PREVALENCE AND TRAJECTORIES OF INTIMATE PARTNER VIOLENCE AMONG SOUTH AFRICAN WOMEN DURING PREGNANCY AND THE POSTPARTUM PERIOD

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ABSTRACT

ALLISON KJELLMAN GROVES: Prevalence and trajectories of intimate partner violence
among South African women during pregnancy and the postpartum period
(Under the direction of Suzanne Maman)

Intimate partner violence (IPV) is a significant public health problem in South Africa.
However, there has been limited research on IPV during pregnancy and the postpartum
period, despite significant negative consequences. A better understanding of the prevalence
and trajectories of IPV for women in South Africa during pregnancy and the postpartum
period will inform IPV prevention interventions.

Study 1 used data from the South Africa HIV antenatal post-test support study
(SAHAPS) to describe the prevalence and rates of physical, sexual and psychological IPV at
pregnancy, at four months postpartum and at nine months postpartum. More than 1 in 5
women experienced some form of IPV at least once during pregnancy. Psychological IPV
was the most common type of IPV experienced in both pregnancy and the postpartum
period.

Study 2 used SAHAPS data to address two aims. First, random coefficients growth
curve modeling was used to describe mean trajectories of physical and psychological IPV as
well as individual variability around the mean during pregnancy and the postpartum period.
This method was also used to examine whether relationship characteristics (relationship
power, relationship stress and partner social support) and women's history of pre-pregnancy
IPV would act together to increase risk for IPV during pregnancy and the postpartum period.
The mean trajectory for both types of IPV was flat which means that, on average, there was

not significant change in levels of IPV over pregnancy and the postpartum period. However, there was significant individual variability in trajectories of IPV over the study period. The association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period was buffered by higher relationship power. Additionally, higher relationship stress increased women's risk of psychological IPV during pregnancy and the postpartum period, regardless of pre-pregnancy IPV. Partner social support did not change women's risk of IPV.

The high prevalence of IPV during pregnancy and the postpartum period highlight the need for screening and intervention during and following pregnancy. While screening alone is not efficacious at reducing IPV, screening in conjunction with an intervention may reduce risk of IPV during this time.

DEDICATION

To mothers everywhere, especially mine

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The data for my dissertation comes from a research intervention that took place in Durban, South Africa. I have worked in tandem with our South African partners for the past six years on this intervention. I could not have completed this dissertation without the wisdom and efforts of our entire South African research team, especially Daya Moodley. I also could not have completed this dissertation if the women living in Umlazi had not been willing to partake in the research intervention. I am forever indebted to them for their willingness to share details about their intimate lives during pregnancy and the postpartum period.

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List of Abbreviations

DALY   disability-adjusted life years

HIV   human immunodeficiency virus

IMAGE   intervention with Microfinance for AIDS and Gender Equity

IPV   intimate partner violence

KZN   KwaZulu Natal

SAHAPS   South Africa HIV antenatal post-test support study

SRPS   Sexual Relationship Power scale

WHO   World Health Organization

Chapter 1: Introduction and specific aims

South Africa has high rates of intimate partner violence (IPV) against women (1-3). Partner violence research suggests that one in three adult women in South Africa have experienced physical violence during their lifetime (4). Further, half of all women whom are killed in South Africa are killed by their intimate partners, and the rate of femicide (8.8/100,000) is well above that which is reported in other countries such as the United States or the United Kingdom (5).

Despite general knowledge of IPV in South Africa, there has been very little research on the prevalence of IPV during pregnancy and the first nine months postpartum. Only one South African study has examined IPV during pregnancy and that study focused exclusively on physical violence (6). Findings indicate that approximately 7% of women experienced physical partner violence during their most recent pregnancy, and one-third of these women reported that the physical violence they experienced was severe enough to cause them pregnancy-specific morbidities, such as miscarriage. To our knowledge, no studies in South Africa have examined the prevalence of psychological or sexual IPV during pregnancy nor are there studies that have examined physical, psychological or sexual IPV in the postpartum period. A better understanding of IPV during this period is important both because of the negative consequences of IPV for women and also because of other adverse health consequences of IPV specific to pregnancy and the postpartum period. These include preterm labor, vaginal bleeding, and postpartum depression (for the mother) (7-11) and low birth weight, preterm birth and neonatal death (for the infant) (7, 12-15).

There is also a global gap in our understanding of how IPV changes during pregnancy and the postpartum period; further, the few existing studies on change in IPV during this time have yielded different conclusions. One longitudinal study found that IPV increased during pregnancy and decreased in the first year postpartum (16), whereas another longitudinal study with women during pregnancy and the first six months postpartum did not find that IPV changed over this time period (17). Three cross-sectional retrospective studies that asked about IPV before, during and after pregnancy have used flow charts to describe how IPV changed for some women and not others (18-20).

Longitudinal methods like random coefficients multilevel growth modeling can help us to assess change at the individual level over time (21). Through this modeling approach, we can examine on average, how IPV changes over pregnancy and the postpartum period for the sample of women. We can also examine if there is significant heterogeneity between women in the sample in their experiences of IPV during pregnancy and the postpartum period.

Although it is not clear from existing literature if IPV changes during this time, one group that is at risk of IPV during pregnancy and/or the postpartum period is women who have experienced IPV in their relationship before pregnancy (18, 21). While there is evidence of an association between IPV before pregnancy and IPV during pregnancy and/or postpartum (18, 21), there is also research which suggests that pregnancy and postpartum may be a time of respite for women who experienced IPV before pregnancy (17-20). Finally, some women who never experienced IPV in their relationship before pregnancy report that it emerges for the first time during pregnancy and/or postpartum (17-22). Taken together, the variation in women's experiences of IPV over this time suggests that other factors may moderate the association between pre-pregnancy IPV and IPV during pregnancy and the first nine months postpartum.

Life course theorists posit the continued pattern of a behavior or outcome over time, i.e., one's trajectory, can be interrupted at developmental transitions depending on the levels of other factors at that transition (23, 24). Glen Elder, one of the earliest life course theorists to study trajectories and turning points posited that the *resources* and *experiences* that people have at the transition (pg. 35, (23)) are factors that may explain why these transitions matter for some individuals' trajectories and not others. That is, levels of *resources* and *experiences* may act as effect modifiers to explain differences between individuals in their trajectories of IPV over time.

Although life course theorists were not specific about which factors are considered *resources* and *experiences* at transitions, other researchers have posited that certain characteristics of the intimate relationship may help us to understand variation in trajectories of IPV (25). Specifically, there are three core relationship characteristics that can be conceptualized as *resources* or *experiences* at pregnancy that may affect the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period. Relationship power and partner social support are both *resources* that may buffer women's risk of IPV, while relationship stress constitutes an *experience* that may exacerbate women's risks of IPV. That is, women who have a history of IPV and who have higher relationship power (defined as greater control over both relationship processes and relationship outcomes) (26, 27) may be less likely to experience IPV during pregnancy and postpartum than women who have a history of IPV and lower relationship power (28, 29). Similarly, women who have a history of IPV and whose partners provide higher social support to them may be less likely to experience IPV during pregnancy and postpartum than women who have a history of IPV and have lower partner social support (30). And finally, women who have a history of IPV and report higher relationship stress at pregnancy (defined by stressful events and experiences at or relevant to pregnancy) may be more likely to experience IPV during pregnancy and postpartum than women who have a history of IPV and lower

relationship stress at pregnancy (31). It is important to understand what relationship characteristics modify the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period since these characteristics may be amenable to intervention.

Therefore, the specific aims of the dissertation study are as follows:

Aim 1: To assess the prevalence, mean rates and severity of physical, psychological and sexual partner violence at pregnancy and at four and nine months postpartum

Aim 2: To use a random coefficients multilevel growth modeling approach to describe trajectories of physical and psychological partner violence during pregnancy and the first nine months postpartum

Aim 3: To test whether the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period is modified by core relationship characteristics (relationship power, partner social support and relationship stress)

The data set for this dissertation analysis comes from the South Africa HIV antenatal post-test support study (SAHAPS), a randomized controlled trial designed to provide psychosocial support to HIV+ and HIV- women during pregnancy and the postpartum period. This longitudinal study is unique in that women report their experiences of physical, psychological and sexual IPV before pregnancy, during pregnancy, four months postpartum and nine months postpartum, which allows us to look at the prevalence and rates of IPV and the trajectories of IPV during pregnancy and the postpartum time period. A better understanding of the scope of IPV, the mean trajectory of IPV and how relationship

characteristics and women's history of IPV act together to contribute to IPV during pregnancy and the postpartum will allow us to develop clinic-based IPV prevention interventions tailored specifically to South African women seeking antenatal and postpartum care.

       The dissertation is organized into five chapters. This chapter provides the general overview and specific aims. Chapter 2 provides further background information on IPV during pregnancy and the postpartum period and a review of the theoretical and empirical evidence in support of the aims of the dissertation. Chapter 3 contains the first dissertation manuscript on the prevalence and rates of physical, psychological and sexual IPV that South African women experience during pregnancy, at four and at nine months postpartum. Chapter 4 contains the second dissertation manuscript, which describes the mean trajectories of physical and psychological IPV and also assesses how core relationship characteristics and women's history of IPV act together to explain variation in these trajectories during pregnancy and the first nine months postpartum. And finally, Chapter 5 summarizes the key results and discusses limitations and implications for future research.

Chapter 2: Empirical and theoretical literature review

This chapter is organized into three sections. In the first section, I develop my rationale for understanding the scope of IPV during pregnancy and postpartum in South Africa. I start by reviewing existing literature on IPV against South African women in general and then describe what is known about IPV during pregnancy and the postpartum period. Given the limited literature on IPV during pregnancy and the postpartum period in South Africa, I broaden the review to include literature on IPV during pregnancy and the postpartum period throughout sub-Saharan Africa. At the end of the first section, I describe the potential consequences of IPV during pregnancy and the postpartum period.

In the second section, I develop my rationale for using random coefficients growth modeling to assess if IPV changes during pregnancy and postpartum among South African women. In this section, I describe how a life course framework on trajectories, transitions and turning points informed the study. Then, I review empirical literature on patterns of IPV during pregnancy and the postpartum period to support the goal of describing the trajectories of physical and psychological IPV for South African women during pregnancy and the first nine months postpartum. And finally, I talk about how the use of random coefficients growth modeling will build on existing literature to help us understand if IPV changes during pregnancy and the postpartum period.

In the final section, I develop my rationale for testing whether three core relationship characteristics and women's history of IPV act together to explain variation in trajectories during pregnancy and the first nine months postpartum. While my study is informed by a life course framework to look at trajectories and turning points in IPV over

pregnancy and the postpartum period, I draw on additional theoretical and empirical literature to develop hypotheses about how relationship power, partner social support and relationship stress act as *resources and experiences* to modify the association between pre-pregnancy IPV and IPV over pregnancy and the postpartum period.

Understanding the scope of IPV among South African women

Prevalence of Intimate partner violence (IPV) among adult women in South Africa

Intimate partner violence (IPV) describes "physical, sexual or psychological harm by a current or former partner or spouse" (32). Such violence can occur among heterosexual or same-sex couples and perpetration can be bidirectional. However, for this study, we will be focusing on IPV that is perpetrated against women by current male partners. Although Article 12 of South Africa's constitution states that individuals have the right to freedom from all forms of violence, including violence from private sources (33, 34), IPV is a significant public health and human rights problem in South Africa.

Prevalence estimates of physical, psychological and sexual IPV among adult women are consistently high in South African studies. In the only nationally representative study on IPV, 31% of South African women had experienced physical IPV at some point in their current relationship (4). Other types of violence within intimate partnerships are also quite common: nearly half of all women in a cross-sectional, community based study conducted in three provinces experienced psychological or financial abuse from their partner in the previous year (financial abuse was defined in part if the partner withheld money within the relationship) (6). Furthermore, though the sensitivity of asking about and reporting sexual violence makes measurement notoriously difficult (35, 36), one national study found that at least 7% of women reported being forced or persuaded to have sex against their will (37, 38).

Prevalence of IPV during pregnancy and the postpartum period in sub-Saharan Africa

There has been one study of IPV during pregnancy or the early postpartum period in South Africa. In a cross-sectional community-based study conducted in three provinces, the prevalence of physical violence during pregnancy by a current or ex-partner in the last year across the three provinces ranged between 4.7%-9.1% (39). In another cross-sectional study in South Africa which measured domestic violence (which included victimization by other individuals in the household), the pregnancy-specific prevalence among 570 women was 35% (40). Of the 200 women who experienced domestic violence during the current pregnancy, 80 of them experienced physical abuse (40%), 38 experienced sexual abuse (19%) and 82 experienced emotional or verbal abuse (41%). The inclusion of a broader range of potential perpetrators may help explain the high prevalence estimate. I could identify no studies that measured the prevalence of IPV during the postpartum period among women in South Africa. Therefore, there is a gap in our understanding of the prevalence of physical, sexual and psychological IPV during pregnancy and the postpartum period in South Africa.

As seen in Table 2.1, there are six studies of IPV against women during pregnancy throughout sub-Saharan Africa. In these studies, the prevalence of IPV during pregnancy ranges from 2.3%-57.1% (6, 22, 40-45). The wide variation in prevalence is at least partially attributable to differences in measurement and definition of IPV across studies. For example, some studies measured physical violence by asking a single question on a survey about physical violence (46), whereas others measured physical, sexual, economic and psychological violence and then dichotomized the variable to a single IPV prevalence estimate (40, 41). These latter estimates may be higher than the former because they include a broader definition of violence.

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Another limitation of much of the existing regional literature on the scope of IPV during pregnancy and the postpartum period is that a majority of the samples are drawn from clinics, even though a substantial portion of women in some of these countries do not seek antenatal care (or seek it quite late in pregnancy). In such contexts, selection bias will affect prevalence estimates, meaning that such estimates are not generalizable to the broader population of women in the country. Indeed, estimates may be downwardly biased given that women who experience IPV during pregnancy may be among the least likely to access prenatal care (47).

Finally, I could identify no studies that measured IPV in the postpartum period in sub-Saharan Africa. However, there was one study that found that 4% of women experienced domestic violence (which included violence perpetrated by other individuals in the household) during the first six weeks of the postpartum period (48). While this number is small, the postpartum time period was also quite short. Thus, the gap in our understanding of the extent of physical, psychological and sexual IPV that occurs during the postpartum period extends throughout sub-Saharan Africa.

Consequences of IPV during pregnancy and the postpartum period

Although there has been no study of the consequences of IPV during pregnancy and the postpartum period for African women, IPV during pregnancy and the postpartum period negatively impacts women and their children in non-African settings. IPV during pregnancy among women in the United States has been associated with physical morbidity, including preterm labor, vaginal bleeding, kidney infection and UTI's (7, 8). IPV during pregnancy among women in other settings ranging from the United States to Vietnam has also been associated with poor mental health, including increased emotional distress during pregnancy (9, 10) as well as postnatal depression (11). Finally, IPV during pregnancy has been

associated with adverse consequences for the infant, including low birth weight (12, 13, 15), preterm birth (12, 14) and perinatal death (12).

Describing change in IPV

Using a life course framework to understand trajectories of IPV during pregnancy and the postpartum period

A life course perspective on how IPV changes is one in which there is attention to both the trajectory of IPV over time as well as to transitions in the relationship that might affect the trajectory. Within the life course framework, a trajectory is a pattern of behavior marked by a sequence of events that occur over an individual's lifetime (23). For example, we could map out an individual's trajectory of physical partner violence victimization by looking at the levels of physically violent events she incurred from her intimate partner across her life course. Violence researchers have called for the use of longitudinal methods to better understand women's trajectories of IPV during pregnancy and the postpartum period since there is some empirical evidence to suggest that pregnancy is a time of respite for some women and a time of risk for others (49).

