches and citation tracking.

Methods: Two reviewers screened 757 full-text articles, extracted data and independently appraised study quality. Included studies were peer-reviewed and assessed IPV alongside engagement in care outcomes: antiretroviral treatment (ART) use; self-reported ART adherence; viral suppression; retention in HIV care. Odds ratios (ORs) were pooled using random effects meta-analysis.

Results: Thirteen cross-sectional studies among HIV-positive women were included. Measurement of IPV varied, with most studies defining a 'case' as any history of physical and/or sexual IPV. Meta-analysis of five studies showed IPV to be significantly associated with lower ART use [OR 0.79, 95% confidence interval (95% CI) 0.64–0.97]. IPV was associated with poorer self-reported ART adherence in six studies (OR 0.48, 95% CI 0.30–0.75) and lower odds of viral load suppression in seven studies (OR 0.64, 95% CI 0.46–0.90). Lack of longitudinal data and measurement considerations should temper interpretation of these results.

Conclusion: IPV is associated with lower ART use, half the odds of self-reported ART adherence and significantly worsened viral suppression among women. To ensure the health of HIV-positive women, it is essential for clinical programmes to address conditions that impact engagement in care and treatment. IPV is one such condition, and its association with declines in ART use and adherence requires urgent attention.

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Keywords: antiretroviral treatment adherence, engagement in care, intimate partner violence, meta-analysis

Introduction

Advances in HIV care and treatment have led to remarkable health gains among those living with HIV. Yet, many HIV-positive patients remain out of care, fail to take up treatment or are nonadherent to antiretroviral therapy (ART). Such challenges with engagement in HIV are common among women [1,2] and are responsible for a considerable proportion of morbidity and mortality among HIV-positive women [3,4].

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There are a number of reasons for poor engagement in HIV care, among which intimate partner violence (IPV) has received increasing attention. IPV is defined as any behaviour within an intimate relationship that causes physical, psychological or sexual harm [5], and global prevalence is estimated to be 30% [6]. IPV has been associated with HIV infection in cross-sectional [7] and prospective studies [8,9]. A meta-analysis of data from 28 studies showed that multiple forms of IPV are associated with incident HIV infection in women [10]. Research points to direct links between IPV and HIV infection, via forced sex, as well as indirect links, via heightened HIV risk among IPV perpetrators and a reduced ability for women in violent relationships to negotiate condom use [11–13].

Despite this emerging literature around HIV acquisition, less is known about the influence of IPV for those already living with HIV. Evidence suggests that women living with HIV have a high likelihood of relationship violence. Clinical samples from resource-rich settings estimate that 68–95% of HIV-positive women experience IPV in their lifetime [14–18]. In resource-constrained settings, HIV-positive women are twice as likely as HIV-negative counterparts to report lifetime violence from a partner [19]. HIV diagnosis, in itself, can trigger relationship conflict and violence [17,20–22]. Importantly, HIV testing, regardless of the serostatus outcome, can lead to violence [23,24], suggesting that even this first step in accessing care and treatment may pose an IPV risk for women.

IPV leads to declines in HIV-related health, with studies finding an association between IPV and virologic failure [25,26], lower $CD4^+$ cell counts [25], higher incidence of opportunistic infection [26,27], marked increase in episodic diseases (e.g. pneumonia, bronchitis, sinusitis) [27] and greater risk of mortality [28]. Negative effects on engagement in care and treatment may be a leading reason for IPV being associated with poor health outcomes for HIV-infected women.

Several plausible mechanisms could drive the relationship between IPV and engagement in HIV care. Fear of new or continued IPV leads women to avoid disclosure of their status to male partners [29–31], which in turn has a significant impact on treatment adherence [32–34]. When women are fearful of violence from their partners, they may be more likely to default on medications or may have other health priorities, such as physical safety, which trump adherence [35]. Qualitative studies have explored how fear and experience of IPV influence women's decisions to take up and stay retained in HIV services [35–37]. Given the well established links between IPV and mental health [38–43], it is possible that poor mental health is a key explanation for how IPV impacts on ART adherence [44–47]. Alternately, feelings of denial and shame may preclude abused women's abilities to seek care openly [48], or partner control may inhibit access to medical care [49].

Despite health risks associated with IPV among HIV-infected persons, IPV remains an understudied factor in the literature around HIV care and treatment [50]. Evidence on the association between IPV and adherence has yet to be reviewed systematically. This study examined the relationships between IPV and engagement in HIV care and treatment (i.e. ART uptake, ART adherence measured through self-report or by viral loads, and retention in HIV care) through a systematic review and meta-analysis.

Materials and methods

A systematic review and meta-analyses were conducted on studies measuring an association between IPV and ART use, ART adherence (self-reported), ART adherence (viral suppression) and retention in HIV. The aim was to determine the extent to which IPV is related to engagement in HIV care and treatment among women.

Selection criteria

This review follows PRISMA reporting guidelines for systematic reviews (see Text S1, http://links.lww.com/QAD/A763) [51]. Studies were eligible for inclusion if they included adult women living with HIV; presented primary, quantitative data in a peer-reviewed manuscript based on cross-sectional, case–control or longitudinal data; and measured the predictor of interest (IPV) and at least one outcome of interest. No restrictions were placed on study setting or population.

Search strategy

Electronic searches were conducted using the following databases: PubMed, Web of Science, CINAHL and PsychoInfo. Articles in English or French were included if they had been published in peer-reviewed journals before or up to January 2015. Search terms and a full search strategy can be found in Text S2, http://links.lww.com/QAD/A763.

Study selection

Using the 'online search' function of EndNote [52], all titles and abstracts matching the search terms were imported. Two authors (A.M.H., E.M.S.) independently reviewed all identified study titles and abstracts. Articles were retained if at least one search term for predictor or outcome concept was found. Abstracts that did not meet all inclusion criteria were excluded and reason for exclusion noted. Exclusion criteria included publication factors and population characteristics (Fig. 1).

The same authors (A.M.H., E.M.S.) independently screened full articles of all included abstracts. Full articles

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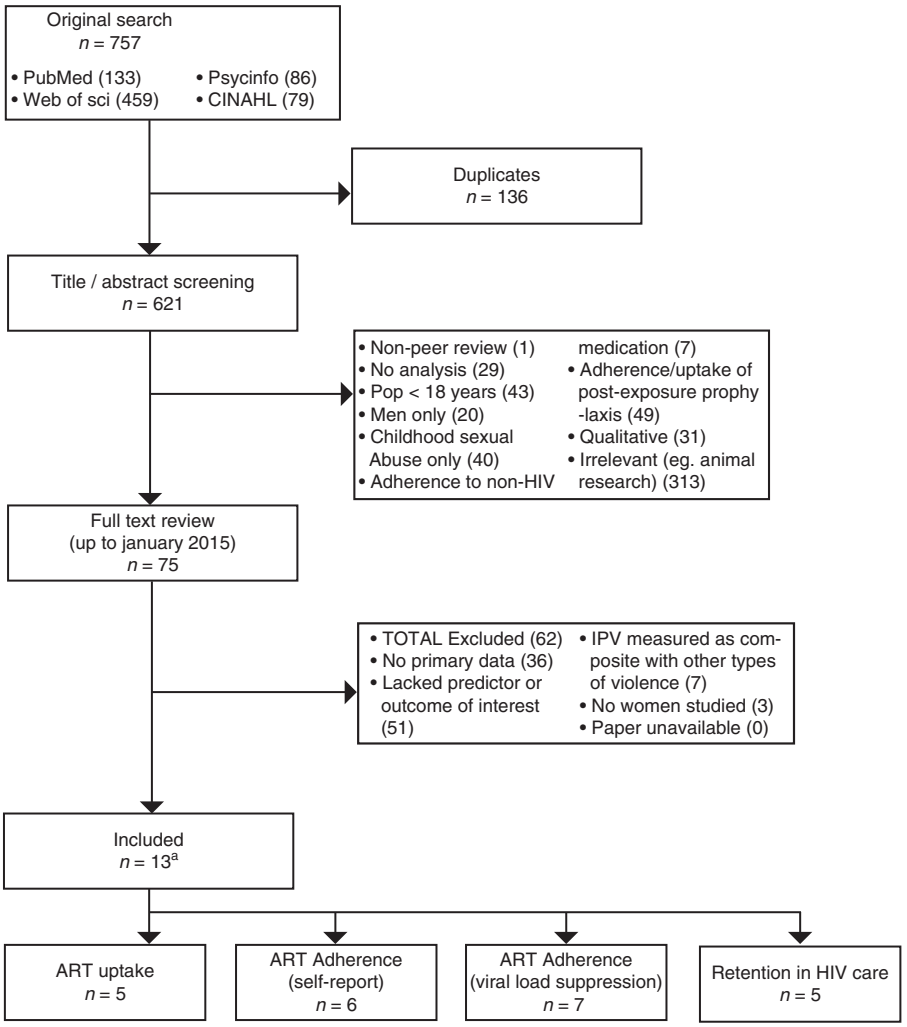


Fig. 1. Flowchart of primary study selection. [a]Five studies examined more than one outcome.

with discrepancy about inclusion were reviewed by a third author (H.S.) to reach consensus. Exclusion reasons were noted. No additional study was identified by searching the reference lists of included articles.

Data extraction

Data were extracted on study design, setting, population, sample size, measures used to investigate IPV and measures used to assess engagement in HIV care. As meta-analysis required data from among women only and in dichotomous outcomes, authors of several articles ($n = 7$) were contacted directly via e-mail and asked to abstract 2×2 tables in Excel: numbers of women reporting IPV vs. not and reporting engagement in care vs. not. Authors of all seven articles requiring additional information were willing and able to provide these data.

Quality appraisal

A quality appraisal was conducted on all included studies using an adapted Critical Appraisal Skills Programme (CASP) quality appraisal tool (Text S3, http://links.lww.com/QAD/A763) [53]. The quality appraisal form includes 15 questions about study quality for which articles received a numeric score representing the extent to which they met the criteria: 0 (non responsive), 1 (partially responsive) or 2 (fully responsive).

Data analysis

Meta-analyses were conducted separately for dichotomous engagement in care outcomes. Dichotomous outcomes were deemed appropriate, as key outcomes of interest were either inherently dichotomous (i.e. current ART use) or represented nonnormally distributed continuous data (i.e. adherence, viral suppression). An assessment was made by the authorship team to ensure that 'clinical heterogeneity' was acceptable to lend each outcome to meta-analysis [54].

Quantitative outcomes were extracted into an Excel table. This included details on overall IPV prevalence in the study, cases and noncases among women with IPV and without IPV, and correlation coefficients. Pooled

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unadjusted odds ratio (OR) estimates [with corresponding 95% confidence intervals (95% CIs)] were calculated using random effects meta-analysis in STATA [55]. No adjustment was made for potential confounders, given that few studies reported covariate data. Heterogeneity among studies was estimated using the I^2 statistic, with significant heterogeneity detected at the P less than 0.05 level. Sensitivity analysis for publication bias was undertaken through visual inspection of funnel plots [56] and Egger's test statistic (with small-study effects being detectable at a conservative $P < 0.10$ level) [57]. To aid comparison with other systematic reviews, the self-reported adherence outcome was transformed to a standardized mean difference [58].

Results

Our search strategy identified 621 unique records, of which 554 were excluded during abstract screening (Fig. 1). Full texts were obtained for 75 articles, of which 62 were excluded upon further screening. A total of 13 studies measured the association between IPV and at least one of the primary outcomes: ART uptake, ART adherence (self-report), ART adherence (viral suppression) and retention in HIV care.

Key features of included articles

Table 1 presents the key characteristics and outcomes of the 13 included studies [25,59–70]. Most studies ($n = 11$) were conducted in the United States and sample sizes across all studies were relatively small, with a median of 234 participants. All 13 studies were cross-sectional. Most studies ($n = 12$) were conducted among the general HIV-infected population, with Kalokhe *et al.* [60] conducting their study among high-risk crack/cocaine users.

Measures of intimate partner violence

Measures of IPV were based on self-reports across all 13 studies. As summarized in Table 1, several studies used brief, unvalidated screening tools to assess violence [59,62–64]. Validated instruments included the Severity of Violence Against Women Scale [25,66], the Conflict Tactics Scale [61], the Slapped, Threatened, and Throw instrument [60], and the Women's Experience of Battering (WEB) scale [25,67–69]. Ryerson Espino *et al.* [68] bolstered the WEB scale to include dimensions of forced sex and fears around physical safety. Siemieniuk *et al.* [71] trained clinic researchers to conduct a standardized screening using a single introductory question about any domestic abuse, after which women were considered to have IPV if they spoke in a semi-structured way about violence as an adult within a current or past partner.

Eleven studies used lifetime experience of IPV as the exposure of interest, whereas two analysed IPV in the past

Table 1. Characteristics of included articles ($n = 13$).

