

**“HE TELLS YOU YOUR WORK IS TO GIVE BIRTH”:
REPRODUCTIVE COERCION AND COVERT USE OF CONTRACEPTION AMONG
FEMALE INTIMATE PARTNER VIOLENCE SURVIVORS IN NAIROBI, KENYA**

by
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Dissertation Abstract

Background: Women's reproductive autonomy is limited by reproductive coercion (RC), or interference in contraceptive and reproductive decisions via direct intervention, threats, or pressure. Women experiencing intimate partner violence (IPV) may be at higher risk of RC, particularly in low- and middle-income countries, where little is known about RC behaviors and impact.

Methods: Utilizing the existing infrastructure from myPlan Kenya, this research examined RC among reproductive age women experiencing IPV through analysis of quantitative baseline data (n=352) and in-depth interviews (IDIs) conducted at three-month follow-up among women indicating RC experience (n=30). Aim 1 assessed the transferability of the US-developed RC Scale and explored RC experiences. Aim 2 examined quantitative correlates and explored qualitative contributors of RC. Aim 3 described the relationship between RC and covert use of contraception and explored IPV survivors' use of reproductive safety strategies.

Results: In the past three months, 82% of IPV survivors experienced any RC and 3.8 types on average. Aim 1 results indicated transferability of the RC Scale to a population of IPV survivors in Nairobi's informal settlements; items factored into pregnancy coercion and condom manipulation sub-scales. Convergence matrixes corroborated transferability via congruous display of RC summary score and qualitative experience.

Aim 2 results highlighted the importance of couple roles and communication in childbearing decisions, with findings indicating that healthier couple communication may be protective against RC. Partner's distrust of contraception and fear that women would seek other partners were described as contributors to RC in IDIs.

Aim 3 findings indicated increased relative risk of covert use and decreased relative risk of overt use, compared to non-use, for women experiencing RC. IDIs demonstrated the cyclic nature of RC and covert use, with women often facing multiple types of RC and attempting to use several contraceptive methods covertly.

Conclusions: Results highlight the severity of RC for women experiencing IPV in Nairobi's informal settlements. Violence and family planning providers must be aware of coercive partner behaviors that prohibit contraceptive uptake and continuation. Use of reproductive safety strategies, namely covert use of contraception, can help maximize women's reproductive preferences considering RC experience.

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Chapter 1. Introduction, Specific Aims, and Dissertation Organization

1.1 Introduction.

Intimate partner violence (IPV) increases women's risk for unintended pregnancy, sexually transmitted infections (STIs)/HIV, and other adverse sexual and reproductive health outcomes.¹⁻³

In addition to physical, sexual, and emotional violence, women's autonomy is further limited by reproductive coercion (RC), or interference in contraceptive and reproductive decisions via direct intervention, threats, or pressure.⁴⁻⁷ This emergent concept specifying coercive behaviors has been linked to poor reproductive outcomes and limited contraceptive decision-making.⁷⁻¹¹ Women experiencing IPV may be at higher risk of RC, particularly in low- and middle-income countries (LMICs), where social norms promoting childbearing are pervasive, gender and power dynamics impede sexual and reproductive health, and little is known about RC behaviors and impact.^{12,13}

To date, the majority of RC research has been conducted in the United States (US), where this concept was first identified. Specifically, the Reproductive Coercion Scale (RCS)^{7,8,14} has proved a reliable measurement tool for examining pregnancy coercion and condom manipulation sub-factors.¹⁵ This nine-item scale, developed and refined in the US, may be applicable for examining RC behaviors in LMICs.^{11,16} Assessing potential correlates across the socioecological framework, including community-level fertility pressures and family or partner restrictions on reproductive decision-making, may provide a more comprehensive understanding of specific sub-populations affected by RC. Further, sexual and reproductive safety strategies, or ways that women protect themselves against RC and its effects, are poorly understood. One such safety strategy is covert use of contraception, which affords women contraceptive use without husband's knowledge.⁴ Understanding the impact of RC on covert use is necessary to maximize women's reproductive preferences and options.

This dissertation research builds on formative work in Nairobi, Kenya to inform a safety strategies intervention for IPV (myPlan Kenya), which described occurrence of RC, including partners forbidding contraceptive use and condom refusal/manipulation.¹⁷ Utilizing the existing infrastructure from myPlan Kenya, this research examined RC among reproductive age women experiencing IPV through analysis of quantitative baseline data and in-depth interviews (IDIs) conducted at three-month follow-up among women indicating RC experience.^{18,19} The overarching aim of these mixed-methods analyses was to better understand risk contexts and protective strategies for women experiencing RC and IPV, in order to ultimately bolster women's safety and well-being.

This mixed-methods dissertation research strengthens the limited literature base examining RC in LMIC settings, where women experiencing IPV may have limited influence in decision-making and face immense social pressure to conceive. Understanding RC dynamics among women experiencing IPV is particularly crucial as these women may have more limited options for seeking care or garnering support.²⁰⁻²² Information on RC behaviors and enabling factors across the socioecological framework can be incorporated into practice guidelines to assist family planning and violence service providers in identifying women most at risk for RC. Further, this research may inform the development of interventions to address RC in LMICs, including integration of specific strategies to protect against RC and its effects.

1.2 Specific Aims.

Among reproductive age women experiencing IPV in Nairobi's informal settlements, data from quantitative surveys completed at baseline and qualitative IDIs conducted at three-month follow-up were used to:

- Aim 1: Assess the transferability of the original RCS and context-specific item to the

Kenyan context. Measure prevalence of RC and relevant sub-scales. Explore the consistency of women's RC experiences through comparison of quantitative and qualitative data.

- Aim 2: Examine correlates of RC and RC sub-factors of pregnancy coercion and condom manipulation at the community, family, couple and individual levels. Contextualize results via qualitative data.
- Aim 3: Estimate the relationship between RC and covert use of contraception. Characterize women's experiences with RC and reproductive safety strategies, including covert use of contraception, using qualitative data.

1.3 Dissertation Overview.

This Introduction describes the premise for the subsequent dissertation research and specific aims that will be addressed. Chapter Two, Background, outlines previous literature to justify the need for this research, and the conceptual framework underlying its analyses. Chapter Three, Methods, provides the detailed methodology from the parent study, as well as in-depth, mixed-methods analysis details for each of the three aims. Chapter Four is the first dissertation paper focused on understanding the transferability of the RCS to the Nairobi context, including triangulation between quantitative measures and women's described qualitative experiences. Chapter Five is the second dissertation paper examining quantitative correlates and qualitative contributors of RC among IPV survivors in Nairobi. Chapter Six is the final dissertation paper describing the relationship between RC and covert use of contraception, and exploring women's experiences with covert use and related reproductive safety strategies. Chapter Seven, Discussion, is the concluding chapter to summarize

all papers together in order to outline strengths, limitations, and future implications for policy, programming, and research.

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Chapter 2. Background

2.1 Significance of IPV Globally.

Gender-based violence (GBV) is a health and human rights issue that can alter women's and girls' health and well-being trajectories significantly. While the health impact of non-partner violence should not be underestimated, intimate partner violence (IPV), or physical, sexual, or emotional abuse perpetrated by an intimate partner, is particularly harmful due to its sustained duration and increased severity.¹⁻⁴ Furthermore, IPV the most prevalent form of GBV; among women physically or sexually abused globally, 75% report perpetration by an intimate partner.⁵

IPV affects approximately one in three ever-partnered women worldwide over the course of her lifetime, though distinct socio-geographic disparities persist.^{2,4} Pooled data estimate that IPV is highest in Central sub-Saharan Africa (lifetime prevalence=65.6%) and lowest in East Asia (lifetime prevalence=16.3%).² Women experiencing IPV suffer immense repercussions, including subsequent suicide (OR=4.5) and injury (OR=2.9), compared to women who have never experienced partner violence.¹ Moreover, one in seven homicides are perpetrated by an intimate partner, with women disproportionately suffering fatality (38.6% females vs. 6.3% males).^{1,6}

The impact of IPV is far-reaching, with sustained trauma leading to a multitude of psychological complications, including post-traumatic stress disorder, anxiety, depression, and eating disorders.¹ Women's well-being may further be altered through the numerous indirect effects of IPV, including substance abuse, limited health care seeking, and stress-induced non-communicable diseases.^{1,7} While these outcomes should not be underestimated, the remainder of this dissertation will primarily focus on the sexual and reproductive health impact of IPV.

2.2 Sexual and Reproductive Health Impact of IPV.

IPV manifests throughout the reproductive life course, where women are at risk for a wide range of sexual and reproductive health outcomes, including sexually transmitted infections (STIs), HIV, gynecological problems, unintended pregnancy, induced abortion, pregnancy loss, and preterm birth.¹ Adolescence is the nexus for violence and adverse sexual and reproductive health outcomes given young women's relative inexperience in sexual relationships.⁸⁻¹¹ IPV among adolescents, including those who undergo forced sexual debut, is widespread, and literature demonstrates young women may be particularly vulnerable to IPV.⁹

Onset and increased abuse during pregnancy further impacts well-being. While few studies report that violence begins during pregnancy, others highlight sustained abuse during this critical period.⁵ Furthermore, women who have experienced IPV have higher odds of unintended pregnancy and induced abortion, compared to women without IPV experience (unintended pregnancy OR=1.7; induced abortion OR=2.7).^{12,13} IPV during pregnancy is additionally associated with a number of birth outcomes, including low birthweight (LBW) (OR=1.2) and preterm birth (OR=1.4).¹⁴ Given the far-reaching impact of IPV, response practices to improve psychological health and mitigate stress should be implemented in tandem with primary sexual and reproductive health services.

The pathways through which IPV impacts sexual and reproductive health outcomes vary from direct effects related to sexual violence perpetration to more indirect psychological and behavioral mechanisms. Particularly, decreased condom use, either due to partner refusal or fear of negotiation, increases women's exposure to adverse sexual and reproductive health outcomes.¹⁵ Limiting use and access to contraceptive methods, or reproductive coercion (RC), further heightens risk for unintended pregnancy.¹⁶

2.3 Defining RC.

The American College of Obstetricians and Gynecologists (ACOG) defines RC as “behavior intended to maintain power and control in a relationship related to reproductive health by someone who is, was, or wishes to be involved in an intimate or dating relationship with an adult or adolescent.”¹⁷ RC is further specified as “behaviors that directly interfere with contraception and pregnancy by reducing female reproductive autonomy.”¹⁸ Previously examined sub-types or forms of RC include pregnancy coercion and contraceptive sabotage. Pregnancy coercion comprises behaviors on the male partner’s side to force the female partner to act against her reproductive intentions to become pregnant, continue, or terminate a pregnancy; observed coercive behaviors include threats and violence to ensure compliance with intentions, blocking access to contraceptive services, or forcing use of services.^{16,17,19} While similar, contraceptive sabotage focuses on behaviors that interfere directly with contraception, including hiding or destroying contraception, removing or poking holes in the condom during sex, or refusing to withdraw. All of these behaviors act against female pregnancy intentions.^{16,17,19}

RC is often conceptualized as a sub-type of IPV that may partially explain the linkage between IPV and poor sexual and reproductive health outcomes. However, previous studies indicate women undergoing RC may not concurrently experience physical or sexual IPV.¹⁸⁻²² While RC can occur in absence of physical or sexual IPV, the literature base indicates that RC combined with physical and/or sexual IPV elevates risk of unintended pregnancy.^{16,19} Furthermore, intimate perpetrators are more likely to report abortion interference than non-intimate perpetrators.²³ These limited studies demonstrate that women who undergo IPV and RC concurrently may experience worse reproductive health outcomes than women without physical or sexual IPV experience.^{16,19,23}

This dissertation examines pronatalist RC perpetrated by the male partner on the female partner, the most widely studied form of RC given its links to unintended pregnancy. While the ACOG definition does not indicate directionality or gender of the coercive partner,¹⁷ subsequent definitions and studies have almost exclusively examined male partners' desire for more children and women seeking to limit or space pregnancies.