Transitions are another key component to understanding trajectories over time. Transitions are specific events embedded within a trajectory. While everyone may go through the same transition, some individuals' trajectories may change during the transition whereas others individuals' trajectories may stay the same. For some, these changes can drastically alter the course of the individual trajectory (23, 24). Life course theorists conceptualize such change in one's trajectory as a 'turning-point' (24).

Glen Elder, one of the earliest sociologists to study trajectories and turning points, posited that the *resources* and *experiences* that people bring to the transition (pg. 35, (23)) are factors that may explain why these transitions matter for some individuals' trajectories

and not others. That is, levels of *resources* and *experiences* may explain differences

between individuals in their trajectories of IPV over time and the effects of these factors may

contribute to pregnancy being a turning point for some individuals and not others.

Although original life course theorists were not specific about which factors were

considered *resources* and *experiences* at transitions, other researchers have posited that

certain characteristics of the intimate relationship may help us to understand variation in

trajectories of IPV during the developmental transitions (25, 50). Prior to describing how

relationship characteristics and women's history of IPV might act together to contribute to

IPV during pregnancy and the postpartum, I first need to determine the mean shape of these

trajectories during pregnancy and the postpartum period. Therefore, in the next part of this

section, I discuss the empirical literature on change in IPV during pregnancy and the

postpartum period.

Cross-sectional studies that describe change in IPV during pregnancy and the postpartum period

There has been no longitudinal study of whether and how IPV changes during

pregnancy and the postpartum period for South African women. One study found that

between 5%-9% of South African women reported physical IPV during pregnancy (39), yet

we have no knowledge of whether these women also experienced IPV in their relationship

before pregnancy or whether they experienced physical IPV for the first time during

pregnancy. Further, we have no knowledge of how physical or psychological IPV changes

for South African women in the postpartum period.

Some research in other settings suggests that pregnancy and the postpartum period

is a time of respite from IPV for women who experience IPV before pregnancy. Population-

based cross sectional studies in North Carolina, Nicaragua and China found that between

33%-39% of women who experienced IPV prior to pregnancy experienced cessation both

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during pregnancy and the postpartum period. Further, between 45%-67% of the women who experienced IPV prior to pregnancy experienced cessation of IPV during pregnancy (Table 2.2). Other empirical studies of IPV in the United States and Canada during at least two of the three time points around pregnancy had similar findings. Between 40%-69% who experienced IPV before pregnancy experienced cessation of IPV during pregnancy and between 25%-57% of women who experienced IPV during pregnancy experienced cessation postpartum (Table 2.3).

On the other hand, empirical research also suggests that IPV persists for some women during pregnancy and the postpartum period. The same population-based cross sectional studies in North Carolina, Nicaragua and China found that between 26%-44% of women who experienced IPV before pregnancy experienced persistent IPV both during pregnancy and the postpartum period (Table 2.2). Other empirical studies of IPV in the United States and Canada during at least two of the three time points around pregnancy had similar findings. Between 31%-60% who experienced IPV before pregnancy experienced persistent IPV during pregnancy and between 43%-75% of women who experienced IPV during pregnancy also experienced IPV postpartum (Table 2.3).

Finally, for some women, IPV emerged for the first time during pregnancy or the postpartum period. As seen in Table 2.4 and Table 2.5, between .9% - 16% of women experienced emergent partner violence during pregnancy or the postpartum period. The percentage of women experiencing emergent IPV was highest in the Nicaragua study (29). The study authors did not focus on emergence of IPV in their paper and thus did not discuss why more women in the Nicaraguan context might be at risk of IPV during pregnancy.

One major limitation of these cross-sectional studies is that they described change over time through the use of flow charts and/or tables. That is, they did not use statistical analyses to model IPV over time. Such an approach limits our ability to understand what the average pattern, or trajectory, of IPV looks like during this time.

Longitudinal study that describes change in physical and psychological IPV during pregnancy and the postpartum period

In the only longitudinal study of IPV during pregnancy and the postpartum period with more than two time points, Macy et al. (2007) used hierarchical linear modeling to look at change in physical IPV for women in North Carolina who reported victimization during the first six months of pregnancy (n=31) as compared to women who did not report victimization during the first six months of pregnancy (n=45) (51). They found that, on average, women who experienced physical IPV in the first six months of pregnancy experienced a decline in physical IPV during the last three months of pregnancy and an increase in physical IPV after giving birth. They also found that the mean rate of psychological IPV for both victimized and comparison women increased during pregnancy through the first month postpartum and then decreased over the next year (51). However, a limitation of this study is that they stratified their sample into two groups, which limits our ability to make conclusions about average change in IPV across all women in the sample. A second limitation of this study is that the small sample size may affect generalizability of the results.

It is difficult to draw conclusions from the existing literature about what the trajectories of physical or psychological IPV will look like during pregnancy and the postpartum period. Modeling trajectories of IPV through the use of multilevel random coefficient growth analysis has a number of distinct benefits as compared to the methods used in previous studies. Specifically, this modeling approach allows us to describe the mean trajectory of IPV over time by generating a parameter to estimate the mean level of IPV at pregnancy (reflected by the intercept) as well as a parameter to estimate the mean change in IPV over time (reflected by the slope). In addition, this modeling approach allows us to test whether there is significant heterogeneity across women by generating a parameter to estimate variability across women in their levels of IPV at pregnancy (intercept)

as well variability across women in change in IPV over time (slope). And finally, this method enables us to assess what factors are associated with IPV at pregnancy as well as what factors are associated with change in IPV over pregnancy and the postpartum period. In sum, this method allows us to test if IPV changes over pregnancy and the postpartum period, if there is significant heterogeneity in women's experiences of IPV at this time and to test whether particular factors explain deviation from the mean trajectory during pregnancy and the postpartum period (52).

Identifying factors associated with change in IPV

Prior IPV as a risk factor for future IPV

Although it is not clear from existing literature if IPV changes during this time, one group that is at continued risk of IPV during pregnancy and the postpartum period is women who have experienced IPV in their relationship before pregnancy (18, 21). One theoretical explanation for persistent victimization draws on the theory of state dependence. State dependence theorists posit that prior events (like the experience of IPV) change an individual in such a way that she is at increased risk of that same event in the future (53). Thus, adult women who have experienced IPV within their current relationship are vulnerable and at risk of IPV in the future within their relationship.

However, as described previously, some women who have experienced IPV in their relationship before pregnancy experience pregnancy and the postpartum period as a time of respite. Furthermore, others who have never experienced IPV before experience it for the first time during pregnancy and postpartum (17-20). Taken together, these findings suggest that other factors may moderate the association between pre-pregnancy IPV and IPV during pregnancy and the first nine months postpartum.

Life course theorists posit that factors that fall under the umbrella of *resources* and *experiences* might temporarily or fully buffer women's trajectories over time. Psychosocial *resources*, in particular, are factors that are posited to play "an ameliorative or positive role" at transitional moments (pg. 10, (24)). While such *resources* are broadly defined by life course theorists, other researchers contend that certain core characteristics of the intimate relationship can be conceptualized as *resources* that affect risk of ongoing violence (25). One psychosocial *resource* that may buffer the association between past IPV and future IPV is the power a woman has in her relationship to control her own decision making, her own behavior and the behavior of her partner. An additional psychosocial *resource* that may buffer the association between past IPV and future IPV may be the social support the partner provides. And finally, *experience* of relationship stress may exacerbate the association between past IPV and future IPV. Each of these potential moderating variables is discussed in further detail below.

Relationship power

Women's relationship power may counteract the negative effects of pre-pregnancy IPV to reduce risk of IPV during pregnancy and the postpartum period. Power is often conceptualized and measured differently across studies but in most cases captures at least one of the following domains: the comparative number of resources each individual has, who has more control over decision-making, and who has control over their own and their partner's behavior (26, 27).This *resource* has reduced women's risk of future IPV among women with a history of IPV in Canada. In Wuestt and Merit-Gray's grounded theory research with women whose relationships had ceased being violent, women described how their own power within the relationship was a key resource that protected them from future IPV. In a population-based study of pregnant women in Nicaragua, women who had higher

power within their relationship over pregnancy and the three year postpartum study period were more likely to experience cessation of IPV at three years postpartum than women who had lower relationship power (29). These two studies both described how relationship power affected women's risk of IPV such that their IPV ended over the long term. However, neither study tested whether relationship power moderated the association between past experience of IPV and future experience of IPV. This dissertation study builds on these prior studies by testing whether relationship power weakens the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period.

Partner social support

Another psychosocial *resource* that may buffer the association between past IPV and future IPV is the social support a male partner provides in the relationship. Criminologists Sampson and Laub posited that men's deviance (including aggression) might be interrupted at a transition like marriage. They theorized that men who were more bonded to their wives at marriage would be less likely to engage in deviance (including aggression) than men who were less bonded because they would risk losing the investments they had gained from their relationship. They argued that bonding served as informal social control, and their empirical work supported their proposition (50). As applied to this study, the continuity of IPV might be interrupted or weakened at the transition of pregnancy for men who provide more support (and are therefore more bonded) to their partners as compared to men who provide less support.

Relationship stress

In addition to the role that psychosocial *resources* play in affecting trajectories at transitions, Elder posited that *experiences* at or related to the transition might also affect trajectories (23). However, in contrast to the potential buffering effect of psychosocial

resources, negative experiences in the form of relationship stress might exacerbate the association between past IPV and future IPV. Relationship stress is a response to demands, or stressors, experienced by an individual or a couple (54). Both individual and environmental factors can affect an individual's ability to respond to these stressors. When the frequency or the impact of the relationship stressor(s) exceeds an individual's ability or perceived ability to cope with the stress in an adaptive way, negative health outcomes or behaviors (e.g. perpetration of violence) can occur (55, 56).

The transition to parenthood that is associated with pregnancy may be a period of relationship stress for couples (57). Couples may face either new or increased relationship stress at this transition and their ability to respond to these relationship stress may change interactions within the relationship. Therefore, negative experiences in the form of relationship stress might exacerbate the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period.

Tables

Table 2.1 Prevalence of IPV before, during and after pregnancy among women in sub-Saharan African countries

Author	Setting	Measurement of IPV	Prevalence, % ,[SE or 95% CI]		
			Before	**During**	**After**
Abasiubong (2010)	Nigeria (urban)	Physical, sexual and economic	*	22.9% [c]	*
DeVries (2010)	Cameroon	Physical	*	8.6% [0.4]	*
	DR Congo	Physical	*	9.4% [0.9]	*
	Malawi	Physical	*	3.8% [0.3]	*
	Mozambique	Physical and sexual	*	7.3% [0.7]	*
	Rwanda	Physical	*	8.8% [0.4]	*
	Uganda	Physical	*	13.5% [1.0]	*
	Zambia	Physical	*	9.0% [0.6]	*
	Zimbabwe	Physical	*	5.6% [0.4]	*
Jewkes (2001)	South Africa (Northern Province)	Physical	*	4.7% [2.8 - 6.6]	*
	South Africa (Mpumulanga)	Physical	*	6.7% [4.1 – 9.3]	*
	South Africa (Eastern Cape)	Physical	*	9.1% [5.5 - 12.6]	*
Kaye (2006)	Uganda (urban)	Physical, sexual and psychological (dichotomized for analysis)	*	27.7% [24.3-31.5]	*
Makayoto (2012)	Kenya (urban)	Physical, sexual and psychological	*	10% [c] 29% [c] 12% [c]	*
Stockl (2010)	Tanzania (urban)	Physical (single item)	*	7% [c]	*
	Tanzania (rural)	Physical (single item)	*	12% [c]	*

* = not available   c=confidence intervals or standard error not reported

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Table 2.2 Persistence and cessation of violence across three time points in pregnancy and the postpartum period

Author	Setting	Study design	Sample Size	Measurement of violence	Violence before and during pregnancy (persistence)	Violence before but not during pregnancy (cessation)	Violence during pregnancy and postpartum (persistence)	Violence during pregnancy but not postpartum (cessation)	Violence persisted at all three time points (persistence)	Violence before but not during or after pregnancy (cessation)	Duration of postpartum period	Violence specific to partner
Guo (2004)	China (four provinces)	population-based, cross sectional	12044	No scale. 3 questions on physical violence. 5 questions on sexual violence.	32.55% (334/1026)	67.4% (692/1026)	84.7% (283/334)	15.3% (51/334)	27.58% (283/1026)	39.0% (400/1026)	up to 18 mo; *u* = 11 mo	yes
Martin (2001)	North Carolina	population-based, mailed cross sectional survey	2648	No scale. 3 questions on physical violence.	54.21% (103/190)	45.8% (87/190)	48.5% (50/103)	51.5% (53/103)	26.3% (50/190)	38.9% (74/190)	2-6 mo post; *u* = 3.6 mo	no
Olagbuji (2010)	Nigeria (Benin City: urban)	clinic-based cross sectional	502	Modified WHO questionnaire (physical, sexual and psychological violence)	*	*	*	*	43.8% (220/502)	*	6 weeks post	no
Salazar (2009)	Nicaragua (Leon: urban)	population-based, longitudinal	478	WHO questionnaire (physical, sexual and psychological violence)	53.5% (116/217)	46.5% (101/217)	54.3% (63/116)	45.7% (53/116)	29% (63/217)	33.6% (73/217)	3 years [a]	yes

a= range not reported

Table 2.3 Persistence and cessation of violence across two time points in pregnancy and the postpartum period

Author	Setting	Study design	Sample Size	Measurement of IPV	IPV before and during pregnancy (persistence)	IPV before but not during pregnancy (cessation)	IPV during pregnancy and postpartum (persistence)	IPV during pregnancy but not postpartum (cessation)	Duration of postpartum	Violence specific to partner
Bohn (2004)	6 postpartum settings in FL and MA	case control cross sectional (participants matched on ethnicity and birth weight)	1004	Modified AAS (2 questions: (1) has your partner ever physically hurt you and (2) has your partner physically hurt you since the pregnancy began?)	31.3% (50/160)	68.8% (110/160)	*		n/a	yes
Harry-kissoon (2002)	University of Texas clinic (adolescents under age 18)	clinic-based longitudinal	770	Modified AAS (inadvertent insertion of the clause "to cause bruising or bleeding")	*	*	75% (46/61)	24.6% (15/61)	3, 6, 12, 8 & 24 mo	yes
Helton (1987)	US city (large metropolitan area, women sampled from 6 public and 2 private clinics)	clinic-based cross sectional	290	No scale. 1 question on psychological violence. 3 questions on physical violence.	54.55% (24/44)	45.5% (20/44)	*	*	n/a	yes
Koenig (2006)	Four U.S. States (Brooklyn, NY; Connecticut; Miami, FL; central North Carolina)	clinic-based longitudinal	634	No scale. 3 questions on physical violence. 2 questions on sexual violence.	*	*	42.86% (24/56)	57.1% (32/56)	6 mo post	no
Stewart & Cecutti (1993)	Toronto and Ontario (urban and periurban)	clinic-based cross sectional (multiple clinic types)	548	12 questions about physical violence, Some questions on psychological violence. Reported on physical violence.	60% (36/60)	40% (24/60)	*		n/a	No

a= range not reported

Table 2.4 Emergence of violence across three time points in pregnancy and the postpartum period