Author	Year	Sample size (women)	Population group	Type of study	Violence measure	Outcome of interest	Country	CASP quality appraisal	Type of IPV measure
Blackstock *et al.* [67]	2015	748	Women only	Cross-sectional	10-item Women's Experience of Battering (WEB) Scale	Retention (medical records)	United States	20	Ever, physical and psychological
Blank *et al.* [70][a]	2015	587	Women only	Cross-sectional	10-item (WEB) Scale	Uptake (medical records), adherence (self-report and viral suppression), retention (medical records)	United States	20	Ever, physical and psychological
Illangasekare *et al.* [59]	2012	196	Women only	Cross-sectional	3 items from the Partner Violence Screen	Uptake (medical records), adherence (viral suppression)	United States	16	Past 12 months, asked at 1 timepoint, physical, psychological
Kalokhe *et al.* [60][a]	2012	175	Women and men (Crack/cocaine users, total 343)	Cross-sectional	5 items from the Slapped, Threatened, and Throw (STaT) instrument	Uptake (self-report), retention (medical records)	United States	18	Ever, physical, sexual, psychological

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Lopez *et al.* [61][a]	2010	94	Women and men (total 190)	Cross-sectional	17-item Conflict Tactics Scale	Adherence (self-report)	United States	20	Ever, past 12 months, physical, sexual, psychological
Malow *et al.* [62][a]	2013	166	Women and men (total 194)	Cross-sectional	4 items from (unnamed) partner relationship scale	Adherence (self-report)	Haiti	20	Ever, physical, psychological
Ramachandran et al. [63]	2010	18	Women and men (total 56)	Cross-sectional	3 items of Abuse Assessment Screen	Uptake (self-report)	United States	14	Ever, past 5 months, physical, sexual, psychological
Rose *et al.* [64][a]	2010	40	Women only	Cross-sectional	1-item from Traumatic Life Events Questionnaire	Adherence (self-report and viral suppression)	United States	15	Ever, physical
Ryerson Espino *et al.* [68][a]	2015	102	Women only	Cross-sectional	10-item (WEB) Scale and 6 additional items on forced sex and fear	Adherence (viral suppression)	United States	22	Ever, past 12 months, asked at multiple timepoints, physical, sexual, psychological
Schafer *et al.* [25]	2012	64	Women only	Cross-sectional	46-item Severity of Violence Against Women Scale (SVAWS) instrument and 10 item WEB Scale	Adherence (viral suppression), retention (medical records)	United States	20	Ever, physical, sexual, psychological
Siemieniuk *et al.* [71]	2013	339	Women only	Cross-sectional	Rich single-item screening question, assessed by interviewer as physical abuse, sexual abuse, emotional abuse, isolation, neglect, intimidation, and/or financial abuse	Uptake (medical records), adherence (viral suppression), retention (medical records)	United States	22	Ever, physical, sexual, psychological
Sullivan *et al.* [69][a]	2015	564	Women only	Cross-sectional	10-item WEB Scale	Adherence (viral suppression)	United States	22	Ever, physical, psychological
Trimble *et al.* [66]	2013	272	Women only	Cross-sectional	46-item SVAWS instrument	Adherence (self-report)	United States	21	Past 12 months, physical, sexual

[a]Authors contacted for raw data on outcomes of interest.

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12 months [59,66]. Although several other articles included measures of recent violence (past 12 months [61,68]; past 5 months [63]), the authors did not conduct analysis using the 'recent violence' data.

Ethical considerations

Quality scores are reported in Table 1. All studies reported informed consent procedures and ethical review. However, Siemieniuk *et al.* [65] and Schafer *et al.* [25] were the only authors to detail specific steps taken by clinicians when women disclosed IPV.

Current antiretroviral therapy use

Five studies measured current ART use. Three studies used self-report of a single question ('are you currently on ART?') to assess ART use at the time of interview [60,63,67]. Two assessed current ART use via clinical data routinely collected in the HIV clinic [59,65].

No individual studies found a statistically significant relationship between IPV and current ART use among women. Siemieniuk *et al.* [65] found that participants who experienced IPV were more likely to report ART non-use, but this association did not reach statistical significance ($P = 0.069$). Kalokhe *et al.* [60] found lower current ART use among 343 male and female cocaine users who had ever experienced IPV ($P = 0.001$), but this finding was not significant among the sub-sample of 175 women. Ramachandran *et al.* [63] found that men and women reporting a history of IPV were less likely to be using ART (66%) than nonabused counterparts (93%, $P = 0.04$), but data were not available among women only. Illangasekare *et al.* [59] found no significant association between experience of lifetime IPV and ART use in a sample of 196 HIV-infected women (risk ratio 0.73, 95% 95% CI 0.39–1.42). Blackstock *et al.* [67] found no significant relationship between lifetime IPV and ART use (risk ratio 1.01, 95% CI 0.88–1.16).

Antiretroviral therapy adherence measured by self-report

Six studies included self-reported measures of ART adherence. Two used the AIDS Clinical Trials Group Questionnaire, which measures good adherence as greater than 90% in the past 3 days and 30 days [61,68]. Trimble *et al.* [66] used an adaptation of the Morisky Medication Adherence Scale, in which good adherence was defined as scores of 7 or higher. Participants in study by Malow *et al.* [62] noted the percentage of time they took medicine as prescribed, with good adherence defined as 95% or greater. Blackstock *et al.* [67] used the Case Adherence Index (CAI), dichotomized into poor adherence (≤ 10) or good adherence (>10). Rose *et al.* [64] asked the patient's physician to rate on a scale of 0–10 how adherent they believed the patient to be, with good adherence assessed as at least 9.

Of the six studies that assessed ART adherence using self-report, three found significant outcomes among women. Trimble *et al.* [66] found that mean adherence scores on the MMAS were significantly lower among women who reported IPV ($M = 5.49$, $SD = 2.06$) than among those without ($M = 6.57$, $SD = 1.57$, $P < 0.001$). Using a dichotomous outcome, this translated to lower odds of good adherence among women reporting IPV (OR 0.28, 95% CI 0.17–0.47). Rose *et al.* [64] found poorer adherence among women with IPV as measured by the continuous outcome of physician-reported scale ($r = -0.38$, $P < 0.05$). As a dichotomous outcome, women with IPV had lower odds of good adherence (OR 0.15, 95% CI 0.03–0.70). Blackstock *et al.* [67] found that self-reported adherence was significantly worse among women who reported IPV (risk ratio 0.74, 95% CI 0.72–0.88). Lopez *et al.* [61] found that among women, 'extreme IPV' (e.g. use of a weapon) was associated with decreased adherence as a continuous variable ($r = -0.26$, $P = 0.026$). When using 'any IPV' as the exposure of interest, Lopez *et al.* [61] did not find a significant difference (OR 0.45, 95% CI 0.15–1.29). Ryerson Espino *et al.* [68] did not find a significant association, with a similar proportion of women reporting good adherence with (36.1%) and without IPV (40.0%). Malow *et al.* [62] did not find a significant direct association between IPV and nonadherence, but when using structural equation modelling, did find that partner conflict led to depression, which in turn was related to nonadherence.

Antiretroviral therapy adherence measured by viral load

Seven studies assessed adherence using patient medical records of viral load suppression. Dichotomized outcomes for viral load suppression used the clinically relevant cut-off at the time of study: 500 copies/ml [65], 400 copies/ml [59] and 200 copies/ml [64,67–70].

Of the seven studies measuring viral load suppression, three found a significant association with IPV. Siemieniuk *et al.* [65] found that women experiencing IPV were more likely to have viral loads greater than 500 copies/ml than IPV-negative counterparts ($P = 0.027$). Rose *et al.* [64] also found a significant association, with the frequency of IPV related to increased HIV viral load ($r = 0.44$, $P < 0.01$). Ryerson Espino *et al.* [68] found viral load suppression significantly lower among women reporting IPV (76.4%) than their counterparts (93.3%, $X^2 = 4.01$ $P < 0.05$). Illangasekare *et al.* [59] found no significant association between viral load of more than 400 copies/ml among those with IPV (59.6%) or without IPV (61.8%). ORs reported in studies by Blank *et al.* [70], Schafer *et al.* [25] and Sullivan *et al.* [69] were nonsignificant [(OR 1.05, 95% CI 0.65–1.70); (OR 1.14, 95% CI 0.42–3.07); (OR 0.72, 95% CI 0.47–1.10), respectively].

Retention in HIV care

Five studies measured retention in HIV care. Blackstock *et al.* [67] and Blank *et al.* [70] defined retention by any

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self-reported HIV medical care in the past 6 months. Kalokhe *et al.* [60] used self-report and asked participants 'In the past 12 months have you gone to a doctor or clinic for HIV care?'. Siemieniuk *et al.* [65] used patient medical records and defined poor retention in care as ever having had an interruption in clinical care greater than 365 days. Schafer *et al.* [25] classified patients as having a high clinic no show rate (NSR ≥33% missed visits) and low NSR (<33% missed visits). Because these retention measures have important conceptual differences, they were deemed too heterogeneous to lend this outcome to meta-analysis.

Siemieniuk *et al.* [65] found that interruptions in clinical care were more common among women with a history of IPV (20.4 vs. 11.9%, $P = 0.032$). Kalokhe *et al.* [60] found that IPV positive participants were more likely to be out of care in the past 12 months (29.4 vs. 18.8%, $P = 0.01$). Neither Blackstock *et al.* [67] nor Blank *et al.* [70] found a significant relationship between IPV and any self-reported medical care in the past 6 months (OR 0.92, 95% CI 0.68–1.24). Schafer found no significant relationship between IPV and a high no show rate among women (OR = 1.11 (0.27–4.60) [25].

Meta-analysis of engagement in care outcomes

A meta-analysis suggests that IPV is associated significantly with lower odds of current ART use (Fig. 2; OR 0.79, 95% CI 0.64–0.97). However, as the extant literature shows heterogeneity ($I^2 = 68.9\%$, $P = 0.012$), this finding should be interpreted cautiously.

The meta-analytical association suggests that IPV is associated with lower odds of self-reported adherence (Fig. 3; OR 0.48, 95% CI 0.30–0.75). Self-reported adherence also shows significant heterogeneity ($I^2 = 56.0\%$, $P = 0.044$). To compare this outcome with other studies, the OR was transformed into an effect size (standardized mean difference $d = -0.404$).

There is a significant meta-analytic association between IPV and worsened viral load suppression (Fig. 4; OR 0.64, 95% CI 0.46–0.90), with an acceptable level of agreement across studies ($I^2 = 41.2\%$, $P = 0.116$).

All meta-analyses were visually inspected for potential publication bias through funnel plots and Egger's test for small-study effects. There was no evidence of publication bias for current ART use (Fig. S1, http://links.lww.com/QAD/A763; $P = 0.486$), self-reported adherence (Fig. S2, http://links.lww.com/QAD/A763; $P = 0.859$) or viral suppression (Fig. S3, http://links.lww.com/QAD/A763; $P = 0.176$).

Discussion

Uptake and adherence to ART is a key pathway through which IPV may negatively influence HIV-related health of women globally. A meta-analysis suggests that IPV reduces the odds of ART adherence among women, a

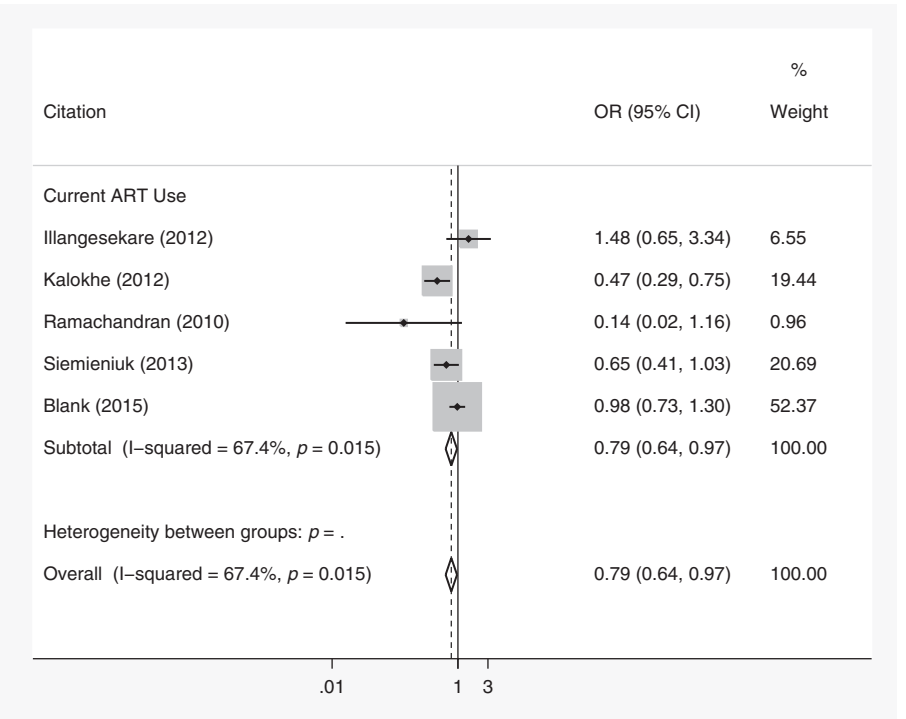


Fig. 2. Meta-analysis of the association between intimate partner violence and current antiretroviral therapy use. CI, confidence interval; OR, odds ratio.