2.4 RC Measurement Development.

Initial measures for the Reproductive Coercion Scale (RCS) were developed from a qualitative study conducted in 2007 by Miller and colleagues in the Boston area.²⁵ This study focused specifically on sexually active adolescent girls with a history of abusive partnerships (n=53) in order to detail links between coercive partner behaviors and unintended pregnancy. A subset of observations indicating active impregnation techniques employed by the abusive partner (n=14) were further analyzed for themes surrounding pregnancy and contraceptive use.²⁵

Semi-structured interviews revealed a variety of partner behaviors and women's reactions. Partner behaviors comprised explicit statements of impregnation intentions, anger upon condom use request, and restriction of access to contraceptive services. Restricting access included both condom manipulation (poking holes in the condom or removing the condom) and birth control sabotage (throwing away pill packs). Women's reactions included mirroring partner desires for pregnancy, implementing resistance strategies via covert use of contraception, and ambivalence. Furthermore, women described intentional impregnation followed by abortion request, outlining the depth and severity of control.²⁵ Explicit quotes detailing reproductive control, male intentions, and behaviors were used to develop preliminary items for the RCS.¹⁹ Concurrent research with adult IPV survivors revealed similar pregnancy-promoting behaviors, indicating that these experiences were not exclusive to adolescents.²⁶

The RCS measure, derived from this formative research, was developed and refined by Miller and colleagues in 2010-2011; items were first tested using baseline data from a family planning intervention for young women in Northern California.^{19,21} The original eleven-item scale focused on both pregnancy coercion and birth control sabotage and is outlined in Table 2.1.

Table 2.1 Original Reproductive Coercion Scale (RCS) Items

<i>Pregnancy coercion:</i>
<i>Has someone you were dating or going out with ever:</i>
<ol style="list-style-type: none"> 1. Told you not to use any birth control (like the pill, shot, ring, etc.)?* 2. Said he would leave you if you did not get pregnant?* 3. Told you he would have a baby with someone else if you did not get pregnant?* 4. Hurt you physically because you did not agree to get pregnant?* 5. Tried to force or pressure you to become pregnant? 6. Have you ever hidden birth control from a sexual partner because you were afraid he would get upset with you for using it?
<i>Birth control sabotage:</i>
<i>Has someone you were dating or going out with ever:</i>
<ol style="list-style-type: none"> 7. Taken off the condom while you were having sex so that you would get pregnant?* 8. Put holes in the condom so you would get pregnant?* 9. Broken a condom on purpose while you were having sex so you would get pregnant?* 10. Taken your birth control (like pills) away from you or kept you from going to the clinic to get birth control so that you would get pregnant?* 11. Made you have sex without a condom so that you would get pregnant?*

*item included in final RCS

All items were examined individually, as well as combined into binary variables for pregnancy coercion, birth control sabotage, and RC. Of note, the original study measures focused on lifetime prevalence of RC and noted limitations around chronology of coercion, IPV, and unintended pregnancy.

The second study, conducted by the same authorship team and embedded within the existing family planning randomized controlled trial (RCT), examined the impact of the intervention on RC. This study narrowed the RC measure to previous three month experience of RC and dropped Pregnancy Coercion Items 5-6.²⁰ The final RCS, therefore, comprises a total of nine items.

These nine items were subsequently refined and psychometric properties assessed using pooled data from the initial RCT in Northern California and a scaled-up longitudinal RCT conducted in 24 Pennsylvania family planning clinics.^{20,21,27} Cronbach's alpha was reported for the Pennsylvania study ($\alpha=0.76$) in a previous paper, but not for the pooled data.²⁸ For pooled data, Horn's Parallel Analysis identified two underlying factors for RC, deemed "pregnancy coercion" and "condom manipulation."²¹ Item Response Theory was undertaken to create a short-version of the RCS. Results yielded three discriminatory items for pregnancy coercion and two for condom manipulation (Pregnancy Coercion= Items 1, 10, 11 and Condom Manipulation=Items 7 and 8-9 combined). Psychometric testing indicated that methods of hormonal birth control were viewed similarly to other pregnancy coercion items, whereas condom manipulation was regarded as a unique factor. Validity analyses compared identification of RC and percent overlap for unwanted pregnancy and IPV; predictivity of RC for unwanted pregnancy and IPV were similar for the short- and long-form RCS. Authors advised that either the short- or long-form RCS could be used for RC research and screening.²¹

In 2014, Upadhyay created a broader measure, the Reproductive Autonomy Scale, to measure decision-making, communication, and coercive influences within couple dyads and familial structures.²⁹ This scale was developed and validated in the US, with English and Spanish items tested among an ethnically diverse sample. Strengths of this scale comprise incorporation of five RCS items within the RC sub-scale to highlight the complexities of women's childbearing decisions and influence of partners and family members (full instrument $\alpha=0.78$, RC sub-scale $\alpha=0.82$). Sub-scales of the Reproductive Autonomy Scale have been tested in LMICs;³⁰ however, to date, the entire scale has not been applied. This scale may provide a more holistic understanding of RC within some LMIC contexts given its focus on multifaceted childbearing influences and the potentially coercive role of family in childbearing decision-making.

2.5 RC Studies in the United States (US).

The first study aimed at optimizing the RCS focused on lifetime experience of RC using baseline data from a family planning intervention in Northern California.¹⁹ Among 16-29 year-old sexually active females, 53% reported physical or sexual IPV experience, 19% reported pregnancy coercion, 15% reported birth control sabotage, and 41% had one or more unintended pregnancies.¹⁹ This study also examined odds of unintended pregnancy given pregnancy coercion, birth control sabotage, and RC, while adjusting for site, age, ethnicity, and immigration status and stratifying by IPV experience. Findings indicated the combined effect of physical and sexual IPV and RC doubled odds of unintended pregnancy (AOR=2.0); similar patterns were found for pregnancy coercion and birth control sabotage.¹⁹

The second study examined the effect of the family planning intervention in reducing RC (also in Northern California).²⁰ Here, the same authorship team examined recent experience of RC using the modified 9-item RCS and reported slightly lower prevalence for pregnancy coercion (9.3% intervention, 7.9% control) and birth control sabotage (10.7% intervention, 7.0% control) at baseline. Moreover, the intervention condition, offering enhanced reproductive health screening, decreased odds of pregnancy coercion by 71%, as compared to a control condition receiving the standard of care (AOR=0.3); insignificant trends for reduction in birth control sabotage were also seen.²⁰ These studies were pivotal not only in examining prevalence of RC, but also in disentangling complex behaviors that could occur with or in absence of physical or sexual IPV. Furthermore, these findings were instrumental in spearheading future research on RC and guiding the ACOG RC screening recommendations.

To date, research on the health impact of RC remains limited. The most frequently studied health effect of RC is unintended pregnancy, given expansive qualitative narratives surrounding RC

behaviors and subsequent pregnancy, as well as the RCS items' focus on sexual and reproductive health. Early studies examined the association between RC and unintended pregnancy, but reported ambiguous temporality.¹⁹ More recent studies have worked to fill this gap, notably, finding that exposure to RC in the past three months significantly increased odds of past-year pregnancy both co-occurring and without physical or sexual IPV (no prior IPV AOR=1.8; history of IPV AOR=2.0).²⁸ While the association between RC and unintended pregnancy is affirmed, far less is known about RC's cascade effects on other sexual and reproductive health outcomes, including STIs and HIV.

2.6 Correlates and Contributors of RC (US Studies).

Since 2011, the majority of RC research has been conducted in the US. A 2016 systematic review on RC reported recent prevalence ranging from 5% to 26%, though measurement differences limited comparability.³¹⁻³³ The correlates presented below focus on items that are most applicable to women in LMICs given the aims of this dissertation research; however, previous studies have examined additional factors that may be more pertinent to women experiencing RC in the US (e.g. health insurance status, living in college dormitories, sexual minority status, etc.).^{31,32,34}

Several sociodemographic characteristics have been established as RC correlates. Specifically, lower levels of education were found to be associated with increased RC.^{19,28,29} In US-based studies, RC was deemed more prevalent among racial minorities born in the US than those who immigrated.^{19,28,29,31,32} Withstanding immigration status, racial disparities may also perpetuate odds of RC experience.³⁵ Additionally, marital status may impact RC, though studies report mixed results—being unmarried increased risk in two studies,^{28,32} but was deemed insignificant in another.²⁹

Few studies have been conducted with men to investigate contributors to RC perpetration. The limited evidence highlights discordant pregnancy intentions as a potential proximate determinant.^{23,36} Other studies highlight lack of male agency and pervasive gender norms surrounding women as the primary decision-makers for childbearing and reproduction.³⁷

2.7 RC Measurement Transferability to Kenya and LMIC Settings.

Conceptualization and initial measurement development surrounding RC occurred exclusively in the US, leading to concerns regarding transferability of this measure to other contexts. To date, only two studies have adapted the RCS to an LMIC setting (Cote d'Ivoire and northern India).^{38,39} Both studies reported high reliability of the RCS (Cote d'Ivoire $\alpha=0.93$; India $\alpha=0.73$), but described substantial measurement adaptation to maximize the applicability of the scale to the local context. Specifically, the India study focused on lifetime RC by both partners and in-laws via an 8-item scale; three context-specific items asked whether the woman was “told it was against their religion or culture to use family planning”; “told that women who use family planning do this so that they can have sex with other men”; and “told that she could not use family planning because she did not have any or enough sons.”³⁹ The Cote d'Ivoire study similarly adapted measures to examine both in-law and partner perpetrated RC, but largely used items from the original 9-item RCS.^{38,40} **Outside of these emergent studies, little is known about the transferability of the RCS or prevalence of RC in other LMIC contexts, where women may face similar coercive dynamics surrounding pregnancy decision-making. To address this gap, Aim 1 sought to understand the transferability of the RCS to an LMIC (Kenya), and explore the consistency of women’s RC experiences via triangulation of quantitative and qualitative data.**

Correlates of RC from LMICs are more limited given the dearth of quantitative data collection specific to RC in these settings. The Cote d'Ivoire study focused on RC and in-law abuse found

that in-law perpetrated RC was associated with ethnicity and marriage.³⁸ The India study did not report on correlates of RC.³⁹

Despite limited research surrounding prevalence and correlates of RC in LMICs, qualitative evidence demonstrates both occurrence and unique contributors to RC in higher fertility settings.⁴¹ For example, women face immense social pressure demanding high fertility and initiation of childbearing immediately after marriage.^{42,43} Fluidity of partnerships and familial pressure may further limit autonomy and negotiation surrounding childbearing.⁴⁴ Knowledge of contraceptive methods and access to contraceptive and abortion services may be further constrained by physical and economic circumstances.^{42,43} **Context-specific research is necessary to understand contributors and characteristics that may increase women’s risk of RC. Given the dearth of literature examining risk contexts within LMICs, Aim 2 will use both quantitative (correlates) and qualitative (contributors) data to examine factors that may increase susceptibility to RC for specific sub-populations.**

2.8 Safety Strategies for RC.

The majority of intervention strategies for RC operate in tandem with existing violence and sexual and reproductive health support services.^{20,27,45} Recommended interventions include integrating screening for RC within clinic settings, provider awareness training, and the inclusion of small information cards as part of the clinic visit.⁴⁶ Specifically, the Addressing Reproductive Coercion in Health Settings (ARCHES) intervention may be valuable in decreasing RC and IPV, while increasing self-efficacy, recognition of abuse, and use of safety strategies.²⁷ To date, ARCHES is the only RC intervention that has been implemented in a LMIC context.⁴⁷ For these interventions to be effective, however, women must first access violence and health services.