Author	Setting	Study design	Sample Size	Measurement of IPV	No IPV before pregnancy, IPV emerged during pregnancy	No IPV during pregnancy, IPV emerged postpartum	Duration of postpartum	Violence specific to partner
Guo (2004)	China (four provinces)	population-based, cross sectional	12044	No scale. 3 questions on physical violence. 5 questions on sexual violence	.9% (100/11018)	2.6% (281/10824)	up to 18 mo; u = 11 mo	yes
Martin (2001)	North Carolina	population-based, mailed cross sectional survey	2648	No scale. 3 questions on physical violence.	1.72% (42/2440)	.9% (21/2398)	2-6 mo post; u = 3.6 mo	no
Salazar (2009)	Nicaragua (Leon: urban)	population-based, longitudinal	478	WHO questionnaire (physical, sexual and psychological violence)	6.6% (12/181)	16.5% (28/169)	3 years[a]	yes

a= range not reported

Table 2.5 Emergence of violence across two time points in pregnancy and the postpartum period

Author	Setting	Study design	Sample Size	Measurement of IPV	No IPV before pregnancy, IPV emerged during pregnancy	No IPV during pregnancy, IPV emerged postpartum	Duration of postpartum	Violence specific to partner
Bohn (2004)	6 postpartum settings in Florida and Massachusetts	case control cross sectional (participants matched on ethnicity and child birth weight)	1004	Modified AAS (2 questions: (1) has your partner ever physically hurt you and (2) has your partner physically hurt you since the pregnancy began?)	.24% (2/834)	*	n/a	yes
Harry-kissoon (2002)	University of Texas clinic (adolescents under age 18)	clinic-based longitudinal	770	Modified AAS (inadvertent insertion of the clause "to cause bruising or bleeding")	*	3%-7% (depending on time point)	3, 6, 12, 8 & 24 mo	yes
Koenig (2006)	Four U.S. States (Brooklyn, NY; Connecticut; Miami, FL; central North Carolina)	clinic-based longitudinal	634	No scale. 3 questions on physical violence. 2 questions on sexual violence.	*	1.75% (10/572)	6 mo post[a]	no
Stewart & Cecutti (1993)	Toronto and Ontario (urban and periurban)	clinic-based cross sectional (multiple clinic types)	548	12 questions about physical violence, Some questions on psychological violence. Reported on physical violence.	.9% (5/548)	*	n/a	no

a= range not reported

Chapter 3: Prevalence, rates and severity of IPV during pregnancy and the postpartum period among South African women

Introduction

Intimate partner violence (IPV) is a significant public health problem and human rights violation in South Africa (58). In a nationally representative study on IPV, one in three South African women had experienced physical IPV at some point in their current relationship (59). Other types of violence within intimate partnerships are also quite common: nearly half of all women in a cross-sectional, community based study conducted in three provinces experienced emotional or financial abuse from their partner in the previous year (financial abuse was defined in part if the partner withheld money within the relationship) (6). Furthermore, though the sensitivity of asking about and reporting sexual violence makes measurement notoriously difficult (35, 36), one national study found that at least 7% of women reported being forced or persuaded to have sex against their will (37, 38).

IPV has been shown to have significant negative health and social consequences for South African women, including injury, poor mental health, sexually transmitted infections (including HIV), substance use and death (58, 60). Half of all women who are killed in South Africa are killed by their intimate partners; this rate of femicide (8.8/100,000) is the highest in the world (61). In addition, interpersonal violence, including IPV, negatively affects South

African women's daily lives and accounts for 10.9% of all disability-adjusted life years (DALYs) (58).

Despite evidence for the extent of IPV in SA, there has been very little research regarding IPV during pregnancy and the postpartum period. Only one South African study has examined IPV during pregnancy and that study focused exclusively on physical violence. Findings indicate that approximately 7% of women experienced physical partner violence during their most recent pregnancy, and one-third of these women reported that the physical violence they experienced was severe enough to cause them pregnancy-specific morbidities, such as miscarriage (6). To our knowledge, there are no studies in South Africa on the prevalence of sexual or psychological IPV during pregnancy or the first nine months postpartum.

In addition, there is a global gap in knowledge of how levels of IPV change during pregnancy and the first nine months postpartum. While retrospective research suggests IPV decreases during pregnancy (as compared to before pregnancy) it is unclear whether IPV decreases or increases postpartum. While two studies found that the prevalence of IPV increased within the first year postpartum as compared to during pregnancy (20, 62), a different study found that the prevalence of IPV decreased further in the immediate postpartum time period (18). Further, there is a dearth of research on the severity of physical IPV and the prevalence of sexual or psychological IPV postpartum.

It is critical to better understand the burden of IPV during pregnancy and the postpartum period in South Africa since there are specific consequences from IPV during this time period. IPV during pregnancy has been associated with physical morbidity, including preterm labor, vaginal bleeding, kidney infection and urinary tract infections (63, 64). IPV during pregnancy has also been associated with poor mental health, including increased emotional distress during pregnancy (65, 66) and postnatal depression (67). In a retrospective case-control study in the United States with abused women, researchers found

that abused women who also experienced IPV during pregnancy were at increased risk for future homicide as compared to abused women who did not experience IPV during pregnancy (68).

IPV during pregnancy also has been associated with adverse consequences for the infant. Infants whose mothers experience IPV during pregnancy are at greater risk of low birth weight (69-71), preterm birth (69) and perinatal death than infants whose mothers do not experience IPV during pregnancy (69).

The purpose of this study is twofold. First, I describe the prevalence and rates of (a) any violence; (b) physical violence (including moderate and severe physical violence); (c) psychological violence; and (d) sexual violence during the period of reproduction amongst 444 urban South African women seeking antenatal and postnatal care. Second, I describe how the prevalence of IPV changes across pregnancy and the first nine months postpartum for these same women.

Methods

Setting and study overview

The data set for this analysis comes from women who participated in the control arm of the South Africa HIV Antenatal Post-test Support Study (SAHAPS), a longitudinal randomized controlled trial designed to provide psychosocial support or the standard of care to 1,500 women during pregnancy and the postpartum period. SAHAPS was based in a public antenatal clinic in Umlazi township, which is 17km southwest of Durban, South Africa in the province of KwaZulu Natal (KZN). Approximately 9,000 women initiate antenatal care at the clinic annually. Of the nine provinces in South Africa, KZN has the highest prevalence of HIV infection, the greatest proportion of individuals living in poverty and the highest infant mortality rate (72).

Women were recruited for SAHAPS at their first antenatal visit and were eligible to participate if they: (1) were at least 18 years old, (2) were pregnant, (3) had never tested for HIV or had most recently tested negative for HIV at least 3 months prior to recruitment, (4) reported having a primary partner who they had been with for at least 6 months, (5) planned to live in Durban for at least the next year, (6) planned to take their infant to the clinic for immunization visits, (7) were able to communicate in English or Zulu, and (8) did not need critical care for a high risk pregnancy that clinic staff was not able to provide.

Of 3,333 women screened, 1,636 (49.1%) met the eligibility criteria. Of the 1,636 eligible, 1,500 (92%) women consented to participate and were subsequently enrolled and randomized. Subsequent to randomization, 13 women in the enhanced counseling arm and 7 women in the usual care arm either did not complete a clinical visit, refused HIV testing or indicated that they had tested at another location, and were therefore not eligible for the study, yielding a final baseline sample size of 1480 women (733 intervention and 747 control).

Women who consented to participate completed a baseline assessment immediately after providing informed consent and prior to receiving clinical services (including HIV testing). After completion of the baseline survey, women were randomized to a study arm using permuted blocks of twelve, wherein subjects were randomly allocated within each block to the intervention or control condition. This randomization scheme was used to ensure that there was a good balance of participants allocated to the intervention and control arm on a daily basis. After randomization, women participated in the intervention or the control arm through 10 weeks postpartum. Women returned to the clinic to complete follow up assessments at 4 months postpartum and 9 months postpartum.

Each assessment was conducted by one of four trained South African survey interviewers using computer assisted personal interviews. Each interviewer completed training on conducting quantitative interviews. The training also included sessions on rapport

building, asking sensitive questions and good ethical conduct in order to maximize the quality of the data obtained. Women who showed any signs of distress during the interview were referred to the onsite psychologist on an as-needed basis. The research was approved by the board of ethics at the University of North Carolina and the University of KwaZuluNatal.

Sample

To describe the prevalence of IPV across pregnancy and the first nine months postpartum, data were used from control arm participants who participated in all three study assessments and who were with the same partner at each of the three time points (n=444). I only included women in the control arm because it is possible that the intervention affected levels of IPV across the study period since the intervention was designed, in part, to decrease IPV and there is no way to control for this in descriptive analysis. I included women who participated in all three study assessments so that I could have a consistent sample size across all estimates. Attrition analysis revealed that there were no significant differences in the prevalence of IPV during pregnancy for women who were in the study at four months postpartum and those who were not, nor were there significant differences in the prevalence of IPV during pregnancy for women who were in the study at nine months and those who were not. Finally, I only included women who had been with the same partner to increase the generalizability of the findings since research suggests that women who separate from or change partners during this time may be at greater risk of IPV than those who remain with their partner during this time (73). Nearly all participants in the sample (94%) were with the same partner at all three time points.

Measures

Violence was measuring using a modified version of the World Health Organization (WHO) Violence Against Women instrument (74). This instrument contains thirteen questions on physical, sexual and psychological violence that a woman has experienced with her current sexual partner, and it has been validated in numerous South African studies (75-77). In the study, the questions were modified to reflect the specific reference period for which the participants were being questioned. For example, in the baseline survey, the instrument assessed violence during pregnancy. Therefore, each question was prefaced with "during this pregnancy, how many times has your current partner…" In the four month postpartum survey, the instrument assessed violence since delivery, and each question was prefaced with "since delivery, how many times has your current partner…" Finally, in the nine month postpartum survey, the instrument assessed violence between four months and nine months, and each question was prefaced with, "since the last time I saw you, how many times has your current partner…" Each question had five response categories, ranging from 'never' to 'more than ten times.'

Any violence was created by summing a woman's responses across all thirteen items on violence and then creating a binary variable where 0=no violence and 1=one or more episodes of violence (regardless of type). A comprehensive binary variable was created to index whether a woman reported experiencing violence at any point in pregnancy or the postpartum period. Three additional binary variables were created to index violence during pregnancy, violence at four months postpartum and violence at nine months postpartum separately.

Rate of total violence In order to calculate the total rate of violence at each time point, the responses to the items for all thirteen violence questions were summed and then divided by the number of months in that particular exposure period. For example, at baseline, women were asked about their experiences of IPV "during pregnancy." Women's

gestational ages varied at baseline (because each woman enrolled in the study when she initiated antenatal care). Therefore, the reference period for exposure to IPV differed across women. To adjust for different lengths of exposure to violence, scores on the violence measure were divided by gestational age (measured in months).

Likewise, at four months postpartum, women were asked about their experiences of IPV "since delivery." Women had a window of time in which they could attend this visit, which meant that the reference period for exposure to IPV postpartum also differed. To adjust for different lengths of exposure to violence in the first postpartum period, scores on the total violence measure were divided by the number of months since the woman had given birth. At nine months postpartum, women were asked about their experiences of IPV since the last time we saw them. Therefore, a similar adjustment was made adjust for different lengths of exposure to violence in the second postpartum period.

Physical violence was measured through six items on physical violence from the WHO instrument. An example of one such item is, "during [reference period], how many times has your current partner pushed or shoved you?"

Prevalence of physical violence. To assess the prevalence of physical violence, each woman's response was summed across the six items and then collapsed to create a binary variable where 0=no episodes of physical violence and 1=one or more episodes of physical violence. Binary variables were created to index physical violence during pregnancy, at four months postpartum and at nine months postpartum. The reliability averaged across the three time points was excellent (α=.80).

Prevalence of moderate physical violence. The prevalence of moderate physical violence was measured by two items "during [reference period], how many times has your current partner 1) slapped or thrown something at you that could hurt you; 2) pushed or shoved you (74)?" Each woman's response was summed across these two items and then collapsed to create a binary variable where 0=no moderate physical violence and 1=1 or

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more episodes of moderate physical violence. Binary variables were created to index moderate physical violence during pregnancy, at four months postpartum and at nine months postpartum.

Prevalence of severe physical violence. The prevalence of severe physical violence was measured by four items "during [reference period], how many times has your current partner: 1) hit you with his fist or something else that could hurt you; 2) kicked you, dragged you or beaten you up; 3) choked or burnt you on purpose; and 4) threatened to use or actually used a gun, knife or other weapon that could hurt you (74)?" Severe physical violence is distinct from moderate physical violence in that it has a higher likelihood of causing physical injury (74). Each woman's response was summed across the four items and then collapsed to create a binary variable where 0=no severe physical violence and 1=1 or more episodes of severe physical violence. Binary variables were created to index severe physical violence during pregnancy, at four months postpartum and at nine months postpartum.

Rate of physical violence. To calculate a rate of physical violence at each time point, responses to the items for physical violence were summed and then divided by the number of months in the exposure period.

Psychological violence was assessed through four items on psychological violence from the WHO instrument. One such item was, "during [reference period], how many times has your current partner insulted you or made you feel bad about yourself?"

Prevalence of psychological violence. Each woman's response was summed across the four items and then collapsed to create a binary variable where 0=no psychological violence and 1=one or more episodes of psychological violence for each of the three time points. Binary variables were created to index psychological violence during pregnancy, at

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four months postpartum and at nine months postpartum. The reliability averaged across the three time points was good (α=.69).

Rate of psychological violence. To calculate a rate of psychological violence at each time point, responses to the items for psychological violence were summed and then divided by the number of months in the exposure period.

Sexual violence was assessed through three items on sexual violence from the WHO instrument. One such item was, "during [reference period], how many times has your current partner physically forced you to have sex when you did not want to?"

Prevalence of sexual violence. Each woman's response was summed across the three items and then collapsed to create a binary variable where 0=no sexual violence and 1=one or more episodes of sexual violence for each of the three time points. Binary variables were created to index sexual violence during pregnancy, at four months postpartum and at nine months postpartum. The reliability averaged across the three time points was excellent (α=.77).

Rate of sexual violence. To calculate a rate of sexual violence, at each time point responses to the items for sexual violence were summed and then divided by the number of months in the exposure period.

Results

Description of sample

Women's ages ranged from 18-44 years and almost all (94%) had completed secondary school or more (see Table 3.1). As described by the eligibility criteria, all women had the same partner across the time period, but only a quarter of them currently lived with their partner. These low cohabitation rates are consistently reported for relationships in this setting, and may be in part because of low marital rates and/or the fact that some women's

partners worked elsewhere in the country for a major part of the year (78). On average, women had been in a relationship with their current partner for 4.5 years. Thirty-six percent of women in the sample were HIV-positive at baseline. Just over one-third of women were pregnant for the first time and four-fifths described their pregnancy as unintended. On average, women were five months pregnant at their first antenatal care visit (range 1-9 months).

Prevalence

Almost half of all women (42.12%) experienced at least one act of physical, psychological or sexual IPV either during pregnancy or postpartum. Just over one-fifth of women (21.39%) experienced any IPV during pregnancy (Table 3.2). Nearly a quarter of women (24.77%) experienced any IPV at four months postpartum and the prevalence decreased slightly (18.23%) after the initial postpartum period.

Approximately nine percent of women (8.78%) experienced physical IPV during pregnancy. The prevalence of physical IPV increased at four months postpartum (13.29%) and the prevalence of physical violence decreased slightly at nine months postpartum (11.18%). Approximately eight percent (8.33%) of all women experienced moderate physical violence during pregnancy, 12.61% experienced moderate physical violence at four months postpartum and 10.26% experienced moderate physical IPV at nine months postpartum. The prevalence of severe physical IPV was relatively stable across the three time points (ranging from 3.15%-5.17%).