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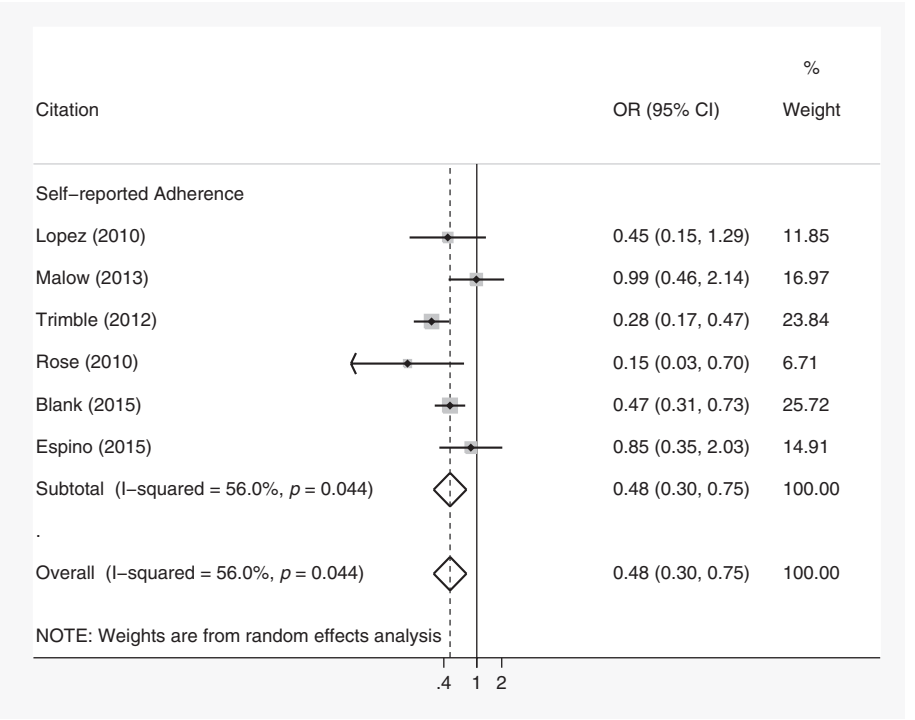


Fig. 3. Meta-analysis of the association between intimate partner violence and self-reported antiretroviral therapy adherence. CI, confidence interval; OR, odds ratio.

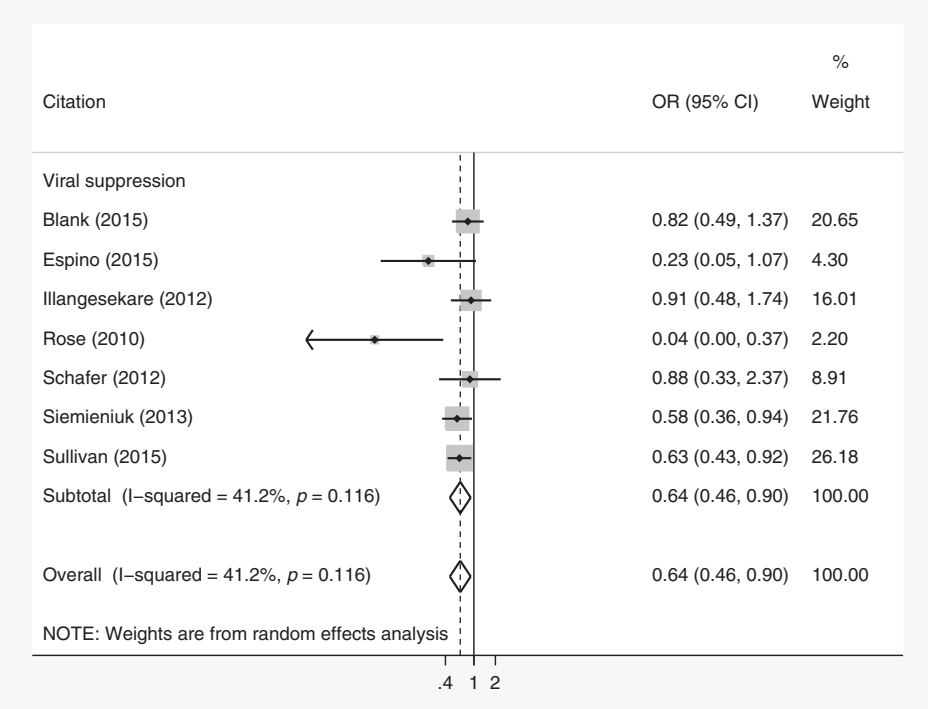


Fig. 4. Meta-analysis of the association between intimate partner violence and viral load suppression. CI, confidence interval; OR, odds ratio.

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finding that is consistent when adherence is measured by self-report (OR 0.48, 95% CI 0.30–0.75) or viral load suppression (OR 0.64, 95% CI 0.46–0.90). Adherence offers a potential explanation for why IPV has been linked to worsened clinical outcomes among HIV-positive women [25–28]. The meta-analytic effect size suggests that IPV exhibits a greater magnitude of association with ART adherence ($d = -0.404$) than other conditions such as depression, substance use, stigma, financial constraints, lack of social support, or pill burden [72].

The causal pathway between IPV and engagement in HIV care and treatment is supported by related trauma literature. Mugavero *et al.* [73] found that each additional episode of lifetime trauma was related to nonadherence even when controlling for depression, substance use and race. Cohen *et al.* [74] found that a history of any type of physical or sexual abuse (including in childhood) increased the odds of women declining HAART when medically eligible. These and other studies [73–80] were excluded from this systematic review because they analysed IPV alongside other forms of violence (e.g. childhood sexual abuse, nonpartner violence). Although such an approach may be useful conceptually, it will be crucial for future studies to prioritize measurement of IPV as a stand-alone construct.

The current evidence base on IPV and HIV care has several important gaps. Nearly all studies were conducted in the United States, limiting translation to other settings globally. This geographic skew, though consistent with broader IPV literature [81,82], warrants urgent attention, as both HIV and IPV prevalence are high in regions such as sub-Saharan Africa [83,84]. The few sub-Saharan African studies that do examine IPV among HIV-positive patients draw from couples who jointly take part in research and may come from relationships that are distinct from 'normal' HIV-positive patients [85,86].

Measures for retention in HIV care were too disparate to be analysed systematically. This shortcoming is suggestive of weaknesses in conceptualization of HIV care retention, which continues to lack a 'gold standard' measurement method [87]. We also found a lack of harmonization regarding the measurement of IPV, with comprehensive, validated measures employed in only three studies [60,61,66]. As behaviourally specific assessment of IPV helps elucidate the connections between violence and health outcomes [88], future research should employ comprehensive measures of IPV [89].

Another gap relates to the clinical nature of responding to violence disclosure in the research setting. Only two authors detailed specific steps taken by clinicians when women disclosed IPV [25,65]. This represents a significant oversight given the well established guidance around how to conduct IPV research in a clinically meaningful and ethically responsible way [90,91].

A final research gap is the extant focus on the 'general population' of HIV-positive patients. It is possible that the association between violence and HIV-related outcomes may be distinct among other special populations (e.g. adolescents, pregnant women, men who have sex with men, sex workers) and these subgroups deserve attention in future research.

Limitations

There are several limitations of the current systematic review that should inform interpretation of findings. We focused the systematic review on HIV-positive women, but such a conceptualization should be followed by future work to understand IPV towards HIV-positive men. Literature included [60,61,63] and excluded [92–95] from this review illustrates that HIV-positive men experience challenges to engagement in care on par or in excess to those of women.

Articles selected for final review have important limitations around comparability, given the variety of populations and sampling strategies used across the studies. There were no longitudinal studies included in this review, which suggests that meta-analytic findings can be viewed as a correlation, but that IPV and engagement in care may not be causally related. Databases used may have inadvertently limited the search, although we attempted to compensate for this shortcoming by reviewing all citations included in the final set of full articles assessed ($n = 67$). Interrater reliability was not formally assessed with regard to the selection of articles, but a third colleague was consulted to review any discrepancies in the inclusion/exclusion process.

Conclusion

In order to ensure HIV-related health among women, it is essential to address conditions that impact their ability to uptake and stay engaged in care and treatment. IPV is one such condition, and its association with declines in ART adherence requires urgent attention. Policy makers and programmers are beginning to recognize the central role that violence plays in the lives of women living with HIV [96,97]. Yet, despite calls for violence screening and intervention within HIV care and treatment programs, few HIV clinics have IPV-specific protocols in place [98]. HIV care and treatment programmes can draw upon existing guidelines for screening and responding to IPV in the health sector [91,99], or can look to a growing number of specialist programmes that address IPV alongside HIV [100–103]. To ensure that women benefit from medical advances, future studies should develop and test interventions to address IPV within HIV clinical care.

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Conflicts of interest

We declare no conflicts of interest.

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Research article

Bidirectional links between HIV and intimate partner violence in pregnancy: implications for prevention of mother-to-child transmission

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Abstract

Introduction: Prevention of mother-to-child transmission (PMTCT) has the potential to eliminate new HIV infections among infants. Yet in many parts of sub-Saharan Africa, PMTCT coverage remains low, leading to unacceptably high rates of morbidity among mothers and new infections among infants. Intimate partner violence (IPV) may be a structural driver of poor PMTCT uptake, but has received little attention in the literature to date.

Methods: We conducted qualitative research in three Johannesburg antenatal clinics to understand the links between IPV and HIV-related health of pregnant women. We held focus group discussions with pregnant women ($n = 13$) alongside qualitative interviews with health care providers ($n = 10$), district health managers ($n = 10$) and pregnant abused women ($n = 5$). Data were analysed in Nvivo10 using a team-based approach to thematic coding.

Findings: We found qualitative evidence of strong bidirectional links between IPV and HIV among pregnant women. HIV diagnosis during pregnancy, and subsequent partner disclosure, were noted as a common trigger of IPV. Disclosure leads to violence because it causes relationship conflict, usually related to perceived infidelity and the notion that women are ''bringing'' the disease into the relationship. IPV worsened HIV-related health through poor PMTCT adherence, since taking medication or accessing health services might unintentionally alert male partners of the women's HIV status. IPV also impacted on HIV-related health via mental health, as women described feeling depressed and anxious due to the violence. IPV led to secondary HIV risk as women experienced forced sex, often with little power to negotiate condom use. Pregnant women described staying silent about condom negotiation in order to stay physically safe during pregnancy.

Conclusions: IPV is a crucial issue in the lives of pregnant women and has bidirectional links with HIV-related health. IPV may worsen access to PMTCT and secondary prevention behaviours, thereby posing a risk of secondary transmission. IPV should be urgently addressed in antenatal care settings to improve uptake of PMTCT and ensure that goals of maternal and child health are met in sub-Saharan African settings.

Keywords: HIV; prevention of mother-to-child transmission; intimate partner violence; pregnancy; adherence.

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Introduction

Prevention of mother-to-child transmission (PMTCT) has reduced new infant HIV infections from an estimated 32% in the absence of treatment [1,2], to as low as 1% [3,4]. However, major gaps in achieving PMTCT coverage remain. In 21 priority African countries, PMTCT coverage is estimated to be 65% [5]. A recent meta-analysis in low- and middle-income settings suggests that while 75% of pregnant women adhere to antiretroviral therapy (ART) during pregnancy, only 53% maintain adequate adherence levels in the postpartum period [6]. Ensuring PMTCT adherence is crucial, particularly as countries increasingly move towards ''Option B+,'' a policy that offers immediate, lifelong treatment for pregnant women living with HIV [7].

Many structural drivers influence PMTCT uptake and adherence. The literature has noted that structural factors such as stigma [8–13], poverty [11] and transport costs [10] inhibit women's ability to adhere to PMTCT. Another key structural factor shaping access and adherence to PMTCT may be intimate partner violence (IPV). Fear and experience of IPV influence pregnant women's decisions to take up HIV services [14,15], and anticipated violence is associated with declines in HIV testing among pregnant women [12,16–22]. A history of physical or sexual violence decreases the likelihood of HIV-positive women using ART when medically eligible [23,24], and those who experience abuse are more likely to miss clinic visits and delay linkage to care [25].

Little research to date has explored the association between IPV and PMTCT. In one qualitative study in South Africa, IPV was described as a common barrier to ART adherence in pregnancy [11]. Healthy intimate partner relationships improve PMTCT uptake: male involvement in antenatal care

predicted better adherence to nevirapine in one South African study [26]; male antenatal attendance halved the risk of MTCT in a Kenyan study, an association that persisted after controlling for maternal viral loads [27].

Using qualitative research methodology, we explored IPV as a potential structural driver of HIV-related health among pregnant women. This research aimed to contribute to literature suggesting that structural drivers shape the health and well-being of those already living with HIV, and may pose barriers to uptake of proven prevention strategies.

Methods

We conducted qualitative research to explore the links between IPV and HIV-related health among pregnant women and service providers in Johannesburg, South Africa. This research was a portion of a larger formative study, intended to help our team design an intervention to address IPV in pregnancy. In this setting, an estimated 29% of pregnant women are HIV positive [28] and between 25 and 35% experience physical or sexual IPV in the 12 months leading up to pregnancy [29–32].

Conceptual framework

To explore the relationship between IPV and HIV-related health of pregnant women, we used an adapted socio-ecological conceptual framework (Figure 1), which posits that broader structural factors and relationship characteristics influence a woman's HIV-related health [33]. This type of approach has been embraced by social scientists, who note that broader social and societal factors shape how women are able to adhere to ART [34] and the extent to which they experience IPV [35]. A socio-ecological framework highlights that the structural context influences the conditions and health outcomes of both IPV and HIV.

Data collection

We conducted an exploratory qualitative study using in-depth interviews (IDIs) and focus group discussions (FGDs) with a wide range of stakeholders with the potential to take part in, deliver, or scale-up an intervention for violence in pregnancy. Participants included pregnant women, pregnant women experiencing IPV, health workers, non-governmental organizations, community leaders and policy makers (Table 1).