Woman-implemented resistance strategies may protect against RC and help women avoid its consequences. Strategies that may reduce RC altogether include thoughtful communication regarding sexual and reproductive health decision-making, mitigating additional stressors within the relationship, or temporary separation. Strategies that could minimize the consequences of RC comprise utilizing informal networks for assistance in accessing services, economic empowerment to leverage resources, or hiding use of contraception. While research has examined IPV safety strategies in LMICs and in urban informal settlements of Nairobi specifically, ^{44,48,49} few reported strategies that were specific to sexual and reproductive health.

2.9 Covert Use of Contraception as a Safety Strategy for RC.

One strategy to circumvent male control of contraception is covert use of contraception, by which women conceal their use of contraceptive methods.⁵⁰ Recommended covert strategies include use of contraceptive methods that require minimal partner compliance, such as injectables and emergency contraception (EC).^{17,25,40,46} While these strategies are recommended in current ACOG guidelines,¹⁷ to date, no studies have quantitatively examined covert use as a strategy to reduce the impact of RC. Qualitative evidence among HIV serodiscordant couples in Western Kenya, however, suggests that covert use may be an appropriate strategy to avoid unwanted births when fertility intentions cannot be agreed upon.⁵¹

Covert use of contraception may be particularly important for women experiencing IPV, given relationship instability and controlling partner dynamics. To date, limited studies have examined the association between covert use and IPV in LMICs. Longitudinal evidence from Uganda found that IPV was a predictor of covert use (AOR=1.7),⁵² whereas qualitative evidence from India suggested that covert use may increase women's risk of violence if the partner learned of use.⁵³ IPV survivors may be a particularly high-risk population given that IPV experience could encourage women in unstable relationships to use covertly, and also be a repercussion of use if

discovered. **A more thorough understanding of covert use dynamics among IPV survivors, including the impact of RC on covert use, is critical to ensure use of strategies that increase safety. To build the literature base surrounding reproductive safety strategies, Aim 3 will examine the relationship between RC and covert use, and contextualize these results via qualitative data.**

2.10 Theories for Understanding RC and Covert Use.

Several frameworks may be helpful for understanding RC, and its correlates, contributors, and potential safety strategies to protect against its effects, particularly Connell’s Theory of Gender and Power (TGP).⁵⁴ TGP can also be used to understand power and relationship differentials related to covert use. TGP adopts social determinants of health, characterizing them to define gendered relationships through the structures of sexual division of labor, sexual division of power, and cathexis (relationships).^{54,55} TGP has previously been used to explore sexual and reproductive health outcomes, particularly HIV/STIs, unintended pregnancy, and condom use.^{15,56–61} This theory was recently applied to unprotected sex and unplanned pregnancy, though specific to adolescents in urban U.S. settings.⁶² Adapting Rosenbaum, Wingood, and DiClemente’s work, this theory is adapted to examine factors that may promote RC (Aim 2) and covert use (Aim 3) within the sexual division of labor, sexual division of power, and cathexis for adult women experiencing IPV in Nairobi’s urban informal settlements (Table 2.2).

Table 2.2 TGP Exposures Relating to RC and Covert Use

Sexual division of labor	Women who: <ul style="list-style-type: none"> • live at the poverty level^Φ • have less than a secondary school education* • are unemployed/underemployed* • have limited financial access to healthcare services*^Φ • at risk of being forcibly displaced^Φ
Sexual division of power	Women who have: <ul style="list-style-type: none"> • a history of physical or sexual abuse*^Φ • a history of emotional abuse*^Φ • an older partner^Φ

	<ul style="list-style-type: none"> • a partner who disapproves of contraceptive use^Φ • differing pregnancy intentions from their partner^Φ • a partner who has multiple partners*^Φ • inequitable gender norms* • limited access to family planning services*^Φ • limited involvement in pregnancy decision-making*^Φ • poor couple communication*^Φ
Cathexis	<p>Women who have:</p> <ul style="list-style-type: none"> • community expectations related to childbearing^Φ • family pressure to conceive*^Φ • harmful beliefs around help-seeking^Φ

* Items included within the conceptual framework and measured quantitatively (Aims 2-3; Figure 2.1)

^ΦItems explored qualitatively (Aims 2-3)

Harm reduction and empowerment frameworks can also be applied to examine covert use and other strategies that women use to protect themselves in light of RC (Aim 3). Harm reduction is an approach that specifies realistic goals that can be achieved short-term, while working towards longer term plans.⁶³ This framework originated in HIV and substance use fields, but has been applied to IPV when women are constrained from leaving their relationship, either due to sociocultural factors or their own volition.^{45,64–66} Specifically, both covert and overt safety strategies may be used to help women achieve their desired goals by either decreasing exposure or reducing the impact of IPV.^{48,67–69} When applied to RC and sexual and reproductive health, the most commonly recommended safety strategy is covert use of family planning.^{46,70} More overt strategies may include verbal resistance or thoughtful communication about family planning and fertility preferences.

An empowerment lens further specifies internal motivations and external pressures, as well as individual behaviors that allow women to achieve their desired goals.⁷¹ The World Bank’s definition of empowerment, “the expansion of an individual’s ability to make strategic life choices where this ability was previously denied,”⁷² directly relates to covert use within the context of RC, as woman’s ability to achieve her desired fertility intentions is denied.

2.11 Persisting Gaps in RC Research.

Several gaps remain in relation to global RC research, necessitating further work to understand its manifestation and impact. Foremost, there is a dearth of research examining RC's prevalence and behaviors in LMIC contexts, as demonstrated by only two studies that have focused specifically on RC.^{39,40} Aim 1 seeks to address this gap by assessing transferability of the RCS to IPV survivors in Nairobi's informal settlements via mixed-methods research. Furthermore, few studies have examined correlates across the socioecological framework that could be associated with RC in LMICs, including pervasive gender norms, societal pressure to conceive, and familial impact on decision-making. Aim 2 begins to fill this gap through further examination of multi-level quantitative correlates of RC and contributors of RC discussed via in-depth interviews (IDIs). Though qualitative studies indicate that covert use of contraception is pervasive, quantitative studies have not examined the relationship between RC and covert use. Further, gaps persist surrounding other reproductive health strategies to safeguard against RC and its effects. Aim 3 seeks to quantitatively assess the relationship between RC and covert use, and explore women's experiences using contraception covertly in light of RC experience via IDIs. Further understanding of risk contexts and protective strategies surrounding RC can bolster women's reproductive health and autonomy globally.

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Chapter 3. Methodology

3.1 Parent Study: Overview.

This dissertation utilized the existing research infrastructure between Johns Hopkins Bloomberg School of Public Health (JHSPH), Johns Hopkins School of Nursing, and Ujamaa, a community-based organization headquartered in Nairobi with reach throughout East Africa. The parent study (PI: Decker) addressed safety preparedness and behaviors for women experiencing intimate partner violence (IPV) via adaptation, implementation, and evaluation of a tailored safety decision aid app (myPlan).^{1,2} myPlan has been deemed effective for decreasing women's decisional conflict and increasing safety preparedness in the US and other developed settings.^{3,4}

The formative phase was conducted from June to December 2017 and included key informant discussions with community service providers (n=18), focus group discussions (FGDs) with women recently experiencing IPV (n=49), and piloting of the app to ensure feasibility and acceptability with IPV survivors (n=18).^{1,5} This phase focused on women's experiences of violence, safety strategies recommended and used, and available community resources. A key component of the parent study was understanding sexual coercion within this population; however, when describing coercive experiences within FGDs, themes around reproductive coercion (RC) inductively emerged.

The second phase of the parent study was a randomized controlled trial (RCT) conducted throughout 2018 (n=177 intervention, n=175 control). Baseline data collection began in April 2018 with phased roll-out to three study sites through Summer 2018. Follow-up data collection occurred three months later from July-October 2018. All data were collected by trained study staff, including community health volunteers (CHVs) that were trained by the JHSPH team. The primary aims of the RCT were to assess the effectiveness of the myPlan app in reducing decisional conflict and in

increasing safety preparedness and resilience after three-month follow-up, as compared to a control condition of standardized safety strategies and referrals.²

3.2 Role of Dissertation Research in Parent Study.

Baseline RCT data were used for quantitative analyses in Aims 1-3. A qualitative phase specific to RC was introduced for the purposes of this dissertation research; qualitative data from in-depth interviews (IDIs) were utilized for all three aims.

The parent study did not investigate RC specifically, nor safety strategies for reproductive and sexual health, including covert use of contraception. This dissertation research extended beyond quantitative data collected for the parent study to examine Reproductive Coercion Scale (RCS) transferability, correlates of and contributors to RC, and RC's association with covert use of contraception. Given the short follow-up time to examine RC's impact on covert use within a high injectable use setting,⁶ quantitative data were limited to baseline participants only.

The subsequent qualitative phase was specific to RC and beyond the scope of the parent study, though built on formative findings. The qualitative phase was conducted with both intervention and control participants who indicated RC experience at baseline. IDIs occurred immediately after three-month follow-up data collection among a subset of participants (n=30). IDIs aimed to bolster knowledge of RC behaviors, risk contexts surrounding RC, and safety strategies used by women experiencing RC, including covert use; these data were further used for triangulation with quantitative results.

3.3 Ethical Approval.

All procedures, instruments, and consent forms for the parent study and extended dissertation research received Institutional Review Board approval from the National Commission for Science and Technology in Kenya (NACOSTI/P/18/73612/21358) and at JHSPH (IRB00008440).

3.4 Study Setting: Nairobi, Kenya

Data for this dissertation research were collected in three informal settlements within Nairobi county: Korogocho/Kariobangi (Kasarani division), Huruma/Mathare (Kasarani division), and Dandora (Embakasi division). These settlements were selected due to high rates of IPV and fertility, as well as proximity to the in-country partner's office for ease of data collection. While the three informal settlements are geographically similar, differences in characteristics could contribute to heterogeneity in key variables between sites. For example, Korogocho/Kariobangi is the poorest settlement and Huruma/Mathare has increased proximity to health and psychosocial support services.