Psychological IPV was more prevalent than physical IPV during pregnancy (16.67%). The prevalence of psychological IPV increased at four months postpartum (19.59%) and the prevalence decreased at nine months postpartum (13.69%). The prevalence of sexual IPV was stable across all three time points (ranging from 2.72-3.15%).

Rates of IPV

Women experienced an average of 0.16 acts of IPV per month during pregnancy. The mean rate of any IPV nearly doubled at four months postpartum (from 0.16 to 0.29) and remained high at nine months postpartum (.27). Women experienced an average of 0.05 acts of physical IPV per month and the rate more than doubled at fourth months postpartum (.11) and remained high at nine months postpartum (.12). The mean rate of psychological violence per month during pregnancy (.09) was nearly double that of physical violence during pregnancy (.05). The mean rate of psychological violence increased at four months postpartum (.16) and decreased at nine months postpartum (.12). The mean rate of sexual violence was stable across the three time points (ranging from 0.02-0.03 acts per month).

Discussion

The aim of this study was to determine the prevalence and rates of different types of IPV at three points in pregnancy and the postpartum period. Over 40% of women experienced at least one act of physical, psychological or sexual IPV across pregnancy or the postpartum period. More than 20% of all women experienced at least one act of physical, psychological or sexual IPV during pregnancy, and the prevalence and rates of any IPV were generally higher in the postpartum period as compared to during pregnancy. Almost 10% of all women experienced physical violence during pregnancy and the prevalence and rates of physical IPV increased in the initial postpartum period and continued to stay high at nine months postpartum. More than 15% of women experienced psychological IPV during pregnancy and the prevalence and rates of psychological IPV increased in the initial postpartum period and then decreased slightly at nine months postpartum. Finally, approximately 3% of women experienced sexual IPV during pregnancy,

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and the prevalence and rates of sexual IPV remained relatively constant through the postpartum time period.

Pregnancy

The prevalence of any IPV during pregnancy (21.4%) was similar to two other studies of IPV in sub-Saharan Africa in which 22.9% of urban Nigerian women (41) and 27.7% of urban Ugandan women experienced IPV during pregnancy (43); however, the prevalence of any IPV was lower than a study of IPV among urban women in Kenya (37%) (45). Additionally, the prevalence of physical IPV during pregnancy was 8.8%, which is within the range of other prevalence estimates of physical IPV during pregnancy in both South Africa and sub-Saharan Africa (3.8%-13.5%) (22, 42). The prevalence of physical IPV during pregnancy was higher than most prevalence estimates of women in the United States who experienced IPV during pregnancy (which ranged between 4.0-8.0%) (79). Finally, the prevalence of physical IPV during pregnancy was also within the range of most estimates in a study of IPV that spanned ten countries conducted by the World Health Organization (in most countries, the prevalence of physical IPV during pregnancy was between 4-12%) (74). While the wide variation in prevalence may be partially attributable to differences in measurement and definition of IPV across studies, the estimates are conservative because the prevalence of IPV during pregnancy was assessed at women's baseline visit, which took place at an average gestational age of five months.

Approximately 3% of the sample experienced severe physical violence during pregnancy, which meant that at least once during their pregnancy, they were hit with a fist, dragged or beaten up, choked or burnt on purpose, threatened or actually assaulted by their partner with a weapon. While women were not asked to detail injuries that resulted directly from their experiences of IPV, the potential trauma from this violence during pregnancy should not be taken lightly. These acts of violence can directly and indirectly affect

pregnancy outcomes. For example, IPV directed at the abdomen during pregnancy has been associated with preterm labor and miscarriage (80, 81).

The prevalence of psychological IPV during pregnancy (16.67%) was lower than the prevalence of psychological IPV in a cross-sectional study with pregnant women in an urban city in Kenya (29%) (45) but still the most common type of IPV women in this study experienced in pregnancy. The prevalence of psychological IPV (16.67%) was nearly double the prevalence of physical IPV (8.78%) and more than five times the prevalence of sexual IPV (3.15%). It is possible that psychological IPV is more prevalent than physical IPV because it is less visible and therefore easier to get away with during pregnancy; however, future research is needed to better understand the social norms governing different types of violence during pregnancy.

The prevalence of sexual IPV during pregnancy (3.15%) was comparable to the prevalence of sexual IPV among a group of Chinese women (2.8%) (20) and lower than the prevalence of sexual IPV in the cross-sectional study with pregnant women in an urban city in Kenya (12%) ((45). While the prevalence of sexual IPV was much lower than other types of IPV during pregnancy, the effects of sexual violence can be even more pernicious than the effects of physical violence alone and may include increased risk of sexually transmitted infections, including HIV (82).

Postpartum

This study is the first to examine IPV in the postpartum period among South African women and one-quarter of women experienced at least one act of physical, sexual or psychological IPV at four months postpartum. To our knowledge, this is among the highest prevalence estimates reported in the early postpartum time period among a sample of adult women. Whereas 13.0% of women in this study reported physical IPV at four months postpartum, only 3.2% of American women in North Carolina reported physical IPV at 3.6

months postpartum (18). The prevalence of physical violence was also among the highest estimates globally at nine months postpartum. That is, 11.0% of women in this study reported physical IPV at nine months postpartum, compared to 7.4% of Chinese women and 4.1% of French women both at twelve months postpartum (20) (62).

Approximately 5.0% of women experienced severe physical violence at four and nine months postpartum. To my knowledge, there is no research assessing the effects of severe IPV in the postpartum time period. However, this can be a time of heightened vulnerability as women recover from the pregnancy and the physical act of labor. Future research should assess how severe IPV during this time affects women's physical recovery, their ability to provide infant care, their ability to breastfeed their infant as desired and their mental health (83).

The prevalence of psychological IPV postpartum was high: nearly 1 in 5 women experienced psychological violence at four months postpartum. While there is a dearth of research on psychological IPV in the postpartum period in other settings, the high prevalence is of concern given that research outside of pregnancy and postpartum has found psychological IPV to be just as detrimental to women's mental health and well-being as physical IPV (84-86). For example, in one cross-sectional population-based study in Japan, women who experienced only psychological IPV had higher levels of suicidal ideation, symptoms of distress, difficulty with daily activities and greater use of health services as compared to women who did not experience psychological IPV(87).

Finally, the prevalence of sexual IPV at both four and nine months postpartum (2.0% and 2.7%, respectively) was slightly lower than the prevalence of sexual IPV among a group of Chinese women at twelve months postpartum (4.9%) (20). While sexual IPV was much rarer than physical and psychological IPV in our sample, the potential negative effects (and in particular, unwanted pregnancy) makes each act of sexual IPV in the postpartum period of concern.

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Changes in prevalence and rates of violence over time

The prevalence of all types of IPV except sexual IPV increased from pregnancy into the postpartum period and the severity of physical violence also increased across this time period. These findings are consistent with research on violence during pregnancy and postpartum among women in China and France (20, 62). Social sanctions against IPV during pregnancy may end with the birth of the child, thereby explaining the increase the proportion of women who experienced IPV again (and in particular, physical violence) in the early postpartum period. A second possibility is that the stress that often accompanies the early postpartum time period elicits violence from the partner if he is unable to cope with the demands of parenthood (57). However, these interpretations are speculative; future qualitative research is necessary to better understand the acceptability of IPV amongst South Africans, particularly during the postpartum time period.

There were two key differences in the findings depending on whether one interprets the trends based on prevalence estimates or as rate estimates. First, the degree of change over time differed using the different metrics. For example, for physical violence, the prevalence estimate increased one and a half times from pregnancy to four months postpartum. Yet the rate estimate of physical violence doubled from pregnancy to four months postpartum. Second, though the trends over time were generally similar regardless of whether I looked at the prevalence estimates or the rates, there was one discrepancy. The prevalence of any violence increased from pregnancy to four months postpartum and then decreased again at nine months postpartum. However, the trend as depicted by the rate estimates differs: the rate increased from pregnancy to four months postpartum and then stayed essentially the same at nine months postpartum. These differences in the degree of change, as well as the difference in the actual trend itself suggest that the prevalence estimates may be biased by differential exposure periods. Therefore, rates of violence for each time period may give us a more accurate understanding of how IPV

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changes for a specific population during this time. Currently, researchers predominantly report prevalence estimates in the literature. For greater precision and also more meaningful comparability of findings across settings, researchers may want to consider reporting rates of IPV in future work.

This study is not without limitations. First, the only assessment of IPV during pregnancy took place at a woman's first antenatal visit, which means that we did not ask about women's experience of IPV during the full exposure period of pregnancy. Since this visit took place, on average, at five months postpartum, it is likely the prevalence of IPV during pregnancy is downwardly-biased. Second, the eligibility criteria to participate in the SAHAPS study excluded women potentially at even greater risk of IPV than those in our sample (e.g. those who were HIV-positive were not eligible to participate). Such selection bias may have affected the prevalence estimates and also contributed to downwardly-biased estimates of IPV. Third, the sensitive nature of asking about IPV may have led to measurement error. Although the study interviewers were trained to ask questions in a sensitive manner, a woman's unwillingness or inability to disclose violence may also have led us to underestimate the prevalence of IPV during this time. Further, given that the data are self-reported, recall bias could also affect the estimates of IPV. A final limitation is that I am looking at prevalence and/or rate estimates at each time point, which does not tell me if the same women who experienced IPV during pregnancy continued to experience IPV postpartum. Longitudinal research is needed to further understand how violence changes (or does not change) for women whose relationships are most abusive prior to pregnancy.

Nonetheless, the study has numerous strengths. It is one of the first studies to look at rates of different types of violence during pregnancy and the first nine months postpartum. Rates may allow for more comparability across time (and also across studies) because the variable presented in this way controls for differential exposure. An additional strength of the study is that it gives us a better sense of the scope of IPV during pregnancy among South

African women because it describes physical, psychological and sexual violence women experienced during this time. It also contributes to our global understanding of IPV in the postpartum time period as well as how prevalence and rates of IPV change across pregnancy and postpartum.

The high prevalence of violence (and particularly psychological violence) during pregnancy and postpartum highlight the urgent need to develop screening and intervention strategies during this time period. The findings illustrate the importance of screening and intervening both during pregnancy and the postpartum period. The findings also suggest that women need to be screened not only for physical violence but also for psychological violence since psychological violence was more prevalent than physical violence, particularly during pregnancy.

South African women are not currently screened for IPV during pregnancy and the postpartum period (88). While there is little evidence to suggest that screening alone reduces IPV, screening done in conjunction with an intervention may reduce women's risk of future IPV(89). There are at least three interventions in other countries that have been efficacious at reducing IPV during this particular time period (90-92). The interventions each offered screening along with additional counseling and/or support to the pregnant woman/new mother. These interventions could be adapted for the South African context and then evaluated to determine their effectiveness at reducing IPV during the period of reproduction.

Interventions beyond the healthcare sector are also needed to address IPV during pregnancy and the postpartum period. While there are a number of community-based interventions that have been effective at reducing IPV in South Africa (such as Stepping Stones and the Intervention with Microfinance for AIDS and Gender Equity (IMAGE)) (93, 94), these interventions are not specific to pregnancy and the postpartum period. Interventions that are tailored specifically to meet the needs of partners of pregnant women

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and/or new fathers may be especially important to reduce male perpetration of violence during this time. Additional community-based research and intervention to better understand and address social norms surrounding violence during pregnancy and the early postpartum period may also prevent violence during the period of reproduction.

As seen both by the high prevalence estimates during pregnancy and the postpartum period and by the fact that the rate of IPV nearly doubled from pregnancy into the first four months postpartum, IPV is a continued burden throughout pregnancy and postpartum among South African women. The levels of IPV during pregnancy and the postpartum period among South African women are at least equal to or greater than the levels reported globally. Given the multiple negative health outcomes associated with violence during this time, it is critical to develop and implement IPV prevention interventions during pregnancy and the postpartum period.

Tables

Table 3.1 Sociodemographic characteristics of the sample at baseline (n=444)

		(mean, sd)
Participant's age (years)		25.90 (5.80)
Length of relationship (years)		4.71 (4.30)
Gestational age (weeks)		23.79 (5.56)
		(n, %)
Live together		111 (25.00)
Education	*Primary*	27 (6.60)
	Secondary	173 (38.96)
	More than secondary	244 (54.95)
HIV+ status at baseline		158 (35.59)
# of prior pregnancies	*0*	164 (36.94)
	1	161 (36.26)
	2 or more	119 (26.80)
Pregnancy unintended		349 (80.00)*

n=438 due to missing data

Table 3.2 Prevalence and rates of IPV during pregnancy and the postpartum period (n=444)

	During Pregnancy	Delivery to four months postpartum	Four months to nine months postpartum
Prevalence estimates [a]			
Any IPV	21.39 (17.57, 25.23)	24.77 (20.74, 28.81)	18.23 (15.94, 20.52)
Physical IPV	8.78 (6.14, 11.43)	13.29 (10.12, 16.46)	11.18 (9.32, 13.05)
Psychological IPV	16.67 (13.19, 20.15)	19.59 (15.89, 23.30)	13.69 (11.65, 15.72)
Sexual IPV	3.15 (1.52, 4.79)	2.03 (0.70, 3.34)	2.72 (1.76, 3.69)
Moderate physical IPV	8.33 (5.75, 10.91)	12.61 (9.51, 15.71)	10.26 (8.47, 12.06)
Severe physical IPV	3.15 (1.52, 4.79)	4.73 (2.74, 6.71)	5.17 (3.86, 6.48)
Rate estimates [b]			
Any IPV rate	0.16 (.51)	0.29 (.89)	0.27 (1.58)
Physical IPV rate	0.05 (.22)	0.11 (.40)	0.12 (.75)
Psychological IPV rate	0.09 (.30)	0.16 (.46)	0.12 (.49)
Sexual IPV rate	0.02 (.12)	0.02 (.21)	0.03 (.43)

[a] *Data are expressed as (%, 95% CI)*
[b] *Data are expressed as (mean, sd)*

Chapter 4: Trajectories of IPV among South African women during pregnancy and the postpartum period

Introduction

Intimate partner violence (IPV) is recognized as a major public health burden in South Africa that affects women at all points in their life course. A recent study found that 21% of South African women experienced IPV during pregnancy and up to 25% experienced IPV in the first nine months postpartum (95). This is of concern given that IPV during pregnancy and the postpartum time period can negatively impact both women and their infants' health (63-67). Despite the high prevalence estimates, we do not know if IPV changes for South African women as they transition from pregnancy to the postpartum period, nor do we know what protects or exacerbates their risk during this time. In order to appropriately identify and intervene with South African women at risk of IPV during and following pregnancy, it is important to understand if and how IPV changes and for whom it changes during pregnancy and the first nine months postpartum.

Studies that have examined whether IPV changes as women transition from pregnancy to the postpartum period report inconsistent findings. One longitudinal study with North Carolinian women found that IPV increased during pregnancy and decreased in the first year postpartum (16), whereas another longitudinal study with women in four U.S. cities found that IPV did not change from pregnancy through the first six months postpartum (17). Other cross-sectional, retrospective studies that asked about IPV before, during and after

pregnancy used flow charts to describe how IPV changes for some women and not others (18-20). However, the cross-sectional studies did not use statistical analyses to model change in IPV over time, which limits our ability to understand what the average pattern, or trajectory, of IPV looks like during pregnancy and postpartum.