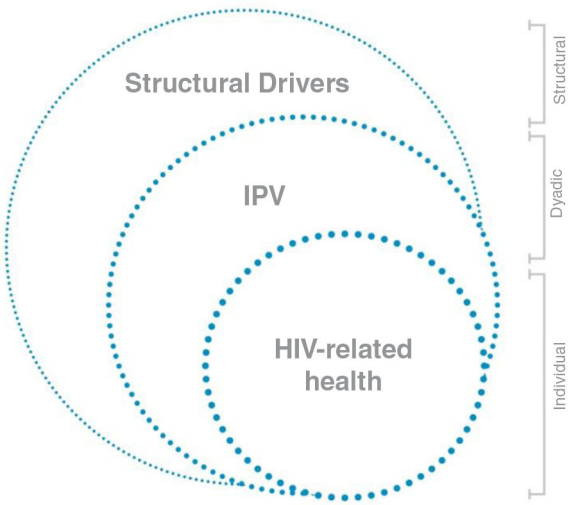


Figure 1. Conceptual framework.

Pregnant women seeking antenatal care from two antenatal clinics were recruited for four FGDs (a total of $n = 13$ women participated). Women were given group information about the study while they waited in queue for a clinic appointment. All FGDs were conducted in a private room in the clinic, led by trained moderators who were the same sex as participants and fluent in multiple local languages (Sotho, Zulu, Tswana). Semi-structured discussion guides explored several topics (Table 1). Discussions were audio-recorded after obtaining participants' permission and signing an informed consent form. The discussion groups lasted for about 1 hour and 30 minutes, and women were reimbursed R50 (US $6). Because of the nature of focus groups, additional confidentiality measures were implemented: during the informed consent process, researchers explained that questions about women's individual experiences of violence or HIV would not be asked, but rather the discussion would address the issue as observed in the community.

Pregnant women who were experiencing IPV were identified during the FGDs. Trained researchers explained that those women who had personal experience of IPV and were interested in participating in IDIs could approach the research team outside of the information giving session and privately indicate their interest in taking part in an interview. The interviews ($n = 5$) took place in a private room at the clinics while the pregnant women were still waiting to be seen by clinic staff. As shown in Table 1, the topics explored through structured interview guides were more focused on IPV-related help seeking and the relationship between IPV and HIV. On average, these interviews lasted about 60 minutes.

In depth interviews with *Other Key Stakeholders* were led by the research team and covered similar topics. This group comprised policy makers ($n = 10$), health workers ($n = 8$), non-governmental organizations ($n = 6$) and community-based organizations ($n = 4$). Stakeholder interviews focused on service provision and asked questions about available resources for women experiencing IPV. Some anecdotes of cases were shared, but this was not the main rationale for these interviews.

Several steps were taken to ensure confidentiality and provide additional support for participants during the research. In keeping with ethical considerations of researching IPV in pregnancy, all researches were conducted based on the World Health Organization's guidance on ethical and safety considerations in researching violence against women [36]. Study staff were trained to describe research as the ''social barriers'' to use health services in the community, so as to reduce any undue risk associated with participating in a violence-related study. All participants were offered an information sheet containing contact information of local resources (counselling, legal advice and health care). Given the high prevalence of IPV in South Africa, it was likely that participants in categories other than ''pregnant and experiencing IPV'' category had experienced or witnessed IPV. If any individual demonstrated a need for additional assistance, that individual was offered an opportunity to speak to someone

Table 1. Data collection methods

Participant group	Group size	Method	Sampling	Example participants	Topics
Pregnant women at ANC	$n = 13$ women in 4 FGDs	Focus group discussions	Convenience	–	Social and structural drivers of IPV; types of IPV in pregnancy; patterns of help seeking and available community resources for violence and HIV; barriers to disclosing IPV; receptivity to an antenatal intervention
Pregnant abused women	$n = 5$	Semi-structured interviews	Convenience	–	Existing needs and concerns of abused women; patterns of help seeking and available community resources for violence; links between IPV and HIV; receptivity to an antenatal intervention
Policy makers	$n = 10$	Semi-structured interviews	Purposive	Department of Health managers, academic experts	Types of IPV in pregnancy; current health sector response to IPV; potential integration with HIV activities, including PMTCT
Health providers	$n = 8$	Semi-structured interviews	Purposive	Doctors, nurses, lay counsellors in antenatal clinics	Types of IPV in pregnancy; knowledge and practice responding to IPV; receptivity of health workers to antenatal intervention; existing capacity in clinic
Non-governmental organizations	$n = 6$	Semi-structured interviews	Purposive	Shelters, police, counselling services	Psycho-social, legal and other needs of abused women; referral options for women living with IPV
Community leaders	$n = 4$	Semi-structured interviews	Convenience	Pastors, neighbourhood representatives, traditional healer	Community factors that support or prevent women from seeking IPV assistance during pregnancy

about his or her experience of IPV, and given referrals to organizations that could assist him or her. However, no participants asked for this referral during the course of the formative research.

All participation in this formative research was sought on the basis of informed consent and good clinical practice guidelines. Ethics approval was obtained by the World Health Organization (WHO A65780) and University of the Witwatersrand (HREC M110832).

Data analysis

The interview and FGD data were transcribed verbatim in the language in which they were conducted and, as necessary, translated from the local language (Sotho, Zulu, Tswana) into English by professional translators. To ensure accurate translation, each transcript was reviewed by a researcher, and queries were resolved through discussions among the researchers via phone or email. All identifying information about the participant or clinic setting was removed and transcripts were saved by a file name with no personal details.

Data were managed in QSR Nvivo 10, a qualitative analysis software package, following a two-day qualitative management and analysis training of the research team. Members of the research team collaboratively built an analytical framework of broad codes by creating a ''start list'' of possible themes and building upon the research questions. Each broad code, or wide thematic basket of ideas [37], was applied to each transcript by two researchers using NVivo. The research team then held a series of meetings to collectively develop ''fine codes'' using an inductive approach – deriving meaning from the data itself rather than imposing pre-formed ideas [38]. Fine codes were developed by printing out a full set of excerpts (from each database) related to each code and identifying sub-themes emerging from the data.

Results

We found qualitative evidence of strong bidirectional links between IPV and HIV among pregnant women. Here, we present a conceptual framework (Figure 2) for understanding the ways in which IPV is related to HIV-related health of pregnant women.

Pathway 1: HIV diagnosis leads to IPV via partner disclosure

HIV diagnosis during pregnancy was noted to be a trigger of IPV. One pregnant woman described how severe violence began following disclosure of her HIV-positive status during pregnancy:

> He started telling me things, hurting me emotionally, telling me that I'm a fool, and stupid, I'm an idiot. And then he strangled me, That's when it started . . . Maybe it's pregnancy, I don't know. I told him that I am HIV positive, so I don't know if that's what made him to do all these things. – Pregnant abused woman 1

HIV may lead to violence because it causes relationship conflict during the disclosure process. Usually, the conflict is

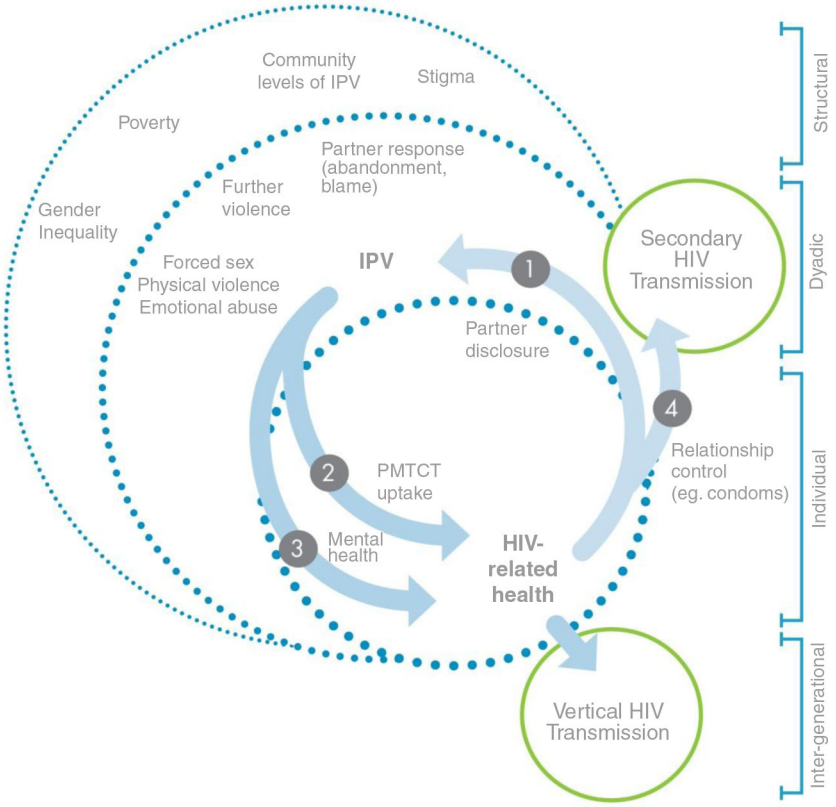


Figure 2. IPV and HIV-related health among pregnant women.

related to perceived infidelity and blaming women for ''bringing'' the disease into the relationship:

> Yes, if you're HIV positive, you start blaming each other. Because maybe the husband will be saying the wife brought it. So sometime, there's a connection [between HIV and violence] because you end up blaming each other. – Pregnant woman, FGD 3

Because HIV testing is coupled with antenatal care, women often learn of their HIV status in a clinic during access to health care during pregnancy. Within this health care context, women bear the brunt of disclosure to partners, who tend to use women's status as a ''proxy'' for their own.

In addition to physical violence, pregnant women described experiencing emotional abuse and abandonment following disclosure of HIV to a partner:

> I have a sister, she was pregnant, . . . then she came to be tested. When she tested she found out she is positive, and when she told her boyfriend everything turned around. And there was violence at home. He started coming late and when she started asking for things for her and the baby, he started to react badly up until he ended up leaving her. – Pregnant woman, FGD 2

Within a context where women fear violence, blame and abandonment, it is perhaps not surprising that many pregnant women chose not to disclose their HIV status to partners. Several pregnant women spoke about the fear of partner disclosure when women live in violent relationships:

> Women who are in this abusive relationship, they do get HIV and they are scared what their partner will say. – Pregnant abused woman 1

Health workers talked about how women in violent relationships would be hesitant to disclose their status to partners:

> When you counsel them . . . after they have tested positive and when you have to issue the treatment she'll be saying, 'I am not going to disclose. I mustn't take this, I must hide it'. Then you find out is it a problem for her to disclose because there's some emotional abuse or physical abuse from the partner. – Female Health Worker 4

Thus, fear of partner disclosure may be an early warning sign that pregnant women are in violent or unsupportive relationships and require additional assistance during antenatal care.

Pathway 2: IPV worsens HIV-related health via non-adherence

For women in violent relationships, adherence to PMTCT services was challenging, since taking medication or accessing health services might unintentionally alert male partners of their HIV status.

Health workers noted that non-adherence also served as warning sign that HIV-positive patients were in a violent relationship:

> It was the very same patient that you had told she was HIV positive that was scared to go and disclose to their partner. It is the very same patient that will default on their medication because their partner does not know that they are taking the medication. – Policy Maker 9

In the antenatal clinic, an HIV diagnosis in the context of living with violence may cause patients to default on clinic visits:

> But in your normal facility it is a bit difficult to avoid losing patients. I think we do. Especially the mere fact that you say to a patient, ''you are HIV positive.'' And this is a patient who is facing domestic violence! Some will just disappear. – Policy maker 3

Thus, the fear of being identified by a male partner as being HIV positive may preclude women from returning to clinic services that are essential for their health. While no participants mentioned this directly, it is important to note that non-adherence to PMTCT regimens greatly increases the risk that pregnant or breastfeeding women will transmit HIV to the infant.

Pathway 3: IPV worsens HIV-related health via mental health

Declines in mental health were noted in women experiencing IPV in pregnancy. In response to persistent violent relationships, women described internalizing the abuse and assuming that they had done something wrong to deserve it:

> He used to beat her while she was pregnant. She just accepted it, and sometime she'd blame herself. Saying maybe I'm the one who's wrong that's why he's beating me. – Pregnant woman, FGD 1

Although IPV is associated with common mental health disorders in pregnancy, few patients or providers recognized these as having clinical implications. Most health providers equated mental health to severe cases of psychopathology and said they rarely encountered mental health disorders. For example, one health worker only considered mental health in relation to bipolar depression and pharmacologically treated patients:

> Mental health, yes, I remember we've had three that we already on treatment, and will tell you, I have a bipolar patient. – Health worker 8

We found that health workers often fail to notice the mental health dynamics of IPV in pregnancy, choosing instead to focus on physical health sequelae of pregnancy. For example, one health provider was asked about stress related to IPV, but responded only in terms of how stress impacts hypertension while ignoring the relevant impact on a woman's mental health:

> Stress is one of the predisposing factors to the development of hypertension. So it is still there, this stress, but as a predisposing factor. Sometimes because of the pregnancy itself, you can develop hypertension of pregnancy. – Health worker 6

This tendency towards equating mental health with severe illness may be related to the lack of capacity within South Africa's public health system. As one policy maker explained, in overlooking mental health issues, current health systems make it unlikely that patients will receive the crucial support that they require:

> No one has time for mental health because there are so many other crises in the health system that need to be addressed, that are much more manifested. So that means that things like depressive disorder or mental health disorders, they're not addressed – including partner depression, mental health and abuse and all of that. And people are not really encouraged to go and get support that they require. – Policy Maker 9

The notion of overlooking mental health is illustrated in an interview with one pregnant, abused woman when she described severe physical violence as leading to a state of being ''a little depressed'':

> Interviewer (I): Are you enjoying your pregnancy so far?
> Participant (P): Being honest, a little depressed but I'm enjoying it.
> I: Ok, so the depression is from what, if I may ask?
> P: From the father of the baby. We are having problems.
> I: What did he do, if you don't mind telling me.
> P: He strangled me and then he let his cousin beat me up. – Pregnant abused woman 1

Not everyone in our sample ignored the impact of mental health on a woman's health and wellbeing. For example, poor mental health had concomitant effects on physical health for one HIV-positive participant, who described ''going low'' emotionally because of violence, and thereafter feeling worse physically:

> I'm HIV positive and I'm in this domestic violence. And if you are HIV positive and then you have a partner who is abusing you emotionally ... or physically hits you, people can't talk. Maybe you can go low, maybe you can go sick. – Pregnant abused woman 3

Pathway 4: IPV leads to secondary HIV risk via lack of relationship control

IPV led to secondary HIV risk when women were in relationships with forced sex or without power to negotiate condom use.