Nairobi informal settlements are unique settings for understanding the behaviors, drivers, and safety strategies for RC. RC has rarely been studied in high fertility settings, where immense value is placed on women's childbearing abilities. The total fertility rate (TFR) for Kenya is 3.9 births per woman, though relatively lower in urban versus rural settings within Kenya (3.1 vs. 4.6, respectively).⁷ Nairobi county holds the lowest TFR in the entire country (2.7 births per woman),⁷ however, study divisions are disproportionately marked by high fertility (Kasarani=4.7 births per woman; Embakasi=3.2 births per woman).⁸ Furthermore, 23.8% of women in urban informal settlements report that their last birth was wanted later or not at all.⁸

Despite high unintended pregnancy, modern methods of contraception are known and available to women in this setting. Greater than ninety percent of women within our study divisions report knowledge of at least one type of modern contraceptive method; the pill and the injectable were most well-known.⁸ Although family planning awareness is high, a disconnect remains for women who may need it the most, with 23.7% of women classified as having an unmet need for family planning within our study settlements. Moreover, less than ten percent of women report condom use at last intercourse.⁸ While surveillance efforts persist for Kenya and Nairobi county specifically, few studies have examined barriers to uptake, particularly those at the couple or familial levels, within Nairobi's informal settlements.^{9,10} Further, data are not specific to IPV survivors, who may have increased unmet need for contraception, unintended pregnancy, and decreased access to services given coercive dynamics within abusive partnerships.

Nairobi's densely-populated informal settlements are unique settings for examining IPV given high population density/proximity to perpetrators, early age at onset, fluidity of partnerships, and economic dependence.^{11,12} The IPV women experience is severe and recurrent—within Nairobi proper, 35% of married reproductive age women report experiencing physical or sexual IPV within the last year, the second highest of all regions in Kenya.⁷ Furthermore, barriers to help-seeking are poorly understood; of women ever-experiencing violence in Nairobi, 35% did not seek help nor tell anyone about their violence experience.⁷ Although RC remains unmeasured in surveillance systems, including the Demographic and Health Surveys (DHS) and National Cross-Sectional Slums Survey (NCSS), formative research for the parent study indicates that RC is common in these settlements.⁵

3.5 Socioecological Framework for Understanding RC.

Heise's socioecological framework for violence prevention and response was adapted to understand correlates and contributors of RC that may span multiple levels.¹³ While responsibility for violence falls with the perpetrator, contextual factors may make individuals particularly vulnerable to IPV and RC. These constraints or enabling factors for RC can occur at the community, family, couple, and individual levels (Aim 2); factors at each level of the framework are outlined below and in Figure 3.1.

Community-level correlates comprise site (community in which the individual resides), and community norms that may shape the individual's belief on a particular matter. Community norms have primarily been used to examine the influence of gender norms on IPV, with a lesser focus on RC.¹⁴⁻¹⁷ Community-level correlates for the present study focus on equitable gender roles, though community norms specific to childbearing and fertility may also influence women's perceptions of RC and her fertility intentions.¹⁸

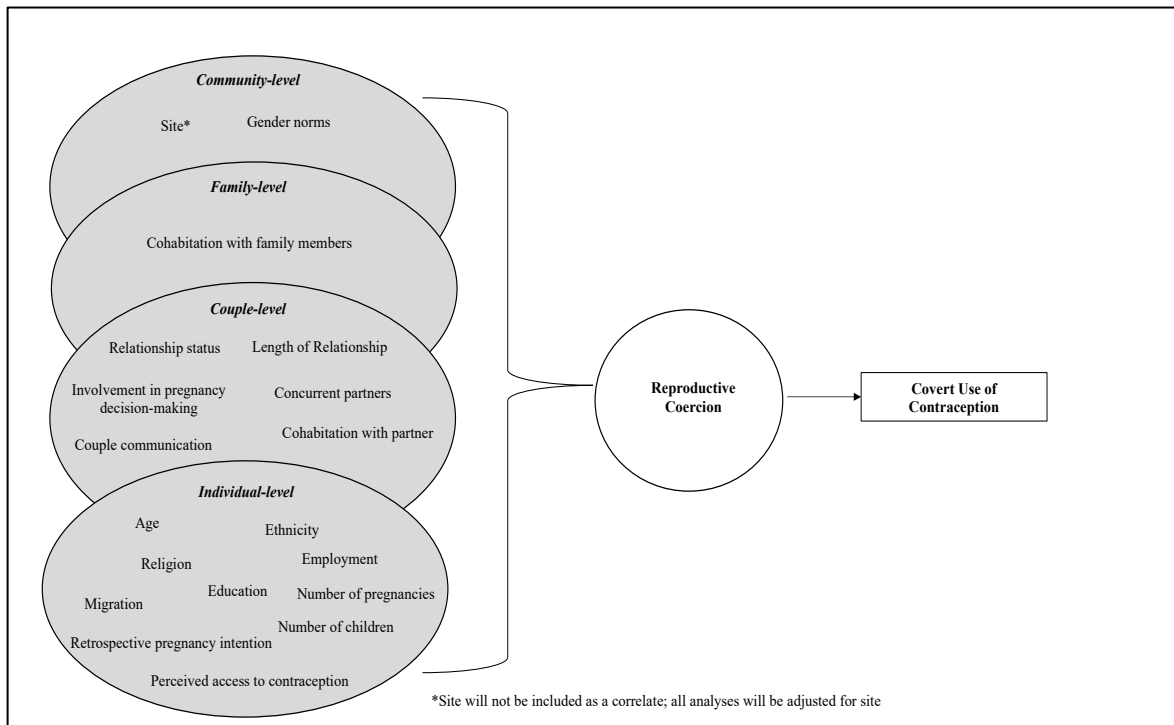
Familial influence (both natal family and in-laws) has been previously examined in relation to RC in LMICs.^{19,20} Given familial pressure for additional children and the influence that family has over both male and female childbearing intentions, cohabitation with family members was examined at the family level.

The couple is a key socioecologic level given the dyadic nature of RC. Relationship status, cohabitation with partner, and length of relationship may indicate strength of the partnership.²¹⁻²³ Concurrent relationships, for either partner, may further be associated with RC; men with other partners may feel less pressured for one partner to bear his children or could serve as a sign of relationship instability. A woman's negotiation skills can be further examined through involvement in pregnancy decision-making and communication in childbearing discussions with her partner;

while these items specify an individual’s skills, they are positioned at the couple level given dependence on couple dynamics within the partner dyad.

Several factors may also contribute to RC at the individual level. Previous studies have indicated the impact of age, ethnicity, education, and immigration status on RC.^{21,22,24,25} Within the Nairobi context, religion, education, and unemployment may also influence a woman’s choice of partner and ability to negotiate with or leave a coercive partner. Reproductive history, including number of pregnancies, number of children, and retrospective pregnancy intention of last birth are also positioned at the individual level given the fluidity of partnerships in this context. Further, access to contraception, or a woman’s perceived access to contraception, could prohibit uptake and use. Factors that may decrease access include travel distance, expense, inconvenience, difficulty obtaining contraception, and negative health effects.

Figure 3.1. Socioecological Framework for RC



3.6 Quantitative Methods.

3.6.1 Quantitative Recruitment.

Quantitative recruitment for the parent RCT used community-based, non-probability sampling. Potential participants learned of the study primarily through recruitment flyers distributed by CHVs and posted at health and community support programs known to serve the target population; participants were additionally recruited via presentations at community events. Community recruitment was deemed most appropriate in order to reach women who may have never disclosed violence experiences nor sought help. Word-of-mouth was determined the most appropriate recruitment mechanism in this setting during the formative phase and therefore utilized for the RCT, however, participants may have self-referred based on flyers providing contact information. All recruitment activities included use of experienced CHV research assistants who regularly served the target population.

Participants were asked to contact the research team by telephone or in person, at which time screening and oral consent activities were conducted. At that time, the research staff reviewed the purpose of the study, eligibility criteria, and research procedures.

Eligibility criteria comprised female, age 18-35, in a relationship where physical or sexual IPV or fears for safety occurred in the past three months, residence in study settlements with no plans to move within the next six months, and fluency in English or Kiswahili. Exclusion criteria comprised male, age under 18 or above 35, no experience of IPV or safety fears within the last three months, residence outside of the study settlements or plans to move within six months, or no knowledge of English or Kiswahili. Eligibility was assessed through single items for sex, age, residence, moving plans, and language; however, violence screening was conducted using three items to obtain a range of IPV experiences: 1) “Is there something about your current partner that makes you feel worried,

uncomfortable, or unsafe?"; 2) "In the past three months did your current partner hit, punch, throw, slap, or kick you?" and 3) "In the past three months, did your current partner ever force or pressure you to have sex when you didn't want to?" An affirmative response to any of the three questions indicated eligibility into the study.

These recruitment procedures generated a baseline sample of 352 participants. At three-month follow-up, 312 participants remained, for an overall retention rate of 89% across sites. Retention was non-differential by violence or RC.

3.6.2 Quantitative Procedures.

Following screening and oral informed consent, participants completed the interviewer-assisted baseline survey. All data collection occurred in a private room with quantitative measures collected via tablet. For the purpose of this dissertation research, both intervention and control participant baseline data are included in Aims 1-3, as the intervention had not yet occurred at data collection.

Baseline study participants were asked to return for follow-up data collection three months later. Participants were asked to provide identifiers for the purpose of recruitment and follow-up. Contact information was stored in a separate database with participant ID as the only link from contact information to survey data.

Following completion of baseline data collection, participants were provided with a list of local resources, facilitated by a staff member to ease connection. At the time of resource provision, the assisting staff member administered a universal upset screener; specifically, research staff said, "We realize this study can raise sensitive topics. How are you feeling right now? Would you like us to reach out to support services for you?" Participants indicating distress were connected

immediately with support services. By providing this screener, all participants had the opportunity to share any distress they may have experienced.

Research staff were present for baseline data collection to assist as needed. All recruitment, informed consent, and survey instruments were available in both English and Kiswahili languages based on participant preference; all research team members were fluent in both languages and underwent a month-long training conducted by the JHSPH team.

Procedures followed best practices for violence-related research²⁶ and were consistent with past myPlan RCT guidelines in other settings.^{27,28}

3.6.3 Quantitative Measurement Development.

The quantitative instrument was piloted with Ujamaa research staff to ensure maximum feasibility and acceptability. Surveys were available in English and Kiswahili. The English version was translated into Kiswahili and back-translated into English by two Ujamaa staff members.

3.6.4 Quantitative Measures.

All quantitative data were assessed at baseline. Psychometrics reported below are from previous research.

Reproductive coercion (RC): Psychometric and descriptive analyses for Aim 1 centered around RC; further, RC was the primary dependent variable for Aim 2 and independent variable for Aim 3.