Modeling trajectories of IPV through the use of multilevel random coefficient growth analysis has a number of distinct benefits as compared to the methods used in previous studies. Specifically, this modeling approach allows us to describe the mean trajectory of IPV over time by generating a parameter to estimate the mean level of IPV at pregnancy (reflected by the intercept) as well as a parameter to estimate the mean change in IPV over time (reflected by the slope). In addition, this modeling approach allows us to test whether there is significant heterogeneity across women by generating a parameter to estimate variability across women in their levels of IPV at pregnancy (intercept) as well as generating a parameter to estimate variability across women in change in IPV over time (slope). And finally, this method enables us to assess what factors are associated with variability in IPV at pregnancy as well as variability in change in IPV over pregnancy and the postpartum period. In sum, this method allows us to test if IPV changes over pregnancy and the postpartum period, if there is significant heterogeneity in women's experiences of IPV at this time and what factors contribute to deviation from the mean trajectory during pregnancy and the postpartum period (52).

Although it is not clear from existing literature if IPV changes during and after pregnancy, one group that is at continued risk of IPV during pregnancy and postpartum is women who have experienced IPV in their relationship before pregnancy (18, 21). One theoretical explanation for persistent victimization draws on the theory of state dependence. State dependence theorists posit that prior events (like the experience of IPV) change an individual in such a way that she is at increased risk of that same event in the future (53).

Thus, adult women who have experienced IPV within their current relationship are vulnerable and at risk of IPV in the future in their relationship.

While there is evidence of the association between IPV before pregnancy and IPV during pregnancy and/or postpartum, there is also research which suggests that pregnancy and postpartum may be a time of respite. Specifically, some women who have previously experienced IPV in their relationship find that IPV ceases or abates during pregnancy and postpartum (17-20). Finally, some women who have never experienced IPV in their relationship before pregnancy find that it emerges for the first time during pregnancy and/or postpartum (17-22). Taken together, these findings suggest that other factors may moderate the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period.

Life course theorists posit that the continued pattern of a behavior or outcome over time, i.e., one's trajectory, can be interrupted at developmental transitions depending on the levels of other factors at that transition (23, 24). Glen Elder, one of the earliest life course theorists to study trajectories and turning points posited that the *resources and experiences* that people have at the transition (pg. 35, (23)) are factors that may explain why these transitions matter for some individuals' trajectories and not others. That is, levels of *resources and experiences* may explain differences between individuals in their trajectories of IPV over time.

Psychosocial *resources*, in particular, are factors that are posited to play "an ameliorative or positive role" at transitional moments (pg. 10 (24)). Such *resources* are broadly defined by life course theorists, however, other researchers theorize that certain core characteristics of the intimate relationship can be resources that affect risk of ongoing violence (25, 50). One psychosocial *resource* that may buffer the association between past IPV and future IPV may be the power a woman has in her relationship to control her own decision making, her own behavior and the behavior of her partner. Canadian women with a

history of violence in their current relationship described how their own power (defined by control over her own and her partner's behavior) at a transitional moment within the relationship was a key factor that protected them from future violence (28). Similarly, Nicaraguan women who had higher power (defined by control over behavior and activities) within their relationship during pregnancy or the postpartum period were more likely to experience cessation of IPV than women who had lower relationship power(19). These two studies both described how relationship power affected women's risk of IPV such that IPV ceased over the long term; however, they did not test whether relationship power moderated the association between past experience of IPV and future experience of IPV. This study builds on these prior studies by testing whether relationship power weakens the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period.

Another psychosocial *resource* that may buffer the association between past IPV and future IPV may be the social support a male partner provides in the relationship. Criminologists Sampson and Laub posited that men's deviance (including aggression) might be interrupted at a transition like marriage. They theorized that men who were more bonded to their wives at marriage would be less likely to engage in deviance (including aggression) than men who were less bonded because they would risk losing the investments they had gained from their relationship. They argued that bonding served as informal social control, and their empirical work supported their proposition (50). As applied to this study, the continuity of IPV might be interrupted or weakened at the transition of pregnancy for men who provide more support (and are therefore more bonded) to their partners as compared to men who provide less support.

In addition to the role that psychosocial *resources* play in affecting trajectories at transitional moments, Elder posited that *experiences* at the transition might also affect trajectories (23). However, in contrast to the potential buffering effect of psychosocial *resources*, the *experience* of relationship stress might exacerbate the association between

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past IPV and future IPV. When the frequency or the impact of relationship stress exceeds an individual's ability or perceived ability to cope with the stress in an adaptive way, negative health outcomes or behaviors (e.g. perpetration of violence) can occur (55, 56). The transition to parenthood that is associated with pregnancy may be a period with high relationship stress for couples (57). Couples may face either new or increased relationship stress at this transition and their ability to respond to this relationship stress may change interactions within the relationship. Therefore, the *experience* of relationship stress might exacerbate the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period.

The current study

In the current study, I had two overarching aims. The first aim was to describe the mean trajectory of IPV over pregnancy and the first nine months postpartum. The second aim was to examine the relationship between pre-pregnancy IPV and trajectories of IPV and to determine whether three core relationship characteristics moderated the association between pre-pregnancy IPV and IPV during pregnancy and the first nine months postpartum. For both aims, I modeled trajectories of physical IPV and psychological IPV.

There were no a priori hypotheses for the first aim because there is no empirical research on trajectories of IPV during pregnancy and the postpartum period. There were two hypotheses for the second aim. The first hypothesis was that the relationship between pre-pregnancy IPV and IPV during pregnancy and postpartum would be weaker for women who reported higher relationship power and higher partner social support, such that pre-pregnancy IPV would be more strongly associated with IPV during pregnancy and the postpartum period for women with lower relationship power and lower partner social support than for women with higher relationship power and higher partner social support. The second hypothesis was that the relationship between pre-pregnancy IPV and IPV during

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pregnancy and postpartum would be exacerbated for women who reported more relationship stress, such that pre-pregnancy IPV would be more positively associated with IPV during pregnancy and postpartum for women with greater relationship stress than for women with lower relationship stress.

Random coefficients multilevel growth modeling was used to achieve the objectives. First, unconditional growth models were built to describe the trajectories of IPV over pregnancy and postpartum and to test whether or not there was a linear change in rates of IPV during this time. Second, a series of conditional models were built to examine three-way interactions between pre-pregnancy IPV, relationship characteristics and time. Through these conditional models, I tested the hypotheses that levels of core relationship characteristics at pregnancy could interfere with continuity of IPV over time such that the relationship between pre-pregnancy IPV and IPV during pregnancy and postpartum would be weaker for South African women who reported more favorable levels as compared to less favorable levels of relationship characteristics. Through these conditional models, I also tested the hypotheses that core relationship characteristics at pregnancy may facilitate turning points in some women's experiences of IPV. See Figure 4.1 for a conceptual model detailing the proposed analyses.

Methods

Setting

This study was based in a public antenatal clinic in Umlazi township, which is 17km southwest of Durban, South Africa in the province of KwaZulu Natal (KZN). Approximately 9,000 women initiate antenatal care at the clinic annually. Of the nine provinces in South Africa, KZN has the highest prevalence of HIV infection, the greatest proportion of individuals living in poverty and the highest infant mortality rate (72).

Data source

The data set for this analysis comes from the South Africa HIV Antenatal Post-test Support Study (SAHAPS), a longitudinal randomized controlled trial designed to provide either psychosocial support or the standard of care to 1,500 HIV-positive and HIV-negative women during pregnancy and the postpartum period. Women who consented to participate in SAHAPS completed a baseline assessment immediately after providing informed consent and prior to receiving clinical services (including HIV testing). After completion of the baseline survey, women were randomized to a study arm using permuted blocks of twelve, wherein subjects were randomly allocated within each block to the intervention or control condition. This randomization scheme was used to ensure that there was a good balance of participants allocated to the intervention and control arm on a daily basis. After randomization, women participated in the intervention or the control arm through 10 weeks postpartum. Follow up behavioral assessments were done at four months postpartum and nine months postpartum; 1,154 women (77%) returned at four months postpartum and 1,104 women (75%) returned at 9 months postpartum.

Each assessment was conducted by one of four trained South African survey interviewers using computer assisted personal interviews. Each interviewer completed training on conducting quantitative interviews. The training also included sessions on rapport building, asking sensitive questions and good ethical conduct in order to maximize the quality of the data obtained. Women who showed any signs of distress during the interview were referred to the onsite psychologist on an as-needed basis. The research was approved by the board of ethics at the University of North Carolina and the University of KwaZuluNatal.

Sample

Women were recruited for the study at their first antenatal visit and were eligible to participate in SAHAPS if they: (1) were at least 18 years old, (2) were pregnant, (3) had never tested for HIV or had most recently tested negative for HIV at least 3 months prior to recruitment, (4) reported having a current primary partner who they had been with for at least 6 months, (5) planned to live in Durban for at least the next year, (6) planned to take their infant to the clinic for immunization visits, (7) were able to communicate in English or Zulu, and (8) did not need critical care for a high risk pregnancy that clinic staff was not able to provide.

Of 3,333 women screened, 1,636 (49.1%) met the eligibility criteria. Of the 1,636 eligible, 1,500 (92%) women consented to participate and were subsequently enrolled and randomized. Subsequent to randomization, 13 women in the treatment arm and 7 women in the usual care arm either did not complete a clinical visit, refused HIV testing or indicated that they had tested at another location, and were therefore not eligible for the study, yielding a final baseline sample size of 1,480 women (733 intervention and 747 control).

Women's ages ranged from 18-44 and almost all (94%) had completed secondary school or more. Women had been in a relationship with their current partner for an average of 4.5 years; however, just over one-quarter of them (26%) currently lived with their partner. These low cohabitation rates are consistently reported for relationships in this setting, and may be in part because of low marital rates and/or the fact that some women's partners worked elsewhere in the country for a major part of the year (78). A small minority of women (5%) changed partners during the course of the study. On average, women were five months pregnant at their first antenatal care visit, which is when they completed the baseline assessment. Finally, nearly 40% experienced some type of violence in their current relationship at some point prior to pregnancy.

Measures

Measures included physical and psychological IPV, four relationship covariates (pre-pregnancy IPV, relationship power, partner social support, relationship stress) and five control covariates (age, whether the participant lived with her partner or not, whether the participant stayed with the same partner through the course of the study, treatment arm and a variable called weeks-exposure). The weeks-exposure variable accounted for the number of weeks a participant had been in the study at each of the three study assessments since the time referents at each assessment was not uniform across participants. For example, some participants came in for the baseline antenatal visit when they were 20 weeks pregnant and others came in when they were 28 weeks pregnant. Including the weeks-exposure variable in the models allowed us to control for variation across participants in the number of weeks they had been in the study at each assessment time point. Physical IPV, psychological IPV and weeks-exposure were assessed at all three study time points. Pre-pregnancy IPV, relationship power, partner social support and relationship stress and all other control variables were taken from the baseline assessment.

A modified version of the World Health Organization (WHO) Violence Against Women instrument was used to measure IPV (74). This instrument has thirteen questions on physical, sexual and psychological IPV that a woman has experienced with her current sexual partner, and it has been used in numerous South African studies (75-77). In the study, the stem of the questions were modified to reflect the specific reference period the participants were being asked about. For example, in the baseline survey, the instrument assessed IPV before pregnancy and during pregnancy. To assess IPV at any point in the relationship before pregnancy, each question was prefaced with "prior to this pregnancy, how many times has your current partner…" To assess IPV during pregnancy, each question was prefaced with "during this pregnancy, how many times has your current partner…" In the four month postpartum survey, the instrument assessed IPV since delivery,

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and each question was prefaced with "since delivery, how many times has your current partner…" Finally, in the nine month postpartum survey, the instrument assessed IPV between four months and nine months, and each question was prefaced with, "since the last time I saw you, how many times has your current partner…"

Physical IPV was assessed using six items from the adapted WHO violence against women instrument. An example of one such item is, "during [reference period], how many times has your current partner pushed or shoved you?" Each item had five response categories that ranged from never to more than ten times. Each woman's response was summed across the six items to create a single measure of physical IPV (average α=.80). The measure for physical IPV was log-transformed and a constant was added to adjust for non-normality in the distribution of the outcome.

Psychological IPV was assessed using four items from the adapted WHO violence against women instrument. An example of one such item is, "during [reference period], how many times has your current partner insulted you or made you feel bad about yourself?" Each item had five response categories that ranged from never to more than ten times. Each woman's response was summed across the four items to create a single measure of psychological IPV (average α=.69). The measure for psychological IPV was log-transformed and a constant was added to adjust for non-normality in the distribution of the outcome.

Pre-pregnancy IPV was assessed using all thirteen items from the adapted WHO violence against women instrument that specifically asked about IPV in the current relationship before pregnancy. Each woman's response was summed across the thirteen items and then dichotomized, where 0=no IPV before pregnancy and 1=one or more episodes of IPV before pregnancy.

Relationship power was assessed using twenty-two items from the modified Sexual Relationship Power scale (SRPS) (96). One item from the original scale was dropped because it overlapped completely with the relationship stress index ("my partner might be

sleeping with someone else"). The SRPS assesses power by measuring the perceived control the women has over decision-making in her relationship and by measuring the perceived control the woman has over her own behavior and her partner's behavior in the relationship. An example of one such item is "my partner does what he wants even if I do not want him to." Each item had response categories on a Likert scale. Each woman's response was summed across the twenty-two items to create a single measure of relationship power, with higher scores being indicative of higher power for the woman within the relationship (α=.86).

Partner social support was assessed using seven items from the Norbeck Social Support Questionnaire, which is an instrument that assesses emotional and material support (97). Respondents were asked to list all individuals who provided them with support in their lives and then were asked seven questions about each of these individuals. The respondent then answered on a five point Likert scale. If the partner was named, the partner social support score was the average of non-missing indicators on the scale. If the partner was not named, the partner social support score was zero (α=.73).

Relationship stress was assessed by aggregating stressful events or conditions within the relationship at pregnancy (or that were directly related to the pregnancy) (98-100). At baseline, the presence or absence of each of the following events or conditions in a participant's life were measured: HIV+ diagnosis within the current pregnancy, unintended pregnancy, perception that one's partner was being unfaithful, the woman's report of having had multiple partners within the six months prior to pregnancy or during pregnancy, previous miscarriage, death of a child, financial stress, first-time parenthood and current legal problems. All items were summed to create a composite index of relationship stress (range 0-9).

Data analysis

Random coefficients multilevel growth curve analyses using PROC MIXED (101) were used to accomplish the study aims. All analyses are specified at two levels, where time is nested within individual. The data were prepared for analysis prior to fitting the unconditional models by accounting for different time referents across participants, centering the variables appropriately and adjusting the sample size to exclude those participants who were missing on independent variables. Each of these steps is described in further detail below.

First, in this study, time is denoted by study wave (which reflects one of three particular time points: pregnancy, 4 months postpartum and 9 months postpartum). However, there was individual variability at each of these time points because women could initiate antenatal care in pregnancy at any time point and there was a window of time in which each woman was eligible to complete the 4 month and 9 month postpartum visit. To account for these different time referents for IPV, a time-varying covariate called weeks-exposure was included in all models. This variable controlled for variation in exposure time across participants for each particular time point.

Second, variables were centered to meet the objectives of the study. Since the aim was to test whether the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period was weakened for individuals with more favorable psychosocial resources and exacerbated for individuals with higher relationship stress, I needed to compare differences in trajectories between individuals with different levels of these characteristics. To model between person differences, I grand-mean centered relationship power, partner social support and relationship stress. Time was centered such that pregnancy=0, which means that the intercept of the trajectory is the amount of IPV at pregnancy. Further, the weeks-exposure variable was person-mean centered so that the

variable reflected the number of weeks the individual was in the study at each reference point relative to the overall number of weeks they participated in the study (52).