> When we are in relationships where our partner is abusive, sometimes we can't even negotiate things like using the condom. Let's say, for instance, you know that your partner is the kind of person that has other girlfriends, but because he uses power over you, you can't negotiate those things. – Pregnant woman, FGD 4

Male partners used their control over the relationship to dictate the terms and timing of sexual activity. In one

instance, a FGD revealed a story about a newly diagnosed HIV-positive woman whose partner insisted that she have sex without condoms:

> There's a friend of mine that was tested alone and she had a lot of problems. The man said, I'm not HIV positive, so I'm not going to test. So the man forced her to sleep with him without a condom. And that man said 'No! Why? We've been sleeping with out a condom, but because today you went to the clinic, you're telling me we've to use a condom?' – Pregnant woman, FGD 1

Pregnant women described balancing risks to physical safety (absence of physical harm to themselves or foetus) with health risks (of onwards HIV transmission to partners). They described making compromises between protecting themselves and the foetus and protecting themselves and partners from sexually transmitted infections:

> If you are not compromising at all and you start saying ''let's use condom,'' he'll start having questions. Some things are better left unsaid, just for the safety part of it. – Pregnant woman, FGD 2

Many preferred staying silent on condom negotiation, in order to stay physically safe during pregnancy.

Discussion

We found that IPV and HIV-related health were connected concerns in the lives of pregnant women in Johannesburg. IPV and HIV seemed to have distinct pathways linking them to one another within the context of pregnancy. The initial HIV disclosure could serve as a trigger for violence in pregnancy. IPV, in turn, worsened HIV-related health through key pathways of lack of adherence and poor mental health. Finally, the experience of IPV led to secondary transmission risk behaviours – both in terms of vertical transmission due to PMTCT non-adherence or secondary transmission due to risky sex.

According to our participants, IPV shapes HIV-related health outcomes among pregnant women primarily because it leads to non-adherence. While the effect of IPV on adherence has been confirmed in small studies in the United States [39–43], this association is yet to be explored among pregnant women. Pregnant and postpartum women are a crucial population within which to understand IPV and adherence, since non-adherence leads not only to morbidity and mortality of the woman but also to risk of onwards HIV transmission to her infant [3,4]. Antenatal care provides a crucial moment to enable adherence, since a pregnant woman accesses the health system routinely and this is when many are first diagnosed with HIV.

Poor adherence among pregnant women may relate to challenges around partner disclosure [44]. In a recent systematic review of PMTCT, partner disclosure was associated with poor PMTCT uptake in a majority of both quantitative (6 of 9) and qualitative (17 of 24) studies [45]. We found that partner disclosure following HIV diagnosis in pregnancy led to enacted or feared violence. This aligns with extant literature, which suggests that fear of new or continued IPV may lead women to avoid disclosure of their status to male partners [11]. In one Nigerian study among HIV-positive pregnant women, the prevalence of IPV was 17% before HIV testing and increased to 63% after testing for HIV and disclosing status [46]. A Zimbabwean study showed that the risk of IPV in pregnancy was greatest among those women testing positive for HIV in antenatal care [47]. Non-disclosure among pregnant women is a health risk in its own right, since it poses a risk for sexual transmission of HIV if the male partner is still HIV negative [48–51] and may have an impact on the implementation of PMTCT [52].

A related but distinct pathway linking IPV to PMTCT uptake may be mental health. A growing body of literature shows that IPV leads to depression and anxiety among pregnant women [29,53,54], yet this link has been largely unexplored in sub-Saharan Africa in HIV-positive populations. Our findings reflect those of a qualitative study in Zambia, in which IPV, mental health and HIV are closely related in the experience of women [55]. Such interrelated ''syndemic'' issues [56] should be explored in future sub-Saharan African studies.

Existing research shows poor mental health has significant impact on ART adherence [57–60] and among pregnant women depressive symptoms are associated with HIV disease progression and mortality [61]. It is possible that IPV is one condition exacerbating the relationship between mental health and HIV outcomes. Indeed, one new study suggests that the link between mental health and ART adherence may be partly driven by partner conflict [62]. Despite high rates of common mental health disorders in antenatal care [63], little screening or treatment exists in South Africa [64]. Mental health will be crucial to address among HIV-positive pregnant women because of its strong relationship to IPV and its association with the uptake of PMTCT regimens [65].

Finally, IPV may worsen secondary prevention behaviours in pregnancy. Non-adherence to PMTCT regimens greatly increases the risk that pregnant or breastfeeding women will transmit HIV to the infant [66], potentially in drug-resistant form [67]. High viral loads related to non-adherence also increase the likelihood of secondary transmission to partners, particularly in the context of unsafe sex. Our research reflects existing knowledge by suggesting that IPV inhibits women's ability to negotiate condoms [68]. These findings explore such dynamics within the context of pregnancy, thereby suggesting a dual risk of mother-to-child infection and secondary transmission risk to a partner.

Our findings echo calls for addressing IPV in pregnancy [69]. Scholars note that antenatal care provides an important ''window of opportunity'' for women who are regularly accessing the health system [70]. Although universal screening is not recommended in settings with limited referral options and overstretched providers [71], some type of IPV assessment, provider training and targeted response may be appropriate for South African antenatal care. Indeed, a comprehensive health response to IPV will likely require either screening or case-finding – both methods that may be acceptable in South African clinics [72,73].

Limitations

The findings of this formative research should be examined in light of several limitations. Firstly, this study is exploratory in

nature, resulting in small sample sizes of each participant group. While analysis suggested that we began to reach saturation through FGDs with pregnant women, the IDIs with pregnant women experiencing IPV were not sufficient to reach thematic saturation [74]. Secondly, the socio-ecological perspective was brought to the data analysis process after data collection. Ideally, this conceptual approach would have informed the entire data collection process, rather than simply guiding the final interpretation of findings. However, since this was a preliminary, exploratory study, it was designed to explore several intersecting issues and we applied the conceptual framework during data analysis. Finally, some of the findings may be applicable for any woman experiencing IPV, and do not necessarily highlight the specific context of pregnancy. Further research should explore the perinatal time-period in detail to determine whether the link between IPV and HIV is somehow distinct during this life stage.

Conclusions

IPV in pregnancy leads to declines in the physical and mental health of pregnant women. Our findings underscore the negative effects of IPV as a health issue in its own right and as a barrier to PMTCT. The connection between IPV and HIV medication adherence among pregnant women has yet to be explored quantitatively in sub-Saharan Africa. In future studies, it would be ideal to find systematic methods for recruiting more robust numbers of pregnant women who experience IPV and who are living with HIV. In the parent study [75], we anticipate that by training health providers to ask about IPV confidentially and skilfully, it may be increasingly possible to reach this crucial population.

Beyond its marked impact on physical and mental health of women, IPV in pregnancy may have important implications for Option B+, as current cost-effectiveness models assume that women are willing and able to achieve 100% adherence [76]. If Option B+ is to be adopted more broadly, the effect of IPV on adherence and mental health should be carefully considered. Addressing the inter-related issues of violence and HIV will be crucial to ensure that goals of maternal and child health are met in the sub-Saharan African region.

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Competing interests
We declare no competing interests.

Authors' contribution
AMH led the data collection, analysis and manuscript preparation. NW and KM contributed to data collection, analysis and manuscript preparation. HS contributed to data analysis and writing. CCP, CM, SDM, HS, NW and CGM designed the study. CGM and CCP obtained the funding. AMH and NW oversaw implementation of the research. All authors have read and approved the final manuscript.

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Mechanisms linking intimate partner violence and prevention of mother-to-child transmission of HIV: A qualitative study in South Africa

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ABSTRACT

Prevention of mother-to-child transmission (PMTCT) can virtually eliminate HIV infection among infants, yet up to one-third of women miss PMTCT steps. Little is known about how partner dynamics such as intimate partner violence (IPV) influence pregnant and postpartum women's adherence to PMTCT. We conducted 32 qualitative interviews with HIV-positive pregnant and postpartum women in Johannesburg who experienced IPV. Trained researchers conducted in-depth interviews over the period of May 2014–Nov 2015 using narrative and social constructionist approaches. Interviews were transcribed verbatim and analyzed thematically and inductively using Dedoose qualitative software. Twenty-six women experienced recent IPV and one-third had poor adherence to PMTCT. Women's experience of partner violence influenced PMTCT behaviors through four pathways. First, fear of partner disclosure led some women to hide their HIV status to avoid a violent reaction. Despite strategic non-disclosure, several maintained good adherence by hiding medication or moving out from their partner's home. Second, IPV caused feelings of depression and anxiety that led to intentionally or accidentally missing medication. Five women stopped treatment altogether, in a type of passive suicidality, hoping to end the distress of IPV. Third, men's controlling behaviors reduced access to friends and family, limiting social support needed for good adherence. Fourth, in a protective pathway, women reported good adherence partly due to their mothering role. The identity around motherhood was used as a coping technique, reminding women that their infant's wellbeing depended on their own health. PMTCT is essential to prevent vertical HIV transmission, but women living with IPV face multiple pathways to non-adherence. Addressing IPV in antenatal care can support the health of women and infants and may enhance PMTCT coverage.
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1. Introduction

Prevention of mother-to-child transmission (PMTCT) interventions have potential to eliminate vertical transmission of HIV from mothers to infants (Mofenson, 2010). Yet, women's adherence to all the steps required for successful PMTCT is often low. Within 21 priority countries, an estimated 65% of eligible pregnant women access HIV treatment (WHO et al., 2013), and pooled analysis suggests that only half of women adhere to treatment postpartum (Nachega et al., 2012). Studies in sub-Saharan Africa suggest that partner relationship factors are among the most important barriers to pregnant women's acceptance of HIV testing and other PMTCT behaviors (Bwirire et al., 2008; Medley et al., 2004; Turan et al., 2011). Intimate partner violence (IPV) may be one important predictor of adherence to HIV medication in pregnancy and postpartum, yet this association has been understudied in the literature to date (Hatcher et al., 2015).

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Among non-pregnant women, IPV victimization is associated with worse HIV-related health outcomes, including higher odds of antiretroviral failure, weaker immune response, increases in opportunistic infections, and greater risk of mortality (Schafer et al., 2012; Weber et al., 2012). A recent meta-analysis showed that women's experience of IPV was associated with 55% lower odds of self-reported adherence and 36% decreased odds of viral suppression (Hatcher et al., 2015). However, of the thirteen included studies, none were based in sub-Saharan Africa or among pregnant women. Since publication of the meta-analysis, only a single study has examined the effect of IPV on adherence in pregnant women. This Zambian study showed that IPV victimization was associated with 74% lower odds of adherence in pregnancy and 89% lower odds of adherence postpartum (Hampanda, 2016). However, the quantitative methods used by this seminal paper preclude a deeper understanding of *how* partner violence alters PMTCT behaviors. This is a crucial dynamic to understand, particularly since many of the same countries in sub-Saharan Africa with the highest rates of mother-to-child transmission also have high prevalence of IPV (Devries et al., 2013).

South Africa is one such sub-Saharan African setting where HIV and IPV are highly prevalent. An estimated 25–35% of South African pregnant women report recent physical and/or sexual IPV (Groves et al., 2012; Hoque et al., 2009). Similarly, antenatal HIV prevalence across South Africa is high, with estimates in Johannesburg reaching 29% (Department of Health, 2012). South Africa has made significant strides towards reducing mother-to-child transmission from 14% in 2009 to an estimated 5% in 2012 (UNAIDS, 2013). Yet, only 54–65% of South African pregnant women and infants complete all recommended PMTCT steps (Stringer et al., 2010; Technau et al., 2014).

Recent qualitative studies have explored the underlying dynamics of IPV among small samples of women living with HIV. Among 8 women reporting violence after HIV disclosure, Colombini *et al.* learned that new HIV diagnosis was a trigger for violence, even in relationships with no prior history of IPV (Colombini et al., 2016). Mulranen *et al.* studied postpartum women living with HIV in Swaziland, of whom 9 reported IPV following disclosure, and learned that violence resulted from acute triggers like HIV status disclosure and also from ongoing marital tensions around fertility (Mulrenan et al., 2015). In a study of pregnant and postpartum HIV-positive women in the United States, Njie-Carr *et al.* found that 3 women with recent violence avoided partner disclosure because they feared a violent reaction (Njie-Carr et al., 2012). Illangesekare *et al.* identified mental health as a primary pathway linking IPV to non-adherence among HIV-positive women reporting lifetime partner violence, of whom 3 were currently living with IPV (Illangasekare et al., 2014). Other qualitative research has broadly explored violence and HIV medication adherence, but not among women who present with both conditions (Hatcher et al., 2014; Zunner et al., 2015).