RC was measured using the full 9-item Reproductive Coercion Scale (RCS), originally developed in the United States by Elizabeth Miller and colleagues.^{29,30} This version of the scale was selected over the 5-item abridged version that drops items specific to threatening to leave or to have a baby with someone else as a result of not getting pregnant; these items were deemed pertinent to the Nairobi context by the study team given the fluidity of relationships and pervasiveness of concurrent partnerships. Given that the original RCS was formulated and revised in the US,^{25,31} two additional context-specific items were added based on formative work that occurred prior to this dissertation research. Both the 9-item RCS and two additional items specific to the Nairobi context are outlined in Table 3.1. Given that Item 11 examined coerced use of contraception, rather than coerced non-use of contraception, it was decided a priori to analyze this item separately and exclude from psychometric testing for the RCS (Aim 1).

All women who were not pregnant or less than or equal to three months pregnant at time of baseline survey were eligible for RC assessment (n=333); the tablet-based survey was programmed to skip women who were more than three months pregnant, as they could not have experienced recent RC.

Table 3.1 Measured Reproductive Coercion Scale (RCS) Items ($\alpha=0.76$)³⁰

<p>In the past three months has your partner:</p> <ol style="list-style-type: none"> 1. Told you not to use any birth control (like the pill, shot, coil, etc.). 2. Said he would leave you if you didn't get pregnant 3. Told you he would have a baby with someone else if you didn't get pregnant 4. Taken your birth control (like pills) away from you or kept you from going to the clinic to get birth control 5. Made you have sex without a condom so you would get pregnant 6. Hurt you physically because you did not agree to get pregnant 7. Taken off the condom while you were having sex, so you would get pregnant 8. Put holes in the condom so you would get pregnant 9. Broken the condom on purpose while you were having sex so you would get pregnant 10. Forced you to remove your IUD/coil or implant (Additional item) 11. Forced you to use birth control when you did not want to (Additional item)*

*a priori decision to exclude from psychometric analyses for RCS

Transferability of the RCS and modeling of RC items were integral components of this dissertation (Aim 1). RC assessments were handled as both binary (never/ever past three-month experience

using all loaded items for RCS) and as a continuous, additive summary score. Sub-scales that emerged from psychometric analyses were also handled as both binary and additive summary scores to understand sub-types of RC. These steps are outlined below in [3.9 Aim 1 Analyses](#).

Covert use: The covert use of contraception item was adapted from IRIS, an early form of the myPlan app.⁴ Specifically, the item asked “In the past three months, have you used birth control without your partner's knowledge to avoid getting pregnant by him?” This item is similar to the direct covert use assessment within some DHS countries that asks “Does your husband/partner know that you are using a method of family planning?”;³² this item is not included the current Kenya DHS. Other measurement approaches for covert use include comparison of men’s and women’s reports of contraceptive use;³³ as only women were interviewed in this study, a direct item was deemed more appropriate for assessing covert use.

To construct the assessment for covert use, first, all women less than or equal to three months pregnant (n=333), were asked if they or their partner had done something or used a method to delay or avoid getting pregnant within the last three months. Women indicating affirmative responses were then asked about most recent method use and whether they used birth control without their husband’s knowledge within the past three months (covert use). Using these items, two measures were created for covert use: 1) a binary measure indicating covert or overt use among reported contraceptive users within the last three months (n=252); 2) a categorical measure among all women with complete contraceptive data (non-users, overt users, covert users; n=321).

Covariates: As outlined in [3.5 Socioecological Framework for Understanding RC](#), covariates were explored at the community, family, couple, and individual levels. Covariates served as factors associated with RC (correlates; Aim 2), as well as potential confounders between RC and covert

use (Aim 3). All covariates were assessed at baseline. Level within the conceptual framework, covariate, and measurement approach are outlined in Table 3.2.

Of note, the perceived access to contraception items focused on potential hindrances that could deter women from using contraception and did not aim to measure women’s own access to contraception.

Table 3.2 Covariates and Measurement Approach

<i>Level</i>	<i>Covariate</i>	<i>Item (alphas from existing literature)</i>
Community	Gender norms	Gender Equitable Men Equitable Gender Norms Subscale ¹⁴ ($\alpha=0.77$)
Family	Cohabitation with family	Single item: Do you currently live with your family?
Couple	Relationship status	Single item: When you enrolled in the study, you told us you were in a relationship with someone that caused you fear, or experienced physical or sexual violence from. What is your current relationship status with that partner?
	Length of relationship	Single item: How long have you been/were you together with that partner?
	Cohabitation with current partner	Single item: Do you currently live with that partner?
	Concurrent partners	1. Have you had other partners in the last three months? 2. Do you know if your partner has had other partners in the last three months?
	Communication	5-item Reproductive Autonomy Communication Sub-Scale ²² ($\alpha=0.74$)
	Decision-Making	4-item Reproductive Autonomy Decision-Making Sub-Scale ²² ($\alpha=0.65$)
Individual	Age	Single item: What is your age?
	Education	Single item: What is the highest level of education you have completed?
	Migration	Single item: Have you moved to Nairobi within the last five years?
	Ethnicity	Single item: What is your ethnicity/tribe?
	Religion	Single item: What religion do you practice?
	Employment	Single item: Are you currently employed?
	Number of pregnancies	Single item: How many times have you been pregnant?
	Number of children	Single item: How many children have you given birth to?

	Retrospective pregnancy intention*	Single item: Now I would like to ask a question about your last birth. At the time you became pregnant, did you want to become pregnant then, did you want to wait until later, or did you not want to have any more children at all?
	Perceived access to contraception*	Single item: Which of the following are reasons to not use methods to avoid or delay a pregnancy? A. Difficult to obtain B. Too far to travel C. Too expensive D. Inconvenient to use E. Health effects

*Missing data due to tablet programming errors; described further in 3.8.1 *Missing Data*

3.7 Qualitative Methods.

3.7.1 Qualitative Recruitment.

After completion of three-month follow-up quantitative data collection, a purposive sampling frame was used to select participants for IDIs focused on RC. Follow-up retention was high (89% across sites) and attrition was non-differential on RC or IPV severity.

All participants (both intervention and control) who completed baseline and follow-up surveys and indicated any RC experience at baseline were eligible for IDI. Eligible women were stratified on intervention status and by site to obtain a mix of experiences. An a priori sample size of 30 interviews was specified; this sample size allowed for a range of RC experiences among 15 intervention 15 control participants, evenly dispersed across the three sites. Weekly calls with the interview team and ongoing review of transcripts for emergent themes ensured that the specified sample size was adequate and saturation of themes had occurred prior to interview completion.

3.7.2 Qualitative Procedures.

Semi-structured interviews were used to ensure consistency. Open-ended questions helped women expand their thoughts and relay personal experiences regarding RC, covert use, and other potential safety strategies. IDIs took place in the Ujamaa offices in the week after follow-up survey data

collection. All interviews were conducted in private settings with measures taken to protect confidentiality in accordance with best practices for violence related research.²⁶

Following an extensive qualitative training by the JHSPH team, three data collectors for the parent study conducted the IDIs. All data collectors had worked in violence-related work within the informal settlements and vetted the acceptability of interview questions.

All IDIs took place in Kiswahili or English, were audio-recorded, transcribed verbatim, and translated into English by the Ujamaa data collection team for analysis in Atlas.ti software.

3.7.3 Qualitative Measurement Development.

The IDI guide was developed by the PhD Candidate, with substantial input from the parent study team and Ujamaa data collectors. Piloting of the IDI guide occurred via focus group of data collectors. The guide was translated into Kiswahili, back-translated by two data collectors into English, and results compared to ensure reliability of wording.

3.8 Exploratory Analyses.

All quantitative analyses were conducted in STATA 16 (StataCorp, College Station, TX), with statistical significance set at $p=0.05$. Exploratory analyses first examined the distributions of key exposures, outcomes, and covariates; extent and nature of missing data; and psychometric properties of covariates. Histograms, scatter plots, Venn diagrams, tabulations, and summary statistics were run for each variable to understand underlying patterns and any potential systematic biases in the data.

3.8.1 Missing Data

Exploratory analyses examined the extent and nature of missing data. Missing data for RC were first explored given that RC the primary focus of this dissertation research and utilized across Aims 1-3.

Recent RC was not assessed for women who were greater than three months pregnant (n=19), as that they could not have experienced RC in the last three months. Sensitivity analyses were first undergone to examine differences in key demographic characteristics among those for whom RC was assessed (n=333) vs. those not assessed given pregnancy status (n=19) using Fisher’s exact test (binary/categorical variables) and t-tests (continuous variables).

Women who did not undergo RC assessment were younger, had shorter relationships, and fewer children; these differences are reasonable given pregnancy status at time of survey (Table 3.3).

Table 3.3 Sensitivity Analysis for Participants Eligible vs. Ineligible for RC Assessment (n=352)

Sample Characteristics	Eligible for RC Assessment (n=333)	Ineligible for RC Assessment (n=19)	p-value
Study Site			0.79
Korogocho	136 (40.8)	9 (47.4)	
Dandora	115 (34.5)	5 (26.3)	
Huruma	82 (24.6)	5 (26.3)	
<i>Age (Mean (sd))</i>	<i>26.6 (4.7)</i>	<i>24.2 (4.5)</i>	0.03
18-20	32 (9.6)	7 (36.8)	0.003
21-25	126 (37.8)	3 (15.8)	
26-30	92 (27.6)	7 (36.8)	
31-35	83 (24.9)	2 (10.5)	
Highest level of education completed			0.48
Primary or less	171 (51.4)	7 (36.8)	
Some secondary	81 (24.3)	6 (31.6)	
Secondary	69 (20.7)	5 (26.3)	
Vocational/University +	12 (3.6)	1 (5.3)	
Ethnicity			0.38

Kikuyu	136 (40.8)	9 (47.4)	
Luo	85 (25.5)	6 (31.6)	
Luhya	57 (17.1)	1 (5.3)	
Borana	11 (3.3)	0 (0.0)	
Kamba	33 (9.9)	1 (5.3)	
Other	11 (3.3)	2 (10.5)	
Religion			0.68
Christian	307 (92.2)	17 (89.5)	
Muslim	24 (7.2)	2 (10.5)	
Other	2 (0.6)	0 (0.0)	
Migrated to Nairobi in past five years	85 (25.5)	4 (21.1)	0.79
Current Relationship Status			1.00
Boyfriend	40 (12.0)	2 (10.5)	
Husband	285 (85.6)	17 (89.5)	
Separated/Other	8 (2.4)	0 (0.0)	
<i>Length of Relationship (Years; Mean (sd))</i>	<i>6.4 (4.4)</i>	<i>4.3 (3.1)</i>	0.05
<i>Number of Children (Mean (sd))</i>	<i>2.1 (0.1)</i>	<i>1.4 (0.3)</i>	0.02

Italics indicate continuous variables

Fisher's exact test for binary and categorical demographic variables; t-tests for continuous variables

An additional six of the 333 women did not respond to one or more RC items. Sensitivity analysis using Fisher's exact tests and t-tests were again run to examine differences in key demographics among those with available RC data (n=327) vs. those missing RC data due to non-response (n=6). No systematic differences in the analytic sample vs. participants missing RC data for non-response were observed (Table 3.4). Complete cases analysis or mean imputation are both justified given that missingness of data for the majority of variables was <5%.³⁴ **While no differences were observed, given that RC the primary variable of interest for all aims, a complete case approach was adopted and all quantitative analyses were limited to participants for whom RC data were available (n=327).**