Third, approximately 2% of individuals were missing values on one or more independent, moderating or control variables. These individuals were dropped from the analysis for a final sample size of 1,447 participants.

After organizing the data, I examined the shape and error structure of the unconditional trajectories of physical and psychological IPV across pregnancy and nine months postpartum. The best model fit for both physical and psychological IPV was a linear model specifying a random intercept and random slope with heteroscedastic residuals. Given the limited number of time points in the data set (3), I was able to test for linear but not higher order trajectories (e.g. quadratic).

Conditional models were built in three phases to arrive at final, parsimonious conditional growth models for both physical and psychological IPV. To test hypotheses, I started with the highest order interactions and worked backwards. Non-significant interactions were dropped before moving on to the next phase of model building. I used likelihood ratio tests to evaluate models that were nested in their parameters to minimize type-1 error.

In the first phase, to test whether the association between pre-pregnancy IPV and trajectories of physical and psychological IPV during pregnancy and the postpartum period was moderated by relationship characteristics (relationship power, partner social support and relationship stress), I compared a model with the independent and moderating variables as main effects and all possible two-way interactions to a model with both the independent and moderating variables, the three three-way interaction terms (pre-pregnancy IPV *x* relationship power *x* time, pre-pregnancy IPV *x* partner social support *x* time, pre-pregnancy IPV *x* relationship stress *x* time) and all two-way interactions encompassed in those three-way interactions. This latter model allowed me to assess the effects of the interactions on

levels of IPV at pregnancy (trajectory intercept) as well as change in IPV over time (trajectory slope).

For both physical and psychological IPV, I failed to reject the null that the group of three-way interactions was significantly different from zero (for physical IPV, the x^2 value comparing the nested models with 3 degrees of freedom was 2.4 (p=.49); for psychological IPV, the x^2 value comparing the nested models with 3 degrees of freedom was 6.5 (p= .09). Therefore, I did not proceed with modeling the three-way interactions

In the second phase, I tested two-way interactions between the independent or moderating variables and time to determine if these variables predicted variability in trajectory slopes. And in the third phase, I tested whether the association between pre-pregnancy IPV and IPV at pregnancy (trajectory intercepts) was moderated by relationship characteristics. These next two phases of model building are described in greater detail below.

In the second phase, to test whether variability in trajectory slopes was explained by pre-pregnancy IPV, relationship power, partner social support and relationship stress, I compared a model containing the independent and moderating variables as main effects to a model with two-way interactions for the trajectory slope (relationship power *x* time, partner social support *x* time, relationship stress *x* time, pre-pregnancy IPV *x* time). Since these models were also nested in their parameters, I used the likelihood ratio test to test the null hypothesis that the group of two-way interactions was equal to zero. For both physical and psychological IPV, I rejected the null (for physical IPV, the x^2 value comparing the nested models with 4 degrees of freedom was 14.9 (p=.005); for psychological IPV, the x^2 value comparing the nested models with 4 degrees of freedom was 11.6 (p= .021.) Therefore, all significant interactions were retained in subsequent models.

In the third phase, to test whether the effects of pre-pregnancy IPV on trajectory intercepts (IPV at pregnancy) varied by relationship characteristics, I compared a model

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containing the main effects and previously significant interactions for the trajectory slope to a model with two-way interactions for the trajectory intercept (pre-pregnancy IPV x relationship power, pre-pregnancy IPV x partner social support, pre-pregnancy IPV x relationship stress) and significant interactions for the trajectory slope. Since these models were also nested in their parameters, I used the likelihood ratio test to test the null hypothesis that the group of two-way interactions for the trajectory intercepts was equal to zero (e.g. relationship power x pre-pregnancy IPV). For both physical and psychological IPV, I rejected the null (for physical IPV, the x^2 value comparing the nested models with 3 degrees of freedom was 35.2 (p= .000); for psychological IPV, the x^2 value comparing the nested models with 3 degrees of freedom was 31.5 (p= .000)). Therefore, all significant interactions were kept in the models.

Results

Trajectories of physical IPV during pregnancy and postpartum (unconditional model)

Parameter estimates for the unconditional model describing the trajectory of physical IPV are presented in Column 1, Table 4.1. As seen in the random effects, there was significant variability across women in the levels of physical IPV experienced at pregnancy (u_{0j} =.040, p<.0001). There was also significant variability across women in the rate of change of physical IPV over pregnancy and the first nine months postpartum (u_{1j}=.022, p<.0001). The fixed effect for time was not significant (γ_{10}=.009, p=.52), which means that the mean trajectory of physical IPV during pregnancy and the postpartum period is best characterized by a flat line.

Assessing whether relationship characteristics modify the association between pre-pregnancy IPV and women's trajectories of physical IPV during pregnancy and postpartum (conditional model)

Results from the final reduced conditional model for physical IPV are presented in Column 2 in Table 4.1. There was no effect between partner social support and trajectories of IPV (either the intercept or the slope). There was also no effect between relationship stress and trajectories of IPV (either the intercept or the slope). Relationship power did partially buffer the association between pre-pregnancy IPV and trajectories of IPV during pregnancy and the postpartum and this will be discussed further below.

As seen in Column 2 in Table 4.1, pre-pregnancy IPV had a significant positive effect on trajectory intercepts and trajectory slopes such that women who had reported pre-pregnancy IPV reported higher initial levels of IPV (trajectory intercepts) and stronger increases in IPV (trajectory slopes) over time. Relationship power moderated the effect of pre-pregnancy IPV on initial levels of IPV (trajectory intercepts) such that the effects of pre-pregnancy IPV on the initial levels of IPV were lower for women with higher power than for women with lower power. But relationship power did not moderate the effects of pre-pregnancy IPV on trajectory slopes such that for women with both higher and lower relationship power, pre-pregnancy IPV was associated with stronger increases in IPV over time.

To further probe the nature of the interactions between pre-pregnancy IPV and relationship power, I created model-predicted trajectories of IPV for four groups of women (women with pre-pregnancy IPV and higher power, women with no pre-pregnancy IPV and higher power, women with pre-pregnancy IPV and lower power, women with no pre-pregnancy IPV and lower power). Specifically, I estimated the effects of high (two standard deviations above the mean) and low (two standard deviations below the mean) relationship

power for women with and without pre-pregnancy IPV on trajectories of IPV. See Figure 4.2 for an illustration of these results.

As shown in Figure 4.2, relationship power moderated the effect of pre-pregnancy IPV on initial levels of physical IPV such that the effects of pre-pregnancy IPV on initial levels of physical IPV were lower for women with higher power than for women with lower power. This can be seen by looking at the magnitude of the difference between the intercepts for women with higher power and pre-pregnancy IPV (the dotted black line) and higher power and no pre-pregnancy IPV (the solid black line) as compared to the magnitude of the difference between the intercepts for women with lower power and pre-pregnancy IPV (the dotted gray line) and lower power and no pre-pregnancy IPV (the solid black line). Further, the buffering effect of higher relationship power extends through the postpartum period as demonstrated by the difference between the trajectories for women with pre-pregnancy IPV and higher power (the dotted black line) and women with no pre-pregnancy IPV and higher power (the solid black line) as compared to the difference between trajectories for women with pre-pregnancy IPV and lower power (the dotted gray line) and women with no pre-pregnancy IPV and lower power (the solid black line). The magnitude of the difference between the two trajectories for women with higher power (the black lines) is much smaller than the difference between the two trajectories for women with lower power (the gray lines), which suggests that higher relationship power does buffer the negative effects of pre-pregnancy IPV on physical IPV over pregnancy and the postpartum period.

Trajectories of psychological IPV during pregnancy and postpartum (unconditional model)

The unconditional models describing the trajectories of psychological IPV are presented in Column 1 of Table 4.2. The random effects indicate that there was significant variability across women in the level of psychological IPV women experienced at pregnancy

(u$_{oj}$ =.053, p<.0001) and there was also significant variability across women in the rate of change of psychological IPV over pregnancy and the postpartum period (u$_{1j}$=.023, p<.0001). The fixed effect for time was not significant (γ_{10}=-.027, p=.13), which means that the mean trajectory of psychological IPV during pregnancy and the postpartum period is best characterized by a flat line.

Assessing whether relationship characteristics modify the association between pre-pregnancy IPV and women's trajectories of psychological IPV during pregnancy and postpartum (conditional model)

Results from the final reduced conditional model are presented in Column 2 in Table 4.2. There was no effect between partner social support and trajectories of IPV (either the intercept or the slope). Relationship stress did not moderate the association between pre-pregnancy IPV and trajectories of IPV (either the intercept or the slope); however, relationship stress was associated with trajectories of IPV during pregnancy and the postpartum period. Relationship power did partially buffer the association between pre-pregnancy IPV and trajectories of IPV during pregnancy and the postpartum period and this will be discussed further below.

Pre-pregnancy IPV had a significant positive effect on the intercept such that women who had reported pre-pregnancy IPV reported higher initial levels of IPV (trajectory intercepts). Relationship power moderated the effect of pre-pregnancy IPV on initial levels of IPV (trajectory intercepts) such that the effects of pre-pregnancy IPV on the initial levels of IPV were lower for women with higher power than for women with lower power.

Pre-pregnancy IPV was not associated with trajectory slopes and there was no interaction between pre-pregnancy IPV and relationship power in predicting trajectory slopes for psychological IPV. However, relationship power was associated with trajectory slopes such that for women with lower relationship power, trajectory slopes tended to decrease

over time but stayed higher than for women with higher relationship power. To visualize the nature of the interactions between pre-pregnancy IPV and relationship power, I created model-predicted trajectories of IPV for four groups of women (women with pre-pregnancy IPV and higher power, pre-pregnancy IPV and lower power, no pre-pregnancy IPV and higher power, no pre-pregnancy IPV and lower power). See Figure 4.3 for an illustration of these results.

As seen in Figure 4.3, relationship power moderated the effect of pre-pregnancy IPV on initial levels of psychological IPV such that the effects of pre-pregnancy IPV on initial levels of psychological IPV were lower for women with higher power than for women with lower power. This can be seen by looking at the magnitude of the difference between the intercepts for women with higher power and pre-pregnancy IPV (the dotted black line) and higher power and no pre-pregnancy IPV (the solid black line) as compared to the magnitude of the difference between the intercepts for women with lower power and pre-pregnancy IPV (the dotted gray line) and lower power and no pre-pregnancy IPV (the solid black line). Further, as seen in Figure 4.3, the buffering effect of relationship power extends through the postpartum period by looking at the difference between the trajectories for women with pre-pregnancy IPV and higher power (the dotted black line) and women with no pre-pregnancy IPV and higher power (the solid black line) as compared to the difference between the trajectories for women with pre-pregnancy IPV and lower power (the dotted gray line) and women with no pre-pregnancy IPV and lower power (the solid gray line). The magnitude of the difference between the two trajectories for women with higher power (the black lines) is much smaller than the difference between the two trajectories for women with lower power (the gray lines), which suggests that higher relationship power at pregnancy does buffer the negative effects of pre-pregnancy IPV on psychological IPV over pregnancy and the postpartum period.

Contrary to hypotheses, relationship stress did not moderate the effects of pre-pregnancy IPV on trajectories of IPV. However, relationship stress was positively associated with higher initial levels of IPV (trajectory intercepts) and was negatively associated with trajectory slopes such that for women with higher relationship stress, trajectory slopes tended to decrease over time but stayed higher than for women with lower relationship stress. Trajectories were flat for women with lower relationship stress.

Discussion

Summary of findings

The current study used random coefficients multilevel growth curve modeling to (a) describe the mean trajectories of physical and psychological IPV over pregnancy and the first nine months postpartum, (b) determine whether relationship power and partner social support buffered the association between pre-pregnancy IPV and IPV during pregnancy and the first nine months postpartum and (c) determine whether relationship stress exacerbated the association between pre-pregnancy IPV and IPV during pregnancy and the first nine months postpartum.

The mean trajectory for both types of IPV was flat which suggests that, on average, there was not significant change in levels of IPV over pregnancy and the first nine months postpartum. However, there was significant variability in levels of IPV at pregnancy and in rates of change in IPV over pregnancy and the postpartum period. Finally, none of the relationship characteristics moderated the effects of IPV on trajectory slopes and only one moderated the effects of IPV on trajectory intercepts.

Life course theorists posit that transitional events like pregnancy can interfere with continuity of IPV based on the levels of other core relationship characteristics at that transitional moment (50, 102); however, there was only some evidence that these

characteristics modified the association between pre-pregnancy IPV and trajectories of IPV during pregnancy and the postpartum period. There are three potential reasons that the hypotheses were only partially supported. First, it may be that women's vulnerability is increased during pregnancy in such a way that the proposed relationship characteristics were not strong enough to overcome pre-existing dynamics that facilitate the persistence of physical IPV within the relationship. For example, it is possible that pre-pregnancy IPV may lead to poor mental health during pregnancy, which in turn, may be associated with continued risk of IPV during pregnancy and the postpartum period. Second, it is possible that core relationship characteristics modify women's trajectories of IPV only for certain individuals. For example, core relationship characteristics may be more relevant in relationships in which there is a history of moderate IPV but not in those relationships in which there is a history of severe IPV. And third, it is possible that the lack of an interaction over time may be because the effects of relationship characteristics on the association between pre-pregnancy IPV and trajectories of IPV are more proximal. In this study, all three moderators were measured as time-stable. Future studies should model relationship characteristics as time-varying, which would allow us to assess whether increases or decreases in an individual's relationship characteristics at each time point is concurrently associated with stronger or weaker associations in the relationship between pre-pregnancy IPV and IPV at that same time point.

Relationship power

Consistent with study hypothesis, higher relationship power protected women with pre-pregnancy IPV from IPV during pregnancy. Further, higher relationship power continued to confer some protection in the postpartum period, although physical IPV began to increase again during this time. As discussed previously, women who have higher relationship power postpartum may find that higher relationship power concurrently weakens the association

between pre-pregnancy IPV and IPV postpartum, whereas women who have lower

relationship power postpartum may find that this power concurrently strengthens the

association between pre-pregnancy IPV and IPV postpartum. Future studies should explore

whether relationship power is a time-varying or time-stable characteristic to further

understand how relationship power protects women from IPV risk at different time points.

Additionally, women with pre-pregnancy IPV and lower relationship power had the

highest levels of physical and psychological IPV at pregnancy and also the highest rates of

IPV through the first nine months postpartum. These findings are consistent with a "dual-

risk" model which posits that negative effects of different interpersonal factors can be

synergistic in terms of one's susceptibility to IPV (103, 104). The findings lend support to this

idea because the detrimental effects of pre-pregnancy IPV were enhanced for women with

lower relationship power such that the effects were stronger for women with lower power

than those with higher power at each time point in the study.

Partner social support

There was no support for the hypothesis that higher partner social support interfered

with the continuity of IPV from pre-pregnancy into the postpartum period. The hypothesis

regarding partner social support built on Sampson and Laub's study of how relationships at

marriage affected trajectories (50), which was also based in part on Social Control Theory

(30). I posited that men with a history of perpetration who were more supportive of the

pregnancy and impending fatherhood would be more bonded to society and therefore less

likely to perpetrate IPV because of the presumed cost of perpetrating IPV (potentially losing

the relationship and/or connection to their child).