While extant qualitative literature offers preliminary understanding that perhaps violence and HIV behaviors are linked, samples sizes ranging from 3 to 9 participants rule out the analytical rigor required to understand *why* IPV alters adherence. In-depth, qualitative elucidation of the specific mechanisms linking IPV and HIV adherence is necessary if we are to increase the proportion of women adhering to PMTCT interventions. We conducted in-depth qualitative research with 32 women living with HIV and reporting experience of IPV in Johannesburg, South Africa. The purpose of the research was to explore mechanisms linking these interconnected issues among pregnant and postpartum women.

1.1. Theoretical framework

This research was informed by socio-ecological conceptual framework applied to infant and maternal health (Fig. 1). The socio-ecological model suggests that individual, relationship, and structural factors shape health outcomes (Heise, 1998), and is widely used in IPV research because it incorporates many complex factors that influence partner violence (WHO, 2010).

Within the ecological model, *individual* factors are the personal characteristics or behaviours that impact one's health. Previous literature has suggested that individual factors inhibiting PMTCT uptake include depression (Nachega et al., 2012; Turan et al., 2013), substance use (Nachega et al., 2012), internalized HIV stigma and shame (Turan et al., 2013), and costs associated with clinic attendance (Bwirire et al., 2008). *Partner relationship* factors are the dyadic partnership issues that frame health outcomes. Partner dynamics that worsen PMTCT behaviors include a lack of male involvement in antenatal care (Aluisio et al., 2011), non-disclosure to a partner (Gourlay et al., 2013; Myer, 2011), and threat of further violence (Antelman et al., 2001). The theory of gender and power (Connell, 1985), which postulates that unequal power dynamics limit the ability of women to exercise personal control in relationships (Amaro and Raj, 2000), provides a theoretical underpinning for the associations seen between partner factors and PMTCT uptake. *Structural* factors refer to the broader social or community factors that impact on health. In this sphere, previous studies have noted that PMTCT is adversely impacted by poverty (hIarlaithe et al., 2014), lack of social support (Kirsten et al., 2011), community stigma around HIV (Turan et al., 2011), and weak health systems (Bwirire et al., 2008). A socio-ecological framework recognizes that similar structural factors underpin both violence and HIV (Maman et al., 2000) and that broader social and societal factors shape women's ability to adhere to HIV medication (Hirsch, 2007) and the extent to which they experience IPV (Heise, 1998).

2. Methods

The goal of this qualitative research was to build understanding around why and how IPV influences PMTCT uptake and HIV-related health. This analysis is guided by our formative qualitative research with pregnant women and health providers (Hatcher et al., 2014). The formative research included no women living with both IPV and HIV, but instead asked participants to speculate about the links between violence and PMTCT. As an elucidation of mechanisms requires incorporation of the perspectives and knowledge of women who actually experience these health conditions, we now present data from in-depth interviews with a larger sample of women ($n = 32$), all living with both IPV and HIV.

Qualitative research was nested within a randomised control trial testing an intervention for IPV in pregnancy (Pallitto et al. in press). Called Safe & Sound, the trial recruited 2016 pregnant women from four antenatal clinics in Johannesburg to take part in baseline questionnaires. In the parent trial, women reporting recent (past-year) physical and/or sexual IPV ($n = 421$) were randomised to a nurse-led empowerment counseling intervention or an enhanced control condition. This sub-study purposively selected the sample of 32 participants to take part in qualitative, in-depth interviews between May 2014–November 2015.

The methodology for this study was informed by *narrative, constructionist approaches* to researching IPV (Allen, 2011). The narrative element of this approach posits that discussing IPV experiences with skillful providers can be therapeutically beneficial and that the research process itself serves as a form of reflection for participants (Allen, 2011). *Narrative approaches* to research on violence acknowledge that women's stories help create coherence

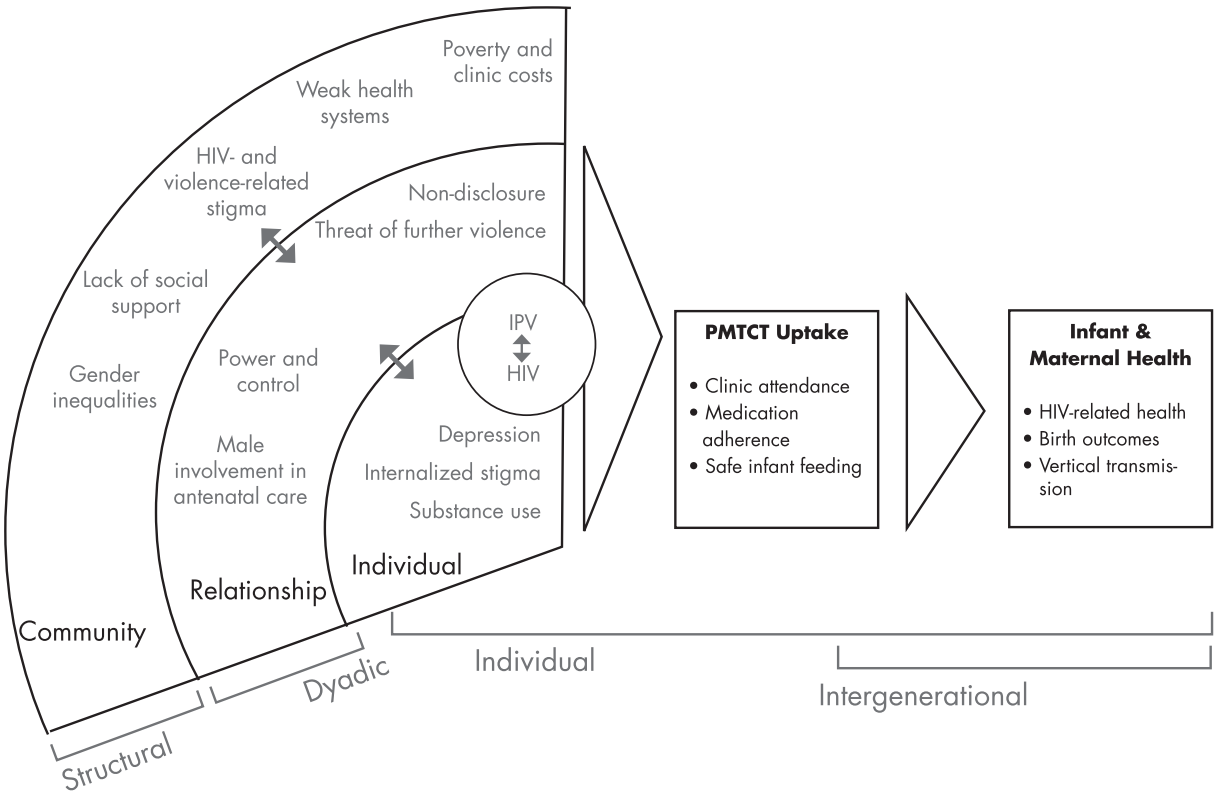


Fig. 1. Socio-ecological framework linking IPV to HIV-related health.

in otherwise chaotic, uncontrollable situations (Williamson, 2010). Narrative approaches use particular techniques during the interview process, such as validation, highlighting resistance strategies, and focusing on meaning and identity (Allen, 2011). The *social constructionist methodology* acknowledges that researchers are part of the research interaction and that their prior knowledge should be brought to light and examined (Charmaz, 2008).

2.1. Participant sampling and recruitment

We conducted qualitative research with 32 participants who were purposively selected from women taking part in baseline Safe & Sound trial questionnaires. Women recruited for this sample were living with HIV and experiencing IPV. In practice, this included women participating in the trial (ie. experiencing recent IPV), as well as women who were not eligible to enroll in the trial, but who had experienced IPV in their lifetime. Both trial and lifetime history participants had already completed a full study baseline questionnaire and agreed to be contacted about further research. Study nurses guided the selection of participants based on their impression of women's willingness to take part in an additional interview, their knowledge of women's experiences of IPV, and women's HIV-positive status.

Initially, the sample size proposed for this qualitative study was 24 participants. Using the constant comparative method to understand the emerging constructs from the data (Charmaz, 2003), we found that upon completion of 18 interviews, theoretical saturation had not yet been reached. Data on our initial research question around links between violence and PMTCT lacked richness and women's stories failed to converge around specific pathways. We thus expanded the sample to reach 32 women using theoretical sampling to include additional women with recent IPV experiences. Theoretical sampling is a technique for using preliminary analysis to guide how data are collected further (Glaser, 1992). In this case, our initial analysis suggested that links between violence and PMTCT are best explored among participants with recent violence and with some challenges adhering to PMTCT behaviors. Displaying "challenges" with PMTCT was therefore used as a selection criteria for the next 14 participants. Additional women with these characteristics allowed us to further refine emergent concepts and test out initial impressions of the data with a more targeted group of participants.

Trained nurse researchers invited women to participate through follow-up phone calls using locator information. All participants contacted for this sub-study were reachable by phone, with 7 women refusing to take part (due to living outside the province, work commitments, or not desiring to take part in additional research). Male partners were never informed about a woman's participation in the research because of the potential for an abusive partner to react violently. To protect participants and reduce the risk that partners would overhear the conversation, nurses were trained to ask "is this a safe time to speak?" before continuing. A full distress protocol included appropriate researcher responses in cases of violence disclosure, psychological distress, high emotionality, or a need for referrals. Basic elements of the distress protocol were employed during most interviews included in this study: a calm, non-judgmental approach to inquiry; watching for signs of resistance when inquiring about violence to avoid re-traumatisation; offering tissues if participants cried; offering a break from the interview. In cases of severe distress, researchers were trained to invite participants to stop the interview, a technique that was used with one participant, and to offer supportive referrals. In the case of current suicidal thinking, researchers were trained to make a direct referral to a psychiatric ward of the nearest hospital. In this sample, no participants revealed current suicidal thinking but several participants recounted a history of suicidal

ideation, for which researchers offered empathetic listening and referrals to a nearby community psychology counseling service.

2.2. Data collection

In-depth interviews were conducted face-to-face, in a private clinic room, at a convenient time for the woman. Interviews were conducted by the lead author and four other trained qualitative researchers. The trained researchers were comprised of two South African, female nurses and two non-South African, female researchers. This composition of the research team helped ensure that some of the positionality challenges associated with language and race were addressed. However, all researchers held positions of relative power compared to participants, a dynamic that was intentionally addressed through training on a humble, inquisitive approach and the ethos among the research team that participants were the 'experts' and researchers were the 'learners'. While this positionality could not be completely eliminated, the rich stories presented by most participants suggests comfort in sharing their stories through the research process.

Interviews were conducted in one of three South African languages (English, Sesotho, isiZulu) and digitally recorded. A semi-structured in-depth interview guide explored three themes: the perceived relationship between IPV and HIV in women's lives; women's perceptions of how violence may influence PMTCT uptake; and, potential mechanisms through which IPV may impact PMTCT-related health behaviors. Interviews lasted between 26 min and 1 h 40 min (median 46 min).

Professional transcriptionists typed verbatim transcripts from the digital recordings. Each transcript was reviewed by a researcher to ensure clarity and for additional detail about tone and non-verbal cues… Interviews conducted in the local language (Sesotho or isiZulu) were translated directly to English and reviewed for translation errors by the researcher who led the interview. All data collection materials were stored in a locked file cabinet and electronic voice files and transcripts were password protected and stored on an encrypted server. At the point of transcription, the lead researcher assigned a pseudonym unrelated to the participant's real name for ease of analysis. The data presented here note the pseudonym, age, and whether the woman was pregnant or postpartum.

2.3. Data analysis

To ensure that interviews achieved adequate depth and richness, the first 6 transcripts were reviewed jointly to establish future questions, points of clarification, and initial themes. Researchers reviewed full transcripts and created detailed 'memos' to highlight initial impressions of the data. This review process was repeated at two other time-points (upon completion of 18 interviews and 28 interviews). Both reviews led to tweaking of the interview guides, with major themes retained but sub-questions altered to enhance probing and clarity. The team developed an initial coding framework based on the preliminary review of 6 transcripts and "sensitizing concepts", or preliminary ideas around how to examine the data (Bowen, 2006).

The coding framework was applied to all transcripts by two researchers using Dedoose qualitative analytic software. The focus of double-coding was to ensure that code application was consistent across transcripts and that code definitions were robust. Rather than assessing inter-rater reliability, the team used a series of phone calls and in-person meetings to refine codes until consensus was reached. This process led to a refined set of thematic codes that comprised broad topics such as relationship characteristics, experience of violence, HIV diagnosis, PMTCT uptake, mental health, social support, partner HIV serostatus disclosure, and reflections on being asked about IPV in pregnancy. Next, the team established a system of fine codes that emerged inductively from the data. Fine codes were applied to a portion of transcripts by three researchers, ensuring that every transcript was double-coded. Examples of fine codes within the partner HIV disclosure section were: fear of partner response, reactive or polarized methods of disclosure, male partner denial of disclosure, concern for the child, supportive steps, displaced anger. During analysis, cases that did not fit the overall picture, called "exceptional cases", were actively sought out. Trustworthiness of findings was ensured by the team approach to data analysis, coding discussion meetings, and by presenting initial findings to groups of colleagues and peers.

2.4. Ethical and safety considerations

All participants provided written, informed consent. The parent trial received approval from the University of the Witwatersrand Human Research Ethics Committee (M121179) and World Health Organization Ethics Research Committee (RPC471). This qualitative substudy received additional secondary analysis approval from University of the Witwatersrand (M140451).