Table 3.4 Sensitivity Analysis for Missing RC Data (n=333)

Sample Characteristics	RC data Available (n=327)	Missing RC Data (n=6)	p-value
Study Site			1.00

Korogocho	133 (40.7)	3 (50.0)	
Dandora	113 (34.6)	2 (33.3)	
Huruma	81 (24.8)	1 (16.7)	
<i>Age (Years; Mean (sd))</i>	<i>26.6 (4.7)</i>	<i>28.2 (4.5)</i>	<i>0.41</i>
18-20	32 (9.8)	0 (0.0)	0.94
21-25	124 (37.9)	2 (33.3)	
26-30	90 (27.5)	2 (33.3)	
31-35	81 (24.8)	2 (33.3)	
Highest Level of Education Completed			0.89
Primary or less	168 (51.4)	3 (50.0)	
Some secondary	79 (24.2)	2 (33.3)	
Secondary	68 (20.8)	1 (16.7)	
Vocational/University +	12 (3.7)	0 (0.0)	
Ethnicity			0.37
Kikuyu	135 (41.3)	1 (16.7)	
Luo	81 (24.8)	4 (66.7)	
Luhya	56 (17.1)	1 (16.7)	
Borana	11 (3.4)	0 (0.0)	
Kamba	33 (10.1)	0 (0.0)	
Other	11 (3.4)	0 (0.0)	
Religion			1.00
Christian	301 (92.1)	6 (100.0)	
Muslim	24 (7.4)	0 (0.0)	
Other	2 (0.6)	0 (0.0)	
Migrated to Nairobi in Past Five Years	83 (25.4)	2 (33.3)	0.65
Current Relationship Status			1.00
Boyfriend	40 (12.2)	0 (0.0)	
Husband	279 (85.3)	6 (100.0)	
Separated/Other	8 (2.5)	0 (0.0)	
<i>Length of Relationship (Years; Mean (sd))</i>	<i>6.4 (4.4)</i>	<i>7.2 (3.7)</i>	<i>0.66</i>
<i>Number of Children (Mean (sd))</i>	<i>2.1 (1.1)</i>	<i>2.5 (0.5)</i>	<i>0.34</i>

Italics indicate continuous variables

Fisher's exact test for binary and categorical demographic variables; t-tests for continuous variables

Missingness was next examined for factors at the community, family, couple, and individual levels (correlates for Aim 2). Missing data for these covariates are outlined in Table 3.5.

Table 3.5 Missing Covariate Data (n=327)

Variable	n (%) missing
<i>Community Level</i>	
Study Site	0 (0%)
Gender Norms	3 (0%)*
<i>Family Level</i>	
Cohabitation with Family	0 (0%)
<i>Couple Level</i>	
Current Relationship Status	0 (0%)
Length of Relationship (years)	4 (1%)*
Cohabitation with Current Partner	0 (0%)
Participant Has Concurrent Partners	0 (0%)
Partner Has Concurrent Partners	0 (0%)
Involvement in Pregnancy Decision-Making	0 (0%)
Couple Communication	1 (0%)*
<i>Individual Level</i>	
Age (years)	0 (0%)
Highest level of Education Completed	0 (0%)
Migrated to Nairobi in Past Five Years	0 (0%)
Ethnicity	0 (0%)
Religion	0 (0%)
Unemployed	1 (0%)
Number of Pregnancies	8 (2%)
Number of Births	0 (0.0)
Intendedness of Last Pregnancy*	24 (7%)**
Perceived Access to Contraception [±]	
Health Effects	16 (4.9)**
Inconvenient to Use	26 (8.0)**
Too Expensive	26 (8.0)**
Difficult to Obtain	25 (7.7)**
Too Far to Travel	26 (8.0)**

Italics indicate continuous variables

* mean imputation for continuous variables

** complete case approach with sensitivity analysis

Complete case analysis or mean imputation are both justified given that missingness of data for the majority of variables was <5%.³⁴ To ensure consistency of the analytic sample for analyses, mean imputation, was applied for continuous variables (gender norms, length of relationship, couple communication, and number of pregnancies).

Two variables were missing data >5% due to errors in programming the baseline questionnaire—retrospective pregnancy intention and perceived access to healthcare items. The programming error occurred specifically with pregnancy intention data, as prospective pregnancy intention data had also intended to be collected, but was unable to ultimately be assessed at baseline. As skip patterns for perceived access to contraception were also dependent on pregnancy intention, approximately 25 women were also missing responses for these variables.

Sensitivity analyses were undergone to understand potential systematic differences in results given non-response patterns. As these items were independent variables for Aim 2, Aim 2 linear regression analyses were first run using single imputation. The analysis was then repeated using a complete case approach (i.e. excluding participants with no available data). Results are presented in *3.10.4 Post-hoc Sensitivity Analyses for Missing Data*.

Lastly, missingness of covert use and contraceptive use items were examined for Aim 3 analyses. No significant differences were observed in demographic characteristics between participants with available vs. missing covert use data, except across age categories (Table 3.6). Given that this was the primary dependent variable for Aim 3 and missingness of covert use was <2%, Aim 3 analyses were restricted to complete cases (n=321).

Table 3.6 Sensitivity Analysis for Missing Covert Use Data (n=327)

Sample characteristics	Covert Use Data Available (n=321)	Missing Covert Use Data (n=6)	p-value
Study Site			0.06
Korogocho	133 (41.4)	0 (0.0)	
Dandora	110 (34.3)	3 (50.0)	
Huruma	78 (24.3)	3 (50.0)	
<i>Age (Mean (sd))</i>	<i>26.6 (4.7)</i>	<i>26.8 (1.7)</i>	<i>0.89</i>

18-20	32 (10.0)	0 (0.0)	0.04
21-25	123 (38.3)	1 (16.7)	
26-30	85 (26.5)	5 (83.3)	
31-35	81 (25.2)	0 (0.0)	
Highest level of education completed			0.16
Primary or less	164 (51.1)	4 (66.7)	
Some secondary	79 (24.6)	0 (0.0)	
Secondary	67 (20.9)	1 (16.7)	
Vocational/University +	11 (3.4)	1 (16.7)	
Ethnicity			0.96
Kikuyu	132 (41.1)	3 (50.0)	
Luo	80 (24.9)	1 (16.7)	
Luhya	55 (17.1)	1 (16.7)	
Borana	11 (3.4)	0 (0.0)	
Kamba	32 (10.0)	1 (16.7)	
Other	11 (3.4)	0 (0.0)	
Religion			1.00
Christian	295 (91.9)	6 (100.0)	
Muslim	24 (7.5)	0 (0.0)	
Other	2 (0.6)	0 (0.0)	
Migrated to Nairobi in past five years	82 (25.6)	1 (16.7)	0.52
Current Relationship Status			0.12
Boyfriend	39 (12.2)	1 (16.7)	
Husband	275 (85.7)	4 (66.7)	
Separated	3 (0.9)	0 (0.0)	
Other	4 (1.3)	1 (16.7)	
<i>Length of Relationship (Mean (sd))</i>	<i>6.3 (4.4)</i>	<i>8.5 (5.0)</i>	<i>0.23</i>
<i>Number of Children (Mean (sd))</i>	<i>2.1 (1.1)</i>	<i>1.8 (0.8)</i>	<i>0.61</i>

Italics indicate continuous variables

Fisher's exact test for binary and categorical demographic variables; t-tests for continuous variables

3.8.2 Psychometric analyses

Psychometric properties of all covariate scales were assessed via principal components analysis (PCA) and using Cronbach's alpha to assess internal consistency. PCA is a technique to examine how much of the composite variables capture information in the original items.³⁵ Cronbach's alpha is defined as "the proportion of a scale's total variance that is attributable for a common source"³⁵ i.e. it assesses the likeness of items within a scale and their ability to measure a single underlying

construct. These two criteria can be used to evaluate external reliability, or how well previously validated scales fit into new contexts. Items with Cronbach's alpha >0.7 and PCA eigenvalues of >1.0 were considered to have high internal consistency and good transferability to the Nairobi context. All covariate scales applicable to this dissertation, Gender Equitable Norms¹⁴ ($\alpha=0.62$), Reproductive Autonomy communication sub-scale²² ($\alpha=0.81$), and Reproductive Autonomy decision-making sub-scale²² ($\alpha=0.72$) demonstrated alpha values indicative of moderate to high internal consistency and were deemed appropriate for use in subsequent analyses.

3.8.3 Modeling of Covariates.

Distributions and linearity assumptions were further examined to understand modeling for covariates in Aims 2-3. For continuous variables, scatter plots were created to understand the distribution of variables with continuous RC measure. Based on scatter plots, if possible, variables were then modelled in their continuous form (number of children, gender norms summary score, etc.). For the age covariate specifically, the decision was made to model both as continuous and categorical covariate for Aims 2-3. This decision was made given lack of linear association with RC described via scatter plots, and knowledge that age generally has a parabolic association with contraceptive use (contraceptive use is lower for younger and older ages). To further understand this association, age was modelled as both a continuous and categorical covariate.

Further, using both conceptual underpinnings and through examination of distributions, small cells were combined whenever possible to ensure that categorical variable groups were adequate for comparison.

3.9 Aim 1 Analyses.

Aim 1 analyses examined prevalence of RC and transferability of the RCS and additional context-specific item within a population of IPV survivors in Nairobi's informal settlements. Qualitative analyses further explored severity of RC experience. Quantitative and qualitative data were triangulated via convergence matrixes to understand consistency of women's RC experiences with quantitative items.

3.9.1 Aim 1 Analytic Sample.

Of the baseline study participants (n=352), a total of 25 participants were dropped based on RC unassessed due to recent pregnancy (n=19) or missing RC data for one or more items (n=6) following a complete case approach, yielding a total analytic sample of n=327 with complete RC information.

3.9.2 Prevalence of Individual RC Items.

Prior to undergoing psychometric analysis, the prevalence of each of the 11 individual RC items was assessed by tabbing the percentage affirmative response per item among all participants.

3.9.3 Psychometric Analysis of the 9-Item RCS.

RC is a latent variable, i.e. it is not observable, cannot be quantified directly, and varies in magnitude.³⁵ The primary aim of Aim 1 and a pivotal part of this dissertation involved understanding RC within the Nairobi setting and validating the RCS.

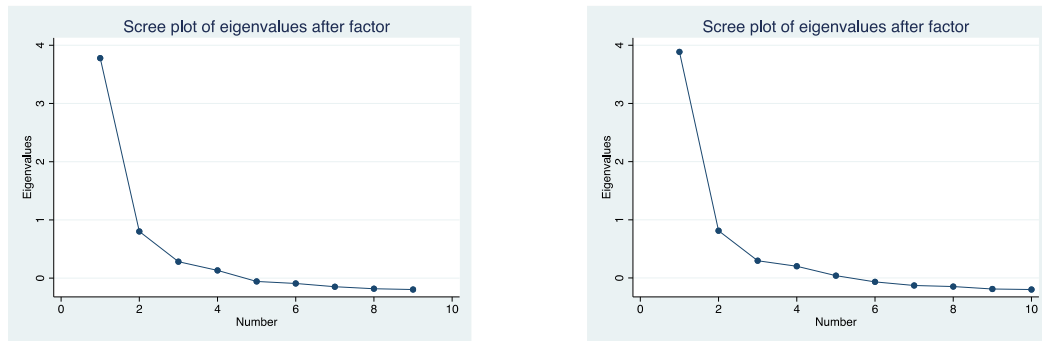
Psychometric testing occurred in two phases: 1) testing of the original 9-item RCS; 2) testing of 9-item RCS and an additional context-specific item. The original 9-item RCS has been validated within the US.³⁰ Two new items were assessed via survey to reflect women's lives in in the Nairobi

context; only one of these items was psychometrically tested with the original nine RCS items (item: forced you to remove your IUD/coil or implant). It was decided a priori to not include the second item for psychometric testing (item: your partner ever forced you to use birth control when you didn't want to).