There are two potential reasons partner social support was not associated with

change in IPV. First, it is possible there was not adequate measurement of how bonded

women's partners were partner social support was the only measure of bonding within this

study. Bonding is a multidimensional construct and also includes assessment of a male's commitment to and involvement in conventional activities and relationships and his beliefs that non-violence is a normative ideal (30). Better measurement of bonding in future study may determine whether bonding is associated with IPV during pregnancy and the postpartum period among South African women. A second reason the hypothesis might not have been supported is because partner social support may not reduce risk of IPV but rather enhance risk of IPV for women with a history of pre-pregnancy IPV. This may be especially true in relationships where the support is largely financial or material in nature and the male partner provides the support as one means of controlling his partner.

Relationship stress

There was also no support for the hypothesis that relationship stress exacerbates the association between pre-pregnancy IPV and IPV during the postpartum period. There are two possible reasons why this hypothesis was not supported. First, our measurement of relationship stress captured only one dimension of stress: the presence or absence of specific relationship stress at pregnancy. Other research suggests stress is a multidimensional construct and that one's perception of stress (as stressful or not) are also related to IPV risk (98). It is possible that perceptions of stress partially or fully mediate the moderated relationship of relationship stress and pre-pregnancy IPV and IPV during pregnancy and postpartum, but we did not measure perceptions of stress and therefore could not test for mediation in this study. Second, it may be that relationship stress has an independent negative effect on IPV during pregnancy and the postpartum period as was observed with psychological IPV in our sample.

Limitations and future research

The current study has three limitations. First, the longitudinal analysis is limited in that IPV was only measured across three time points (3). The sparse number of observations limited my ability to analyze different potential forms of the mean trajectory, which may have affected the study conclusions that there was no pattern over time across all women and that relationship characteristics only partially modified women's trajectories of IPV during this time. Future research with more time points may further understanding of whether and how IPV changes over pregnancy and the postpartum period.

A second and related limitation is that women were not asked about their experiences of IPV in the year preceding pregnancy. Measurement of women's experiences of IPV in the year preceding pregnancy would have provided another observation for the analyses and therefore potentially more information about trajectories of IPV during this time. Although there was a measure of pre-pregnancy IPV within the current relationship, it was a measure of lifetime IPV within the relationship prior to pregnancy. Such measurement may have been particularly susceptible to recall bias.

A third limitation is with regard to the sample. This study was conducted using a convenience sample from an urban antenatal clinic. Further, the eligibility criteria to participate in the SAHAPS study excluded women potentially at even greater risk of IPV than those in the sample (e.g. those who already knew their HIV-positive status at pregnancy were not eligible to participate). Given such, the generalizability of the results may be limited to other urban contexts within Southern Africa. Moreover, the results may not be generalizable to the most vulnerable women within those urban contexts. Future longitudinal research on IPV during pregnancy and the postpartum period with rural and high-risk populations in sub-Saharan Africa is greatly needed.

Implications for intervention

The findings have implications for IPV screening and intervention during pregnancy and the postpartum period. Specifically, it may be possible to identify and intervene with women at risk of (or currently experiencing) IPV during pregnancy and the postpartum period by assessing other characteristics of their relationship. This may enhance identification of women at risk of IPV since a review of IPV screening tools found that the sensitivity of these tools varied greatly (105) and none of them have been psychometrically evaluated in the South African context. Of the twenty-one screening tools reviewed, most assessed current IPV and some also assessed lifetime IPV and experience of IPV in the past year (105). An alternative screening tool might assess levels of relationship power and relationship stress a woman has within her current relationship at pregnancy. This alternative tool may improve our ability to identify those who experience IPV (or who will experience IPV) during this time.

That said, IPV screening in the absence of other interventions to reduce IPV is a contested practice because there is limited evidence to suggest that screening alone reduces IPV (106). There are at least three interventions in other countries that have been efficacious at reducing IPV during this particular time period (90-92). The interventions each offered screening along with additional counseling and/or support to the pregnant woman/new mother. One was framed as an empowerment intervention and was designed to increase women's control within the relationship through a 30-minute counseling session; however, the researchers did not test the mechanisms through which the intervention worked. It is possible that components of the empowerment intervention or of the other two interventions could be adapted for the South African context and then evaluated to determine their effectiveness at reducing IPV during the pregnancy and the postpartum period. One potential way they might be adapted is to include components that focus both on increasing women's relationship power and decreasing relationship stress at pregnancy.

Couples-based interventions that affect relationship dynamics may be another approach to preventing IPV during pregnancy and postpartum, particularly given the findings that dynamics of the relationship affect IPV during this time. Couples-based interventions in the United States have been efficacious in reducing IPV within relationships that are moderately violent (107-109), though they may be less appropriate for relationships wherein women experience frequent and severe IPV (108). While couples-based interventions have been use to promote HIV testing and disclosure amongst couples in sub-Saharan Africa (110), I could find no literature on couple-based interventions to prevent IPV in the sub-Saharan African setting.

In conclusion, women with a history of pre-pregnancy IPV and lower relationship power were at heightened risk of both physical and psychological IPV during pregnancy and the postpartum time period; further, women with higher relationship stress were at heightened risk of psychological IPV during this time, irrespective of past experiences of IPV within their relationship. Women's active engagement with the health care sector during and following their pregnancy represents a prime opportunity for screening and intervention. Given the negative health ramifications of IPV during this time period for both women and their children, interventions that identify women and reduce their risk of IPV are urgently needed.

Tables and Figures

Table 4.1 Results for the unconditional and conditional model of physical IPV during pregnancy and the first nine months postpartum		
Parameter	**Unconditional**	**Conditional**
Random effects		
intercept	0.040[a]	0.032[a]
Slope	0.022[a]	0.02[a]
Fixed effects		
Intercept	0.774[a]	0.761[a]
Time	.009	.006
pre-pregnancy IPV	.	0.058[a]
relationship power	.	-0.003[b]
partner social support	.	-.001
relationship stress	.	.006
pre-pregnancy IPV *time	.	0.041[a]
relationship power*pre-pregnancy IPV	.	-0.009[a]

[a]$p <= .0001$, [b] $p < .001$, [c]$p < .05$
residual errors were allowed to vary over time and were significant at each time point
conditional model controls for variation in weeks at each time point, age, cohabitation, treatment arm and whether or not the woman changed partners over the course of the study

Table 4.2 Results for the unconditional and conditional model of psychological IPV during pregnancy and the first nine months postpartum

Parameter	Unconditional	Conditional
Random effects		
intercept	0.053[a]	0.042[a]
Slope	0.023[a]	0.026[a]
Fixed effects		
intercept	0.858[a]	0.875[a]
Time	-.027	-.019
pre-pregnancy IPV	.	0.140[a]
relationship power	.	-0.006[a]
partner social support	.	-.007
relationship stress	.	0.025[b]
relationship power*time	.	0.002[c]
relationship stress*time	.	-0.012[c]
relationship power*pre-pregnancy IPV	.	-0.010[a]

[a]p<.0001, [b] p<.001, [c]p<.05
*residual errors were allowed to vary over time and were significant at each time point
*conditional model controls for variation in weeks at each time point, age, cohabitation, treatment arm and whether or not the woman changed partners over the course of the study

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Figure 4.1. Conceptual Model

Figure 4.2 Physical IPV over time by relationship power and pre-pregnancy IPV

Physical IPV (logged)

Pregnancy through nine months postpartum

Relationship power
- low_power_no_pre_preg_vio
- low_power_pre_preg_vio
- high_power_no_pre_preg_vio
- high_power_pre_preg_vio

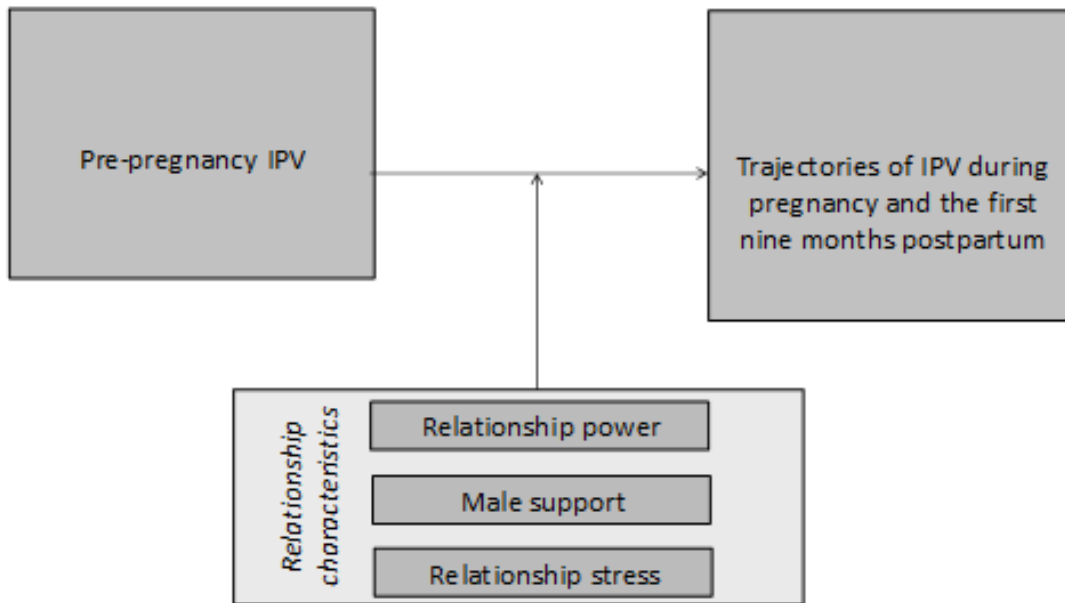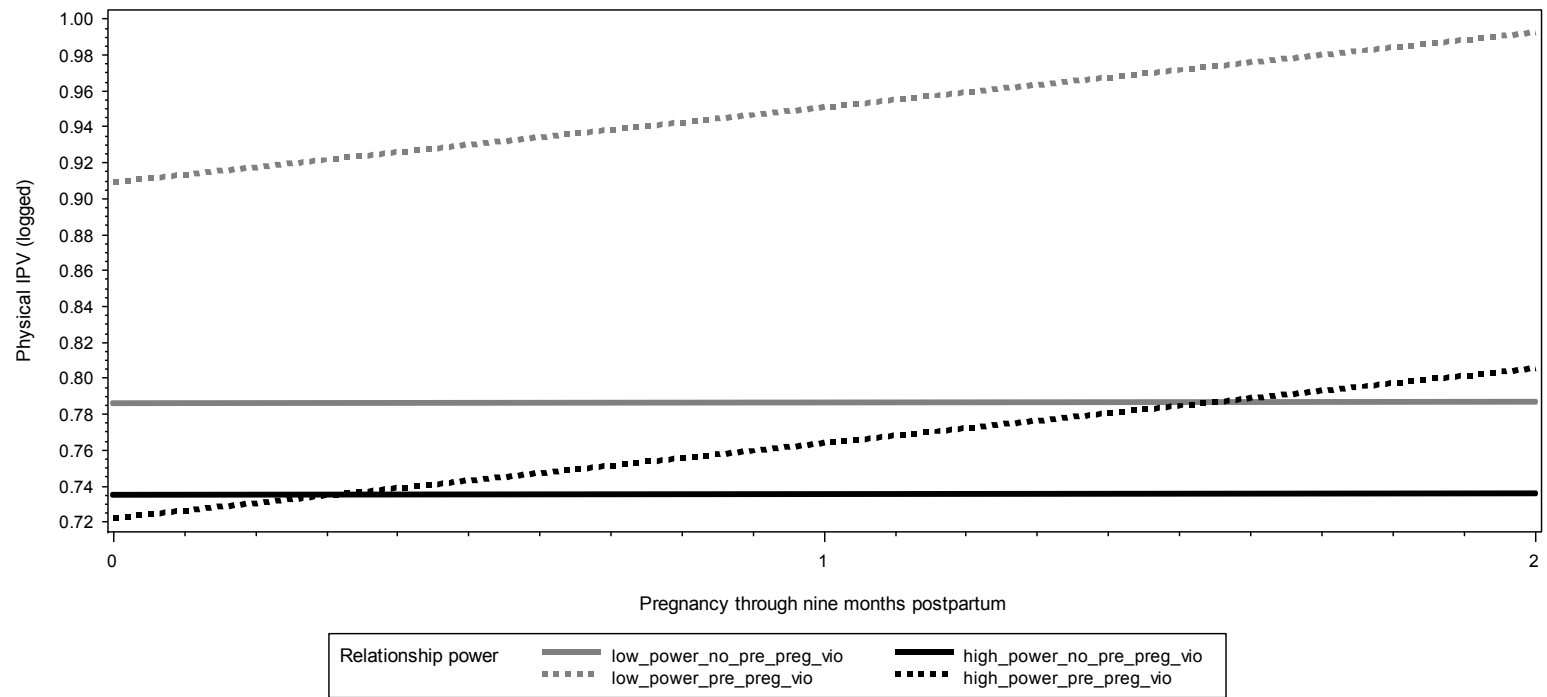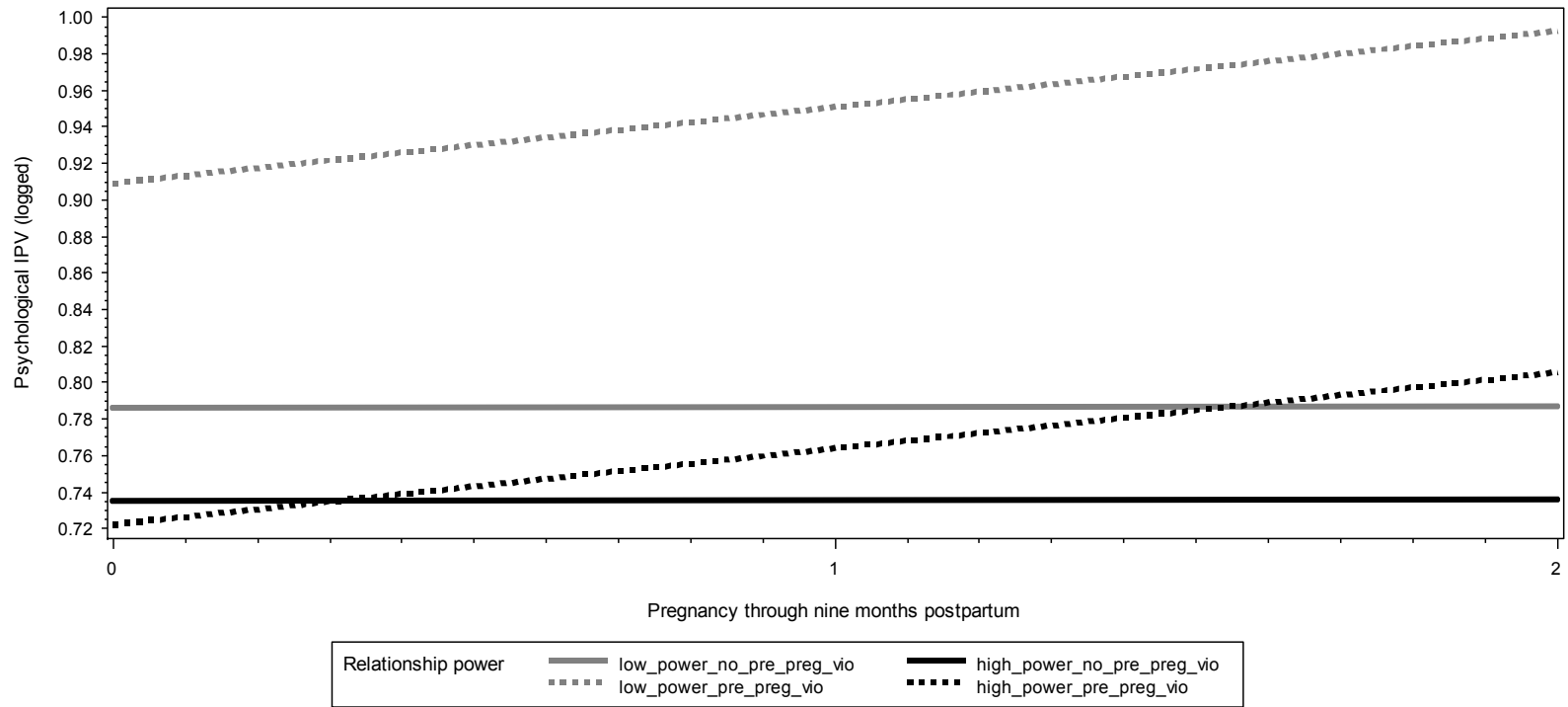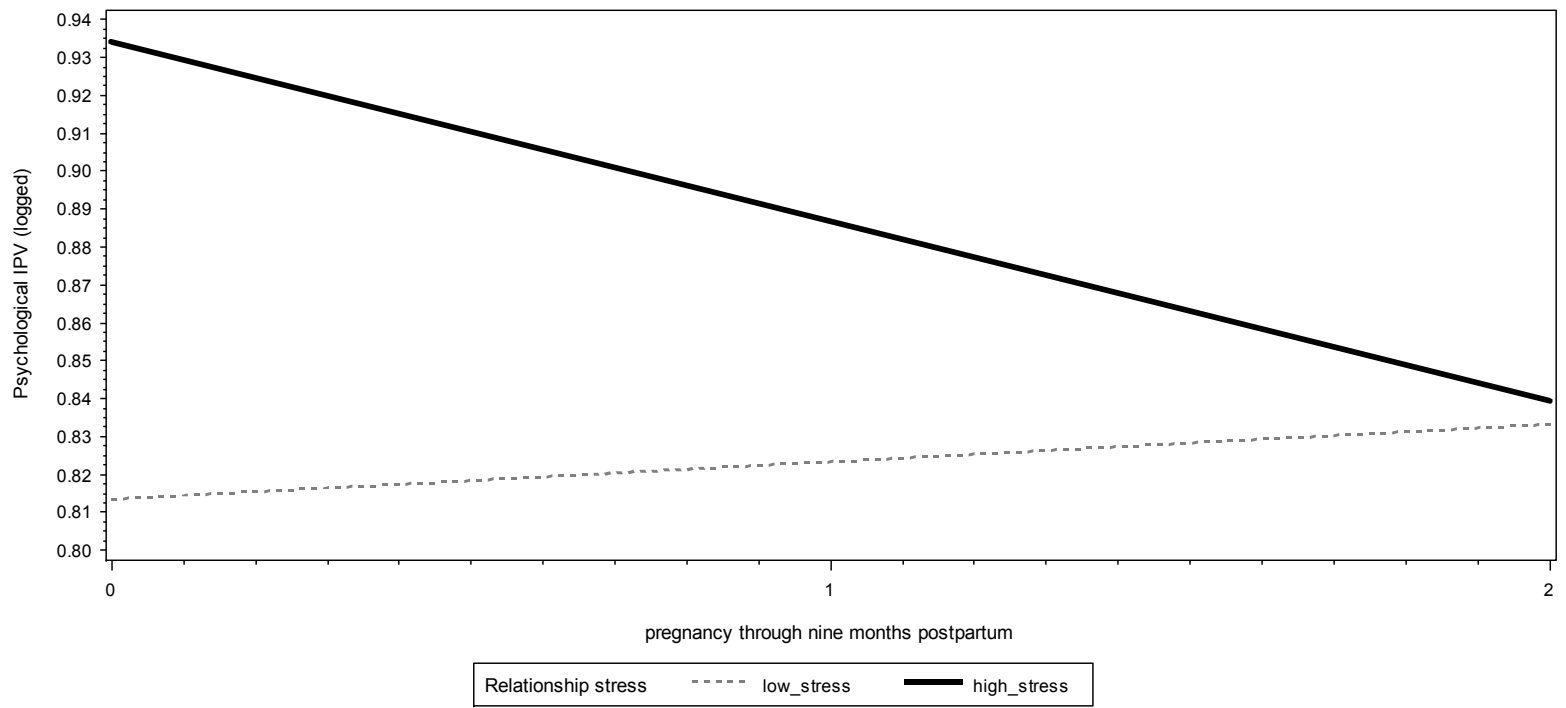**Figure 4.3 Psychological IPV over time by relationship power and pre-pregnancy IPV**