Given the special considerations around researching violence, all portions of this study were designed to adhere to the WHO ethical and safety guidance on IPV research (WHO, 2001). The research was presented broadly so that the specific nature of the study was not made public. Only when the participant and interviewer were alone, during the informed consent process, did the researcher provide further information that the nature of the study involved HIV and IPV. All qualitative researchers were intensively trained. A 30-h technical training alongside weekly mentorship and debriefing by senior team members ensured all researchers had the knowledge and skills required to skillfully handle disclosure of violence (Reynolds, 2007).

3. Results

3.1. Sample characteristics

Of the 32 participants, 26 women reported IPV in pregnancy while 6 reported a prior history of IPV (see characteristics

Table 1
Descriptive statistics of sample (n = 32)

Characteristics	Number or Median	Percentage or IQR[a]
Sociodemographics		
Age	30 years	(26–32)
High school education	10	(31.3%)
Employed	13	(40.6%)
Country of origin		
South Africa	19	(59.4%)
Zimbabwe	12	(37.5%)
Malawi	1	(3.1%)
Relationship characteristics		
Type of violence		
Emotional only	3	(9.4%)
Physical and emotional	24	(75.0%)
Physical, sexual, and emotional	5	(15.6%)
Recent (vs. lifetime)	26	(81.3%)
Living with partner	11	(34.4%)
Partner age	34 years	(31–36)
Length of relationship	4.5 years	(2–5)
HIV-related characteristics		
Pregnant at time of interview	14	(43.8%)
Time since HIV diagnosis	2 years	(1–5)
Non-adherent to ART in pregnancy	12	(37.5%)

[a] IQR: interquartile range; ART: antiretroviral therapy.

summarized in Table 1). The majority of participants (75%) reported physical and emotional violence, with several (16%) reporting physical, sexual, and emotional violence. Twelve participants (38%) reported that they were non-adherent to HIV medication during the time of pregnancy or were not on treatment.

3.2. Links between violence and PMTCT adherence

We learned that four pathways linked women's experience of IPV with their adherence to PMTCT interventions. The first pathway was partner disclosure, with violent relationships framing a decision to hide one's HIV status. Some women were unable to maintain careful PMTCT behaviors without risking disclosure, so they opted to take treatment breaks or stop treatment altogether. A second pathway was mental health, as IPV resulted in depressive views that "life is not worth living" and led to missing doses of medication. A third pathway was partner control and isolation, in which men limited participant access to friends and family, which precluded the social support required for good adherence. In a final, protective pathway, good PMTCT adherence seemed linked to women's identity as mothers, with the wellbeing of the baby framing decisions to stay attentive to medication.

Below, we present each pathway alongside illustrative quotes and case examples of participants. While it may appear that certain women 'belong' primarily to one single pathway, this was certainly not the case within the overall analysis. Participants often related stories that highlighted the complex relationship across the pathways.

3.3. Partner (non) disclosure: hiding HIV from a partner

Of the 16 women who disclosed to partners, many experienced subsequent physical violence ($n = 6$) and emotional violence ($n = 7$) that they directly linked to the disclosure act. Participants recalled incidents of violence that started or worsened immediately following HIV testing. Lulama, who was 30 years old and pregnant with her second child, made a direct link between her HIV status and physical and emotional violence from her partner. The partner consistently blamed Lulama for "giving" him HIV, and would use threats of further physical violence to show his disdain for her status. Thuto, a 25-year-old postpartum participant, explained that the violence in her relationship started when she tested HIV-positive during her first pregnancy. Thereafter, a severe episode of physical violence in her third pregnancy was directly related to her HIV status: "He came back from the *shebeen* [local bar] and said I was a slut, and that's why I came with this disease."

Not all women experienced physical violence after disclosing their HIV status. A tension occurred in Leah's relationship that demonstrates the blurred lines between violence and partner support around HIV. As a 33-year-old pregnant participant, Leah's husband was broadly supportive of her taking medication, because Leah had carefully convinced him that PMTCT can prevent HIV in their infant. Leah's partner would even remind her of her treatment time. Yet, alongside this instrumental support, he was emotionally abusive and would remind her that HIV would lead to her death by stating, "You will die, your children will be alone."

In this context of violent or psychologically harmful reactions, it is perhaps not surprising that 16 women opted to keep their HIV status a secret. Participants described this choice as a reasoned response to a dangerous situation. Six participants feared that their partners would react to disclosure with physical violence. For Simphiwe, a 33-year-old woman who had been with her partner for five years, a history of physical violence led her to keep HIV a secret. Another participant, Kandi, feared physical violence because her partner explicitly stated that he would hurt her should she test HIV-positive.

Fears of partner reaction led some women to be partially non-adherent to their HIV medications. One 32-year-old postpartum participant, Nomsa, described her fear that the father of her first child might murder her or the child as a response to HIV disclosure. Nomsa kept her status hidden by pretending the medication was for pregnancy, rather than for HIV, but admitted it was challenging to keep taking the pills after giving birth. Another participant, Thembi, was 26 years-old and postpartum when she recounted how she chose not to start HIV medication in pregnancy because she was frightened that her partner would be physically violent when she asked him to use a condom. Her (incorrect) understanding of treatment came from antenatal staff who often say that HIV medication must be accompanied by consistent condom use. Since Thembi knew she could not safely use condoms, she chose to avoid HIV medication altogether. Her non-uptake of treatment meant that her infant acquired HIV during the course of the study.

The act of hiding medication and withholding one's status from partners requires considerable foresight and care. Lulama, 30 years and pregnant during the interview, strategically took medication at a time when her husband was away from the house. At 34 years and pregnant, Ayanda changed the container of her HIV medication so that it would appear to be other routine medication. Other women like Mpefe also had to carefully navigate clinic visits and medication:

> *My boyfriend doesn't know about this. I just kept it to myself. So my treatments, when I would come and take my treatments here by the clinic, then I would hide it by my place. Even when I drink my tablets I would hide them. — Mpefe, 25 years, Pregnant*

When Mpefe noticed her partner was nearby, she would forgo treatment altogether. Eventually, Mpefe decided to move out so that she could easily take her treatment without worry that her boyfriend might see.

Similarly, Zama (25 years and pregnant) found it easier to adhere to medication once she moved out from her partner's place. Before she would wait until he fell asleep to take her daily prescription: "It was a little bit tricky because I had to hide the medication. And then at times he would be in the same bedroom where I hide it, so I can't take it." For Sonja, the original response to disclosure was threats of violence and forced eviction from the household. In this context, Sonja, 23-years-old and pregnant, carefully avoided taking medication in front of her partner, worrying that simply seeing the medicine might trigger a violent reaction. One day, her partner snuck up on her in the bathroom and caught her taking the treatment. While the response was not physical violence, her partner disappeared and returned home in an agitated state after a bout of drinking.

A subtler rationale for hiding medication from violent partners was to withhold information from a person who had caused so much pain. For two women, this appeared to be a resistance strategy for proving to themselves that their own health was not within the realm of things men could control. Simphiwe professed that she made up her mind immediately after testing HIV positive, since "he was violent, hitting me and all that stuff. So I decided I'm not going to tell him." Similarly, Zinhile explained "If he was a proper person, then I would tell him that I'm HIV positive, let's go to the hospital together to test. But if he is going to put me at risk, why should I say that?" Zinhile met her partner's lack of care by stubbornly refusing to share anything about HIV with him:

> *I didn't want him to know I have gone to the clinic. I didn't even want him to know what I was doing in my life, in my future, because he didn't want to be close … I didn't even want him to see*

me taking the tablets, because he didn't want to know, he didn't want me. — Zinhile, 38 years, Postpartum

3.4. Mental health: poor adherence as a result of depression and anxiety

Several women related stories of non-adherent periods, many of which resulted from depressive episodes that followed phases of violence. At 24 years, Thuto had recently delivered her fourth child, and explained the tendency to feel despondent particularly after extremely violent episodes or when her husband refused to buy food for the family. Thuto sometimes struggled with staying adherent, and explained that she had given up hope: "Sometimes, when I'm stressed, I feel that its better I also died… I've just lost hope." Zama expressed a concern that her infant would test HIV-positive, since she herself had experienced adherence struggles. Similar to several other participants, Zama disclosed a desire to "end everything" as a method to reduce the distress she was feeling about the violent relationship:

When I was three months pregnant, that is when it started changing to being physical [*violence*]. *At times I would just feel like ending everything, the stress and all that… I am very much worried about my baby being positive, especially with the fact that I was not able to take my medication as frequently as I was supposed to. —Zama, 25 years, Pregnant*

Ayanda's partner had been physically abusive the night before the interview. She described the physical violence alongside the overwhelming nature of coping with frequent abusive episodes and anticipating the arrival of a new baby. The stress related to the violence was a concern because Ayanda realised how episodes of IPV took priority over remembering to take her medication:

You know what bothers me sometimes? That when he makes this thing [*violence*], *I may forget to drink my medication. Then maybe I will just default* [*not comply with HIV visits and medications*]. *And what worries me is that I will default when I'm breastfeeding the child. —Ayanda, 34 years, Pregnant*

This notion of "forgetting" to take medication is perhaps more linked to how women are able to cope with various life challenges. When violence is more of a concern, or more 'top of mind', than HIV-related concerns, women may forgo the steps required for good HIV care. This finding denotes how subtle mental health considerations, like being too cognitively overwhelmed by the violence, may influence PMTCT uptake.

Six women described periods of stopping treatment altogether due to depressive and suicidal feelings. The underlying emotion of stopping treatment for these women was a desire to end their lives. One participant, Dova, named it a "death wish" and recounted the overwhelming feelings of hopelessness and failure that had led her to stop taking HIV treatment:

There was a time when I was really, really down, so I stopped taking my medication. I completely just stopped and I sort of had this death wish in me that if only this thing would, if HIV would work like really for us then it would just kill me. I stopped for three to four months without taking my medication. — Dova, 32 years, Pregnant

Another participant, Dintle, had tried to commit suicide by drinking poison several weeks prior to the interview. Her husband had been extremely violent, hitting her in front of the neighbours, withholding food, and publicly shaming her. She explained in subtle terms (such as "stress" and "feeling bad") how her recent suicidal experience and anxiety symptoms would cause her to forgo treatment for periods of time:

Participant (P): Sometimes I forget to take my treatment. It happened two months ago. I had pills, but I just forgot dates to go fetch my treatment.

Researcher (R): What led you to forget?

P: Stress, I am always thinking.

I: What were you thinking?

P: I was thinking about the time he threatened me. I just end up thinking about too many things. By the time I remember it is too late, my days have passed. — Dintle, 30 years, Postpartum

For Dintle, stopping treatment was a by-product of experiencing intense episodes of violence and concomitant mental health challenges. This suggests that in cases of severe depression, HIV treatment non-adherence can be both a mode of self-harm and a result of being overwhelmed at times of high distress.

3.5. Isolation and partner control: the hidden nature of IPV and HIV

In this sample, there were only a few examples of partners directly controlling the health of women through barring access to clinics or medication. At 38 years and postpartum, Zinhile feared blame associated with having HIV, but not necessarily a violent reprisal. Even still, the controlling behaviors her partner exhibited against the backdrop of physical and sexual violence meant that Zinhile would surreptitiously visit the clinic.

Yet, partner control did not always lead to poor adherence. For example, Kagiso's partner was suspicious when she went to the clinic, assuming she was cheating on him. At times, he would physically abuse her when she came home from the clinic, presuming she was unfaithful during her times away from home, but she described a stubborn dedication to continue seeking medical treatment:

Sometimes when I go to the clinic he say hey you are not going to the clinic. He asked me too many questions … But I refuse. I tell him I can't stop going to clinic because this is my life! I have children. I have to live to take care of my babies. Sometimes when I come back to the house he beats me, accusing that I'm not coming from the clinic. —Kagiso, 28 years, Postpartum

For many women, violent partners did not actively bar access to clinics, but indirectly used isolation as a type of partner control. One example is found in Lulama's story about how returning from a normal day would often result in questions and threats: "He is always looking at what I do and wants to know what I get up to. He controls my life, he says I should always be at home." The outcome of these controlling behaviors was often immense isolation and mental health challenges for Lulama, who was 30 years and pregnant at time of interview.

For several participants, the feeling of isolation was pervasive, leaving them troubled and continually ruminating over difficult thoughts. Dova illustrated this by describing how thoughts of the violence were "stuck in her mind" and left her isolated and alone:

It is just basically stuck there in my mind - all these things that have been happening. When you are alone, you just sit and think about it and I don't have anyone. Sometimes I don't sleep the whole night I am thinking and thinking. — Dova, 32 years, Pregnant

Another implicit trait of the partner control and isolation pathway is the hidden nature of both HIV and violence. Both HIV and IPV are stigmatised, which leads to a worsened ability among women to find support for either condition. Several women spoke of staying silent with their families about the violence in their relationships. As 30-year-old, pregnant Lulama noted, "whatever we fight about I keep to myself most of the time." For Neo, it was easier to pretend that things were fine than to disclose to her friends that she lived in a violent relationship:

> *It's hard to tell people I've got a problem, I'm not living a good life, with a partner that I'm worried, we're always fighting, things like that. You just pretend, like now pretending that I'm ok but I'm not ok. — Neo, 28 years, Postpartum*

3.6. Motherhood as a coping strategy: protective pathway

Despite immense challenges with HIV, violence, and pregnancy, many women in this sample exhibited unique coping strategies for adhering to treatment. For some women ($n = 8$), the concept of motherhood was a source of resilience and helped them stick with HIV medications. At 32 years and postpartum, Nomsa struggled to find clothing and food for her children, but continually reminded herself that treatment was an essential part of being able to care for her children: "I'm drinking my tablets. I'm just telling myself that I must help myself and get help. I know I need to work for my kids rather than die."