Exploratory factor analysis was used to understand the underlying latent variable (RC). Factor analysis is useful for a number of reasons, including: 1) determining how many latent variables conform a set of items, 2) condensing number of items to make sense of information, 3) understanding meaning in underlying factors, and 4) identifying items that fit better or worse.³⁵ Exploratory factor analysis was used in place of confirmatory factor analysis to explore whether there were differing underlying constructs for the Nairobi context, rather than to confirm factors previously described in the US.

Psychometric criteria, including eigenvalues, factor loadings, and scree tests were used to determine the number of items to be retained. Eigenvalues indicate the amount of information, or strength, of a factor, with values >1 deemed unique factors.³⁵ Factor loadings indicate the strength of each item, whereas uniqueness indicates how different the item is from other items; criterion for retaining an item comprised factor loading >0.4 , though uniqueness <0.7 was also examined to ensure factors were unique. Similarly, scree tests plot eigenvalues per factor to indicate number of factors that emerge from a set of items; the elbow of the plot depicts how many underlying factors are contained within a set of items.³⁵ Unrotated scree tests for the original RCS and RCS with additional item are indicated in Figure 3.2. The original RCS plot indicates one strong factor (Eigenvalue=3.9) and a lesser factor (Eigenvalue=0.81).

Figure 3.2 Scree Tests for Original RCS and RCS with Additional Item



Parallel analysis and exploratory factor analysis (EFA) were conducted based on tetrachoric correlation matrices. Parallel analysis is a technique to examine whether the eigenvalue for the last retained factor exceeds that of data obtained from random data under comparable conditions (using an artificial data set in STATA).³⁵ Tetrachoric correlation matrixes were used given the dichotomous nature of the response category for RC item.³⁵ Both oblique and orthogonal rotation methods were examined, however, oblique rotation using the promax command in STATA was ultimately selected given the high intercorrelation between items.³⁵ When the oblique rotation was applied, eigenvalues improved to indicate two factors >1. Factor analysis then guided the selection of items based on >0.40 factor loading criteria.

Cronbach’s alpha values of 0.70 or higher helped determine the internal consistency of the RC scale and potential sub-scales. These results are presented more thoroughly in Chapter 4, however, are described briefly here for understanding of selection criteria. Factor loadings and rotated eigenvalues for the nine items suggested a two-factor solution—the first indicative of condom manipulation (eigenvalue=3.22) and the second of pregnancy coercion (eigenvalue=3.11). The 9-item RCS and emergent sub-scales demonstrated high reliability (overall Cronbach’s $\alpha=0.86$; condom manipulation $\alpha=0.85$; pregnancy coercion $\alpha=0.78$). Emergent sub-scales had similar structure to those identified in the US.³⁰

3.9.4 Psychometric Properties of 10-Item RCS and Refinement of Scale.

The second step of psychometric testing involved repeating the same process with the addition of the context-specific item “forced you to remove your IUD/coil or implant” (total of ten items tested). Upon inclusion of the additional item in EFA, eigenvalues for both factors increased, however, internal consistency slightly decreased ($\alpha=0.84$). Further, the additional item did not load on either factor (factor loading <0.4) and was thus dropped from further analyses. **Based on these results, the final RC scale used for all subsequent analyses in Aims 1-3 retained only the original nine RCS items.**

3.9.5 Prevalence of RC and Calculation of Summary Scores.

Prevalence of the overall 9-item RCS and emergent condom manipulation and pregnancy coercion sub-scales were then calculated.

Given the high prevalence of RC ($>80\%$), a continuous summary score was additionally presented and used in subsequent analyses (Aims 2-3). This decision was made to increase granularity in RC measurement, as items varied in severity and number of items experienced could be indicative of more severe RC. The summary score was calculated by summing all nine items that loaded within psychometric analyses. Similarly, items for the sub-scales were summed for items that loaded per pregnancy coercion (five items; Range 0-5) and condom manipulation (four items; Range 0-4) sub-scales.

3.9.6 Post-hoc Exploration of Weighted RC Summary Score.

Weighted summary scores based on factor loadings were also explored, as some researchers recommend this approach given that the summary score weights items that load best within EFA.³⁶ Sensitivity analyses were run with the weighted summary scores, however, revealed comparable

results for Aim 2-3. Without strong conceptual justification for weighting and to maintain simplicity and consistency with past approaches, the standard additive approach was applied for both overall RC and sub-scale summary scores.

Subsequent analyses (Aims 2-3) use additive scores for 9-item overall RC, 5-item pregnancy coercion, and 4-item condom manipulation for summary measures.

3.9.7 Aim 1 Qualitative Analyses.

Transcripts were coded by two trained qualitative researchers using an inductive thematic analysis approach^{37,38} to identify emerging themes from the transcripts and then develop an initial set of codes. An incremental, stepwise approach was used to assess inter-rater reliability; after every five transcripts were coded, the researchers compared codes and discrepancies were discussed until consensus achieved. Dual coding was used until thinking was synced and minimal discrepancies occurred across coders. This process was used rather than examining inter-rater reliability to maximize changes that could be made throughout the process and improve coding overall. Coding was complete when all transcripts had been thoroughly coded and themes began to repeat without presenting any new information (saturation).³⁹

Quotes were coded as RC experience if they were explicit statements either of RC or partner's behaviors leading to RC, including partner pressure to have a child, threats upon contraceptive request, prohibition of use of contraception, or direct contraceptive sabotage. Separate sub-codes for RC were used to examine women's thoughts on partners' intentions surrounding RC, experience of unintended pregnancy as the result of RC, and forced use of family planning. Quotes coded as RC-related codes were downloaded from Atlas.ti; matrices of code themes were created and organized by RC experiences. Sociodemographic information (site and age) was pulled for each

quote; as themes and sub-themes were constructed, underlying patterns in sociodemographic information were examined.

3.9.8 Aim 1 Triangulation Between Quantitative and Qualitative Data.

This explanatory mixed-methods design positioned the qualitative phase following the quantitative to further expand on RC behaviors.⁴⁰ Triangulation between quantitative and qualitative data can be displayed during recruitment, analysis, results, or discussion phase of the research process.⁴⁰ In this study, triangulation is presented in the results section to understand the RC behaviors and the severity of RC experienced by women experiencing IPV in Nairobi; further, it helped assess whether a continuous measure was more appropriate to capture these experiences. As a triangulation measure, convergence matrixes were used to assess congruence between quantitative items (continuous summary score; Range: 1-9) and qualitative experiences (RC experience via IDI) per each participant in the qualitative phase (n=30).⁴⁰

3.10 Aim 2 Analyses.

Aim 2 quantitative analyses examined correlates of RC at the community, family, couple, and community levels cross-sectionally. Using linear regression, all items were assessed individually, first adjusted for site only and then adjusted for other significant covariates to understand independent effects. IDI data further explored contributors to RC using inductive thematic analysis.

3.10.1 Aim 2 Analytic Sample.

The baseline sample for the parent study comprised 352 participants, of whom nineteen were dropped from the analytic sample for current pregnancy >3 months; an additional 6 participants were missing RC information for one or more item, yielding a sample of 327 participants with complete RC data. Missing correlate data were <2%, with the exception of retrospective pregnancy

intention and perceived access to contraception (<10%) due to errors in programming of the baseline survey. Single imputation with post-hoc sensitivity analyses were applied to examine biases that could have resulted with imputation of these two potential correlates. Given that imputation methods were applied for covariate data, Aim 2 analyses included 327 participants with complete RC data.

3.10.2 Distribution of Correlates.

Given the continuous nature of the outcome (RC), distributions of potential correlates were examined for the overall sample and by RC severity (split by median RC score). Dichotomization at RC median was chosen to maximize statistical power and to ease visual representation given the continuous nature of the primary dependent variable; dichotomization was inclusive of those with no RC experience (i.e. summary score=0). Split at RC median was deemed appropriate given mean and median of the continuous RC score were approximately equal (mean=3.8; median=4.0). Chi-squared (categorical and binary variables) and t-tests (continuous variables) statistics were calculated to assess significant differences in covariates by high/low levels of RC.

3.10.3 Linear Regression.

Multivariable linear regression was first used to examine the association between each postulated correlate and the primary dependent variable (continuous RC score), adjusted for site only; this decision was made a priori given heterogeneity in study communities. Separate multivariable linear regression models were run for each postulated correlate (independent variable) and RC (dependent variable). If the independent variable was categorical, associations with individual categories were examined. The equation for linear regression is outlined below.

This process was repeated to calculate multivariable linear regression coefficients between each postulated correlate and sub-scale summary scores (continuous scores for pregnancy coercion and condom manipulation).

All models (individual correlate and 1) full RC score, 2) pregnancy coercion, and 3) condom manipulation) were then further adjusted for all correlates that were significant at the $p < 0.1$ level in the site-only models to ensure that observed correlate effects were indeed independent and not due to other potential confounding variables.

Aim 2 Equation for Linear Regression: $(Y_i) = (\beta_0) + \mu_0 + (\beta_1) + (\gamma_1) \dots (\gamma_2)$

where:

β_0 =intercept for RC

μ_0 =intercept for site

β_1 =difference in RC with one-unit change in postulated correlate for woman i at baseline, assessing each correlate individually

$\gamma_1 \dots \gamma_2$ = difference in RC use with one-unit change in covariate

3.10.4 Post-hoc Sensitivity Analyses for Missing Data.

As mentioned previously, sensitivity analyses were run to examine differences in betas via single imputation vs. a complete case approach for retrospective pregnancy intention and perceived access to contraception variables (Table 3.7). Given differences in $B < 10\%$ for all variables, a single imputation approach was deemed appropriate and presented for primary regression analyses.

Table 3.7 Linear Regression Results Using Single Imputation vs. Complete Case Approaches (n=327)

	Single Imputation ^ϕ (n=327)			Complete Case ^ϕ (n=301)		
	Full RC	Pregnancy Coercion	Condom Manip.	Full RC	Pregnancy Coercion	Condom Manip.
Intendedness of Last Pregnancy						
Wanted Then	ref	ref	ref	ref	ref	ref
Wanted Later	0.6 (-0.1, 1.3)	0.3 (-0.1, 0.8)	0.3 (-0.1, 0.6)	0.5 (-0.2, 1.3)	0.3 (-0.2, 0.7)	0.3 (-0.1, 0.7)
Wanted Not At All	1.3** (0.5, 2.2)	0.8** (0.3, 1.3)	0.5* (0.1, 1.0)	1.2** (0.4, 2.2)	0.7** (0.9, 1.3)	0.5* (0.1, 1.0)

Perceived Access to Contraception						
Difficult to obtain	0.2 (-0.6, 1.1)	0.1 (-0.4, 0.6)	0.1 (-0.3, 0.5)	0.2 (-0.6, 1.1)	0.1 (-0.4, 0.6)	0.1 (-0.3, 0.5)
Too far to travel	0.3 (-0.7, 1.3)	0.1 (-0.5, 0.7)	0.2 (-0.3, 0.7)	0.3 (-0.7, 1.4)	0.1 (-0.6, 0.7)	0.2 (-0.3, 0.8)
Too expensive	0.7 (-0.1, 1.5)	0.5* (0.0, 1.0)	0.1 (-0.3, 0.6)	0.7 (-0.1, 1.5)	0.5* (0.1, 1.1)	0.2 (-0.3, 0.6)
Inconvenient to use	1.0** (0.4, 1.7)	0.6** (0.2, 1.0)	0.5** (0.1, 0.8)	1.1** (0.4, 1.7)	0.6** (0.2, 1.0)	0.5** (0.1, 0.8)
Health effects	0.3 (-0.3, 1.0)	0.3 (-0.1, 0.7)	0.0 (-0.3, 0.3)	0.4 (-0.3, 1.1)	0.4 (0.0, 0.8)	0.0 (-0.3, 0.4)

*p<0.05; **p<0.01

^φadjusted for site only

3.10.5 Qualitative Data Analysis.

Transcripts were coded by two trained qualitative researchers using an inductive thematic analysis approach^{37,38} to identify emergent themes from the transcripts and develop an initial set of codes. An incremental, stepwise approach was used to assess inter-rater reliability; after every five transcripts were coded, the researchers compared codes and discussed inconsistencies until consensus was achieved. Dual coding was used until thinking was synced and minimal discrepancies occurred across coders. Coding was complete when all transcripts had been thoroughly coded and themes began to repeat without presenting any new information (saturation).³⁹

Codes that could encompass contributors of RC (Table 3.8) were examined and quotes for these codes downloaded from Atlas.ti. Codes included childbearing and family planning perceptions at different socioecological levels (community, peers, family, partner, individual). Matrices of code themes and sub-themes were created; sociodemographic information (age and site) were pulled to identify potential patterns in themes.

Table 3.8 Qualitative Codes Examined as RC Contributors

childbearpercept_education	fpเปอร์cept_comm	fpเปอร์cept_fam	fpchall_logistics
childbearpercept_money	fpเปอร์cept_peer	discuss_part	fpchall_other
childbearpercept_health	fpเปอร์cept_part	intent_part	rc_intent
childbearpercept_family	fpเปอร์cept_woman	fpchall_sideeffects	condomเปอร์cept_part
fpเปอร์cept_comm	fpexper_peer	fpchall_cost	condom_norm

3.10.6 Integration of Quantitative and Qualitative Data.

Per Creswell, quantitative and qualitative findings were compared in the Discussion.⁴⁰ This decision was made given space constraints and to ensure that proper consideration was given to both correlates and contributors of RC with the Results.

3.11 Aim 3 Analyses.

Aim 3 analyses centered on examining the association between RC and RC sub-factors (independent variables), and covert use of contraception, the dependent variable. Qualitative themes surrounding covert use and related reproductive safety strategies were further explored via IDIs.

3.11.1 Analytic Sample.

The baseline sample for the parent study comprised 352 participants, of whom nineteen were dropped from the analytic sample for current pregnancy >3 months; an additional 6 participants were missing RC information for one or more item, yielding a sample of 327 participants with complete RC data. Following a complete case approach, participants were further dropped if missing covert use data (n=6), for a final sample of 321 participants in Aim 3 quantitative analyses.

3.11.2 Sample Characteristics and Distribution of Covert Use (Dependent Variable).

Sample characteristics, including factors at the community, family, couple, and individual level were examined overall and by covert use categories (non-use, overt use, and covert use of

contraception). Significance testing between covert use groups was assessed via chi-squared and Fisher's exact test (cells size <5 observations) for binary/categorical items and ANOVA for continuous items.

Contraceptive method mix between covert and overt users was further assessed among users of contraception (n=252) via chi-squared and Fisher's exact tests. While some covert users indicated use of methods that are unable to be concealed (i.e. male condom or withdrawal), the decision was made to not recode these participants as overt users given differences in measure wording. Specifically, the method mix variable asks about *most recent* contraceptive use within the last three months, whereas the covert item asks about use of any contraceptive method without the partner's knowledge within the past three months. It is possible that participants were using another method covertly, although their most recent method was an overt method; largely, however, methods aligned with covert or overt usage.

3.11.3 Distribution of RC Across Contraceptive Use Categories.

Mean and standard deviation of RC and RC sub-scales were examined across contraceptive use categories (non-use, overt use, and covert use) to understand distributions. ANOVA was used to test for significant differences in means across the three categories.

3.11.4 Confounding Assessment Prior to Regression Analyses.

Prior to examining the relationship between RC (independent variable) and covert use (dependent variable), potential confounders were assessed. By definition, a confounder is a variable that may distort the effect between the independent and dependent variables.⁴¹ To qualify as a confounder, this variable must 1) be associated with the independent variable, 2) be a risk factor for the

dependent variable, and 3) must not be on the causal pathway between the independent and dependent variables.⁴¹ P-values of <0.1 served as threshold for potential inclusion.⁴¹

As specified in 3.6.4 *Quantitative Measures*, all Aim 2 correlates were also assessed as confounders for Aim 3 analyses. Aim 2 regression analyses examining the association between correlates and RC served as the first assessment for confounding definition (confounder must be associated with the independent variable). Fully adjusted Aim 2 regression analyses indicated that study site (p=0.09), concurrent partnership (p=0.001), couple communication (p=0.002), pregnancy intention (p=0.009), and inconvenient use (p=0.02) were associated with RC.

Association between correlates and covert use of contraception were also previously assessed in 3.11.2 *Sample Characteristics and Distribution of Covert Use (Dependent Variable)*; results presented in Table 6.1. These analyses indicated that study site (p=0.07), partner's concurrent partnership (p=0.04), involvement in pregnancy decision-making (p=0.009), unemployment (p=0.001), number of pregnancies (p=0.07), and health effects (p=0.009) were associated with covert use.

The a priori decision was made to adjust all analyses for site. Given associations with both independent and dependent variables, the final model additionally adjusted for partner's concurrent partnership.

3.11.5 Relationship Between RC and Covert Use of Contraception.

Multinomial logistic regression was first used to examine the association between RC and contraceptive use categories (covert or overt use, with non-use as the referent group). Multinomial logistic regression is a modelling technique for a nominal dependent variable with more than two

levels (i.e. it allows unordered categories to be compared against a common referent category).⁴² This approach was chosen to allow comparison of covert and overt use as separate categories and to maximize sample size given that reasons for covert and overt use may differ based on RC experience, relative to non-use of contraception. Models were first run adjusted only for site; then, covariates that were associated both independently with RC and covert use were added to the model (partner's concurrent partnership). The equation used for multinomial regression is outlined below.

Equation for Multinomial Logistic Regression: Relative Risk $(Y_i)=(\beta_0)+ \mu_0 + (\beta_1) + (\gamma_1)$

where:

β_0 =average risk of covert use category

μ_0 =intercept for site

β_1 =difference in risk of covert use category for experience of RC vs. no experience of RC

γ_1 = difference in risk of covert use category with one-unit change in covariate

The relationship between RC and covert use was then additionally examined via logistic regression among contraceptive users only (covert vs. overt use; $n=252$; covert vs. overt use). This step was to better understand the effect estimate, rather than for statistical significance testing of differences between groups. Similar to the multinomial model, analyses were first run adjusted for site only, and then fully adjusted to also include partner's concurrent partnerships. The equation for multivariable logistic regression is outlined below.

Equation for Multivariable Logistic Regression: Log Odds $(Y_i)=(\beta_0)+ \mu_0 + (\beta_1) + (\gamma_1)$

where:

β_0 =average log odds of covert use

μ_0 =intercept for site

β_1 =difference in log odds of covert use for experience of RC vs. no experience of RC

γ_1 = difference in log odds of covert use with one-unit change in covariate

3.11.6 Qualitative Data Analysis Examining Covert Use and Related Safety Strategies.

Transcripts were coded followed the same approach as specified for previous aims: two trained qualitative researchers conducted inductive thematic analysis^{37,38} and used an incremental, stepwise approach to assess inter-rater reliability. Coding was complete when all transcripts had been thoroughly coded and themes began to repeat without presenting any new information (saturation).³⁹

Safety strategies codes included discussions of intentional behaviors aimed at reducing RC and its effects. These codes encompassed covert use (strat_covert), reproductive strategies covered in myPlan, including thoughtful partner communication and minimizing damage (strat_myPlan), and safety strategies used but not specifically discussed in myPlan (strat_other). Given widespread discussions on covert use, challenges of using contraception covertly were additionally coded (covertchall_sideeffects, covertchall_logistics, covertchall_partner). Coding for safety strategies that women had not previously used, but believed could be helpful to mitigate impact of RC (strat_idea) were also incorporated. Matrices of code themes were created and organized by emergent safety strategy sub-themes. Sociodemographic data (age and site) were integrated to assist in identifying patterns in themes.

Results were presented primarily as emergent themes, however, a narrative approach was also adopted to serve as a representation of women's RC and covert use experiences. This approach was integrated in order to demonstrate the often cyclic and intertwined nature of RC and covert use, that would otherwise be lost if examining each in silo. Pseudonyms were used in place of IPV survivors' real names.

3.11.7 Integration of Quantitative and Qualitative Data.

Similarly to Aim 2, quantitative and qualitative findings were compared in the Discussion.⁴⁰ This decision was made to further contextualize these results within the prior literature base.

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Chapter 4. Understanding the transferability of the Reproductive Coercion Scale to a low- and middle-income context: mixed-methods research with intimate partner violence survivors in Nairobi, Kenya

4.1 Abstract.

Background: Intimate partner violence (IPV) incurs significant reproductive risk to women and girls globally. Specifically, reproductive coercion (RC), or partner interference in reproductive decisions, may limit contraceptive decision-making and exacerbate adverse reproductive outcomes. To date, there is a dearth of research surrounding RC measurement in low- and middle-income countries (LMICs).

Methods: An explanatory mixed-methods design was used to examine transferability of the US-based RC Scale to the Kenyan context. Women experiencing IPV were recruited via community-based sampling from three informal settlements of Nairobi; quantitative analyses utilized baseline data from the myPlan Kenya trial (n=327). Prevalence of individual RC items was first examined. Transferability of RC measures was assessed via eigenvalues, factor loadings, and scree tests. Exploratory factor analysis was conducted based on tetrachoric correlation matrices. Using item loading for the emergent scale and sub-scales, past three-month prevalence of RC, sub-scales, and continuous summary score were examined using descriptive statistics. In-depth interviews (IDIs; n=30) at three-month follow-up among women indicating recent RC experience contextualize results and examine severity. Triangulation of quantitative items and IDI data occurred