Figure 4.4 Psychological IPV over time by relationship stress

Psychological IPV (logged)

pregnancy through nine months postpartum

Relationship stress ----- low_stress ——— high_stress

Chapter 5: Discussion

Summary of findings

The purpose of this dissertation was to describe the prevalence and rates of IPV at pregnancy, at four months postpartum and at nine months postpartum, to use longitudinal methods to describe trajectories of IPV during this time period and to test whether particular relationship characteristics were associated with change in trajectories of IPV during the same time period.

The main finding from the first study is that the burden of IPV during this time period is high: just under half of all women experienced some type of IPV during pregnancy or within the first nine months postpartum. Further, more than 1 in 5 women experienced some type of IPV during pregnancy. When women's experiences of physical, psychological and sexual IPV were estimated separately, the prevalence of physical IPV and the prevalence of psychological IPV both increased from pregnancy in the early postpartum period and the prevalence of sexual IPV remained relatively constant over time. The findings from the rate estimates were generally consistent with the findings from the prevalence estimates.

The second study built on the first study by studying whether and how IPV changed for individuals over time. The mean trajectory for both types of IPV was flat, which suggests that, on average, there was not significant change in levels of IPV over pregnancy and the first nine months postpartum. Despite this lack of a time trend across all women, there was significant variability in levels of IPV at pregnancy and in rates of change in IPV over

pregnancy and the postpartum period, which means that some women were at risk of increased or decreased levels of IPV during pregnancy and the postpartum period. Higher relationship power buffered women's risk of IPV during pregnancy and the postpartum period for women who had pre-pregnancy IPV. Higher relationship stress did increase women's risk of psychological IPV during this time period, regardless of women's history of IPV in the intimate relationship. Partner social support did not buffer women's risk of IPV during this time.

Summary of strengths

These two studies make a number of contributions to the literature. The first study gives us a better sense of the scope of IPV during both pregnancy and postpartum; a time period wherein IPV is under researched not only in South Africa but in all of sub-Saharan Africa. It is important to understand the extent of psychological and sexual IPV women in the study faced since these are often not measured during this time period (111) and since both psychological IPV and sexual IPV have adverse effects that are distinct from physical IPV (85, 112). Finally, the calculation and report of rates of IPV during this time ensures future comparability across studies. This is of value given that one persistent challenge to studying IPV during this time is to make meaningful comparison in prevalence estimates across studies (and settings) since studies often estimate prevalence using slightly different time periods.

The second study is one of the only longitudinal studies of IPV during pregnancy and the postpartum period globally and as far as I know, the first longitudinal study of IPV within sub-Saharan Africa. The finding that the mean trajectory of IPV does not change over this time contributes to the literature on IPV during pregnancy and the postpartum period because researchers have wondered whether or not IPV changes during this time but have

not had the data to answer this question (111). Though the mean trajectory of IPV did not change among South African women, this study sheds light on how specific relationship characteristics affected women's risk of physical and psychological IPV during this time period. Other studies in South Africa have documented the negative effects of lower relationship power on unsafe sex and HIV infection (75, 77, 113). The results of this study suggest that lower relationship power is also associated with an increased risk of IPV during pregnancy, particularly for women with a history of IPV in their relationship and is also associated with an increased risk of psychological IPV postpartum, regardless of women's history of IPV. The results also support Jasinski's theory that relationship stress is associated with IPV during this time (57) since women with higher relationship stress at pregnancy were at increased risk of psychological IPV during pregnancy and through nine months postpartum. These findings contribute to our understanding of IPV during this time and also have the potential to inform future interventions.

Summary of limitations

Nonetheless, there are a number of limitations to these studies. The first is that the generalizability of the findings from both studies is limited to black urban women in Southern Africa. Nearly two-thirds of South Africa's population lives in urban areas (114). However, our findings exclude both the most vulnerable urban women who were not eligible for the parent study (e.g. women who had previously tested positive for HIV, women who were pregnant and under the age of 18, etc.) and women from rural areas.

A second limitation is that research on IPV during this time period has been largely atheoretical, particularly in this context. This dissertation was informed by theories developed by researchers in North America (24, 28, 30, 102), and there was only partial support for the hypotheses. It is possible that these theories are not appropriate either to the

South African setting or to the time encompassing pregnancy and the postpartum period. While there has been extensive theorizing about the etiology of IPV in South Africa (see the following for some examples:(60, 115, 116)), there has been limited attention to whether transitions associated with pregnancy itself, or whether other time-specific factors, affect IPV during pregnancy and the postpartum time period.

Finally, there are a number of issues with measurement that may have also influenced our findings. Pre-pregnancy IPV was measured broadly within the relationship: women were asked to recall the number of times they had experienced IPV with their current partner at any point in the relationship prior to pregnancy. Women were then categorized as having experienced pre-pregnancy IPV or not having pre-pregnancy IPV. The mean relationship length for women in SAHAPS was 4.5 years, which means that some women were asked to recall acts of IPV over a long time period. The lack of a more specific time referent for IPV that occurred in the relationship before pregnancy could have contributed to recall bias and affected estimates of pre-pregnancy IPV. Further, the lack of a specific time referent also hindered my ability to examine how IPV that immediately preceded pregnancy may have affected women's risk of IPV during pregnancy. Women who experienced IPV in their current relationship just before pregnancy may be at differential risk of IPV during pregnancy and the postpartum period than women who experienced IPV in their relationship several years prior, yet there was no way of distinguishing between these two groups of women in the analyses.

Another limitation related to measurement is that the measure of relationship stress captures only one dimension of stress: the presence or absence of specific relationship stressors at pregnancy. Other research suggests stress is a multidimensional construct and that one's perception of stressors (as stressful or not) are also related to IPV risk (98). It is possible that these perceptions partially or fully mediate the association between

relationship stress and IPV, but we did not measure perceptions of stressors and therefore could not test for mediation in this study.

A final limitation with regard to measurement has to do with relationship power. The sexual relationship power scale (SRPS) scale was used to assess whether control over decision-making and control of behavior were resources that weakened the association between pre-pregnancy IPV and IPV during pregnancy and the postpartum period. However, this scale does not capture the full range of resources women and men bring into their relationship. Theorists have posited that a wide range of resources (economic, personal, affective and cognitive) contribute to relationship power (117). Given the high levels of unemployment in South Africa, a fuller understanding of resource allocation within relationships – and in particular – inequitable access to income – may be of particular importance to IPV during this time. However, distribution of economic resources within relationships was not assessed in this study.

Future research

The findings for this dissertation have a number of implications for future research. Higher relationship power buffered women's risk of IPV during pregnancy and the postpartum period for women who had pre-pregnancy IPV, however, there is relatively little knowledge about the stability of power within intimate relationships over time. It is possible that relationship power changes throughout the course of one's relationship. Future research should explore how relationship power changes over time and whether or not higher relationship power at each time point in the early postpartum period is concurrently associated with lower IPV.

A second and related point is that there is a limited sense of what demographic characteristics are associated with relationship power. Existing research in South Africa has

focused on evaluating whether or not relationship power is associated with negative health outcomes (it is) ((75, 77, 113). However, understanding who is at risk of having limited relationship power may also contribute to screening and intervention development. In a qualitative study with women in Johannesburg, researchers found that women who were more educated and less dependent on their partners (in that they had not had children with them and did not live with them) had higher power in their relationship than women who were less educated and more dependent on their partners (118). These associations and other potential associations should be evaluated empirically since they will help to identify those at risk of having lower power, and also since some demographic characteristics may be more amenable to intervention than others.

And finally, while there is an emerging literature on the experience of Black men as fathers in contemporary South African society (119, 120) there continue to be gaps in our knowledge of how and why some men are more likely to perpetrate violence during this time than others. Although partner social support was not associated with IPV in our study, there may be other characteristics of the partner key to understanding IPV during this time. Qualitative research with men who have perpetrated violence during pregnancy or postpartum may shed light on relationship dynamics and IPV risk from their perspective.

Intervention implications

More than one in five women experienced IPV during pregnancy and even more were at risk in the postpartum, which suggests that interventions to screen and prevent IPV during this time are desperately needed. While screening alone has not been shown to be efficacious at reducing IPV, screening in conjunction with intervention may reduce women's risk of IPV during this time (106). The findings from this dissertation can be used in three different intervention approaches and will be discussed in further detail below.

First, interventions that target women at the clinic may be effective in reducing IPV during pregnancy and the postpartum time period. There are two randomized control intervention trials from non-African contexts that have provided counseling and psychosocial support in the clinic to women who had previously experienced IPV or who were at risk of IPV that were effective at reducing IPV risk during this time (Kiely, El-Mohandes, El-Khorazaty, & Gantz, 2010; Tiwari et al., 2005). Both of these interventions were adapted from an intervention cohort study based on Dutton's empowerment theory (121) and were designed to increase women's independence and control (122). One intervention targeted African American women in Washington, D.C., and consisted of 35 minute individual counseling sessions delivered by social workers during the prenatal and postnatal period (participants received 4-8 sessions prenatally and 2 sessions postnatally) (90). The counseling sessions focused on four behavioral risks, including IPV. The IPV component included counseling about safety (and developing a safety plan as needed), choice-making and problem solving. The second intervention targeted Chinese women and consisted of a 30 minute session during pregnancy delivered by a health professional. The health professional provided counseling that was similar to the intervention in D.C. in that it also focused on enhancing independence and control (91). Both interventions decreased IPV, though neither tested the mechanisms through which this process occurred. These existing interventions could be adapted for the South African context with additional attention to counseling that focuses on other ways to increase relationship power and decrease relationship stress during pregnancy.

Second, interventions that target couples may be effective in reducing IPV during pregnancy and the postpartum time period (107, 109, 123). This may be particularly true for couples who have low to moderate levels of IPV in their relationship. Dyadic interventions may not be appropriate for couples with severe IPV in their relationship because the intervention itself may further increase women's risk (108). Men in these relationships may

need separate interventions to address their aggressive propensities. Couples-based interventions have been used with moderate success to promote HIV testing and disclosure amongst couples in sub-Saharan Africa (110, 124, 125), however, I could find no literature on couple-based interventions to prevent IPV in the sub-Saharan African setting. One of the biggest challenges of couples-based interventions for HIV testing has been to recruit men to the antenatal clinic for testing. It would be important to pilot test couple-based interventions in various venues to determine feasibility of these types of interventions.

Third, interventions outside of the clinic setting that specifically target the male partners of pregnant women and new mothers may be effective in reducing IPV during pregnancy and the postpartum time period. Although there are no existing interventions that target men of this particular demographic, there have been a number of interventions that have successfully altered gender norms and subsequently reduced IPV and sexual risk among men in general (126, 127). Assuming gender norms play a role in IPV risk during pregnancy and the postpartum time period, it would be worth exploring whether aspects of these interventions could be appropriately tailored to meet the needs of new fathers or fathers-to-be. It would also be of value to then assess whether these adapted interventions positively affected gender norms and subsequently reduced risk of IPV during this time.

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