Zama did have trouble with adhering to treatment, and considered suicide during phases when the physical violence was particularly bad. Yet, at 25 years and pregnant, the reminder of her new baby would often be enough to return her to thoughts of living and trying to provide for her baby: "Maybe after a fight, I will be crying, stressed and then I would be like, okay, let me just do this [commit suicide], then I would think, 'No, but let us give this baby a chance'." It is important to note that Zama exhibited these methods of "resilience" by focusing on her baby's wellbeing even as she struggled with suicidality and isolation. Her story illustrates the complex relationship within multiple pathways, and shows that IPV's influence can manifest in complicated ways.

Grace used the idea of caring for her children as a way to "move on with life" and leave her violent partner:

> *Like in future I was thinking like to move on with my life. Do something for my life and for my kids! That's what I want now because I'm done with living in the painful relationship. — Grace, 27 years, Postpartum*

Zethu's baby similarly helped her keep "priorities straight." As a 21-year-old pregnant woman, she boldly stated that HIV treatment was more important than her husband, and expressed how non-adherence was simply going to harm herself: "I'm doing it [PMTCT] for my baby. I don't want to stress myself so that I leave the tablets - it's better to leave that husband and continue with my tablet." Beyond Zethu's commitment to protecting her baby, it appeared that taking care of her own HIV could be a subtle way to "leave that husband" and regain control over her own life.

Not every participant was able to use the notion of motherhood to feel more confident around HIV treatment. For example, Dova felt that the stress related to the violent relationship was making her a worse mother — a notion that she illustrated by describing how her suicidal thoughts were linked to thoughts of hurting her children:

> *I have suicidal thoughts because I don't have anyone. The only people I have are my kids. And the worst part is with these suicidal thoughts I am always saying, if I had to kill myself, I wouldn't leave my kids behind. I would take them with. If there is a method whereby I would kill me and my kids, I would do it. So it is just, it is not well. I am not even a good mother these days. —Dova, 32 years, Pregnant*

Dova's story reflects upon multiple pathways of mental health and isolation, suggesting again that pathways may have a dynamic relationship and do not necessarily stand alone as distinct situations.

4. Discussion

This is the first study, to our knowledge, to explore the relationship between violence and HIV adherence within a relatively robust qualitative sample of 32 pregnant and postpartum women reporting both HIV and IPV. It highlights that women living with HIV and IPV have unique challenges to maintaining healthy adherence behaviors around the time of pregnancy. Four key pathways emerged that link IPV to PMTCT: partner non-disclosure, poor mental health, isolation due to partner control, and motherhood.

As shown in Fig. 2, pathways from IPV to PMTCT outcomes tend to intersect and collide. Rather than falling into distinct categories, participants often presented stories that fell within multiple pathways. The pathways seemed to be comprised of both positive and negative aspects of responding to IPV. So while mental health and partner control/isolation seemed to worsen HIV outcomes for women, pathways of motherhood and partner non-disclosure highlighted unique resilience strategies used by women. This nuanced understanding of the IPV—HIV adherence relationship can help contextualize recent conflicting evidence from sub-Saharan Africa. Whereas one study with pregnant women in Zambia showed that violence worsens HIV adherence (Hampanda, 2016), another in Kenya among female sex workers suggests that history of IPV actually improved odds of HIV-related health (Wilson et al., 2016). It is possible that while experience of IPV may hinder women's ability to take HIV medication, it could alternately (or simultaneously) spur women towards persevering with HIV treatment.

While *motherhood* was a protective element and a resilience strategy for some participants, this finding contains critical contradictions. Our findings reflect that women's sense of self around the time of pregnancy can be grounded in the infant relationship (Bhandari et al., 2012), and that striving for motherhood may be an active coping strategy (Burnett et al., 2015; Foster et al., 2015). Motherhood can represent an important "turning point" when women start to consider leaving a violent relationship for the sake of the infant (Semaan et al., 2013: 74). However, there is a less positive aspect to the motherhood identity, as it necessarily expects that mothers will be the nurturing caretaker and sacrifice her own needs for that of her child (Hays, 1998). When, in the context of IPV, women may not be fully able to protect their infants from psychological and physical harm, they may be held responsible for failure to protect the child, even as they themselves require protection (Lapierre, 2008). The shame associated with both IPV and HIV may be compounded with the shame of being a 'bad mother', which could only worsen mental and physical health outcomes.

The pathway of partner non-disclosure seems to reveal both negative aspects of IPV as well as resilience strategies used by women. This tension between women being both constrained by the violence while also being agentic in their response has been

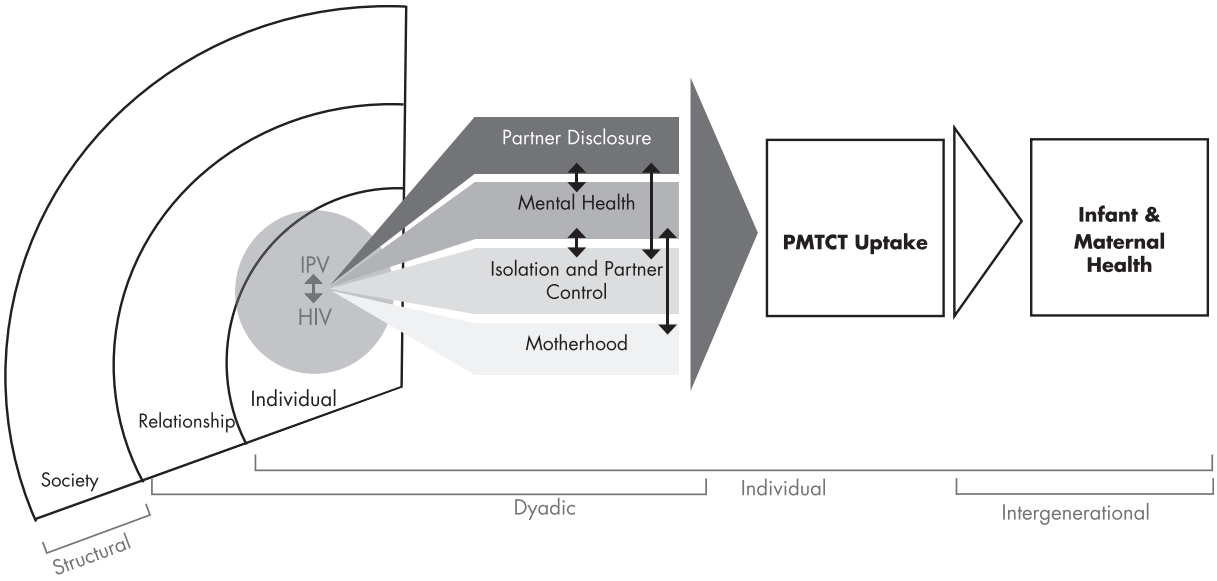


Fig. 2. Pathways linking intimate partner violence to PMTCT uptake.

highlighted in previous IPV literature (Campbell and Mannell, 2016; Turan et al., 2016). In our sample, partner non-disclosure made it challenging for some women to take treatment openly and consistently (Awiti Ujiji et al., 2011; Sayles et al., 2006). Yet, for others, non-disclosure was an important safety strategy. Women in this sample made strategic choices to stay safe from violent reprisals by placing medication in other containers, taking it at times when partners would be away, and by moving out from home altogether. Importantly, non-disclosure was also a method for regaining control over chaotic lives. It is important to note that this 'agentic' finding around non-disclosure strategies may have emerged partly because of our narrative approach to data collection. Constructing meaning through narratives is a particularly useful approach to violence research, as it restores agency and power among a group that is often considered the "helpless victim" (Boonzaier and van Schalkwyk, 2011: 278). Notwithstanding the methodological considerations of this conclusion, the strong evidence from nine women in our cohort suggests that women do use important strategies to avoid partner disclosure while staying faithful to HIV medication adherence.

Pathways of partner control and mental health offered 'negative' influence on PMTCT behaviors. For several women, relationship control led to an inability to attend the clinic or take medication when desired (Lichtenstein, 2006). More often, however, partner control manifested as a sense of isolation and inability to define one's own choices about health, movement outside the home, or taking care of the infant. The isolation caused by severe partner control meant that women had little access to social resources to help them (Liang et al., 2005). Isolation also contributed towards the mental health pathway, with women reporting increased anxiety and distress due to being alone.

Our findings certainly support extant literature by suggesting that IPV leads to emotional trauma, anxiety, suicidal ideation, and depression among women, including in antenatal care (Ellsberg et al., 2008; Mahenge et al., 2013) and that poor mental health has onward impact on HIV medication adherence (Sumari-de Boer et al., 2012). We add to this evidence base by highlighting the complex underpinnings behind the IPV-mental health connection. On the more manageable side of the spectrum, women in violent relationships have stress and emotional concerns that take priority over the daily regimen of medication. For other women, on the more extreme side, a sense of hopelessness and being overwhelmed due to the extreme distress of violence led to the potential for self-harming behavior. In the six cases of women who described suicidal ideation, several used the act of stopping treatment as part of thoughts of ending their own lives. Others have noted that women's experience of abuse may create a self-image of being damaged, inhibiting self-care and access to regular health services (Leenerts, 1999; Rothenberg and Paskey, 1995). Our findings go beyond this literature by noting that HIV medication – due to its very necessity for good health – can be used in a self-harming manner through intentional treatment interruptions.

4.1. Limitations

The findings of this study should be viewed in light of several limitations. All participants were visiting antenatal care, limiting our ability to understand these dynamics among women who avoid healthcare in pregnancy. Similarly, participants in this sample all reported IPV victimization (a majority with recent violent episodes), limiting a comparison to women living without IPV. Purposive selection of participants preclude our ability to generalize these data to the entire parent trial cohort, a limitation of most qualitative research. The urban Johannesburg setting has distinctions from other sub-Saharan African health settings, which makes it challenging to compare findings. Our narrative, social constructionist approach to interviews intentionally focused on techniques like validation, highlighting resistance, and locating identity within participant stories. Therefore, our interpretations are likely to differ from that of a 'neutral observer', as utilized within a more positivist research paradigm. Nevertheless, this study provides initial impressions of violence among HIV-positive pregnant/postpartum women in a sample that is larger than the extant literature.

4.2. Implications for intervention, research & policy

Several intervention strategies emerge from these data. With appropriate training, supervision, and tools, health workers in antenatal settings could be the first point of contact for pregnant, abused women. The 'window of opportunity' in antenatal care,

when women are repeatedly visiting the clinic, can ensure that violence and HIV considerations are jointly addressed– particularly through onwards referral to services that specialise in addressing violence. The current method of group-based PMTCT messaging should be refined towards an individually-tailored approach that truly addresses the concerns, confusions, and daily lives of pregnant and postpartum women. Open, honest discussions at this phase in a woman's life may have benefits for staying safe while adhering to crucial PMTCT interventions. The notion of 'striving for motherhood' can also be harnessed during this time, to help women prioritize their own health and safety as another form of commitment to the infant. It is clear that the intertwined issues of mental health and disclosure need to be incorporated into PMTCT services, and this can be achieved by training antenatal staff to implement brief mental health interventions or through referrals. Social support in the form of skillfully-facilitated peer support groups could assist women with the isolation pathway that is so pervasive in abusive partnerships.

These qualitative findings suggest several avenues for further research. Given the potential positive and negative ways that violence may impact HIV adherence, future quantitative research should extend beyond simplistic analytic techniques. To date, the literature has been limited to bivariate association between violence and HIV adherence. Simple regression techniques may fail to account for important meditational pathways between IPV and adherence. In one recent study, for example, the direct association between IPV and HIV adherence was non-significant, yet when mediated by mental health there was a strong negative path association (Malow et al., 2013). Specific pathways identified in this research should be explored and confirmed in a larger, quantitative sample using techniques that recognize the interrelated nature of pathways, such as structural equation modeling.

PMTCT policy could also benefit from these qualitative findings. Current South African PMTCT guidelines discuss the "benefits" of partner HIV disclosure and prompt health workers to "encourage" disclosure and "support … partner notification" (South African Department of Health, 2014: 37). However, no mention is made of the safety dilemmas that mothers may face in disclosing to a violent partner. We learned that partner non-disclosure is a strategic way to stay safe in a violent relationship, and that some women can manage to safely continue treatment without their partners finding out. Given that 25–35% of South African women experience IPV in pregnancy (Dunkle et al., 2004; Groves et al., 2012), the omission of strategic non-disclosure in current guidelines is likely to burden health workers, who are currently unskilled at discussing partner dynamics.

5. Conclusion

IPV and HIV are strongly linked in the lives of childbearing women in many settings globally, and violence leads to adherence challenges that place maternal and infant health at risk. These intersecting issues deserve increased attention if we are to ensure elimination of vertical HIV transmission and protect the health of mothers. Current policy and intervention is sorely lacking, with little evidence that health workers and policy makers are alert to the considerations of violence within PMTCT programming. Pregnant and postpartum women will greatly benefit from antenatal care that recognizes the realities of living in violent relationships and emboldens women to prioritize their own health, as well as the health of their infants, during this critical phase.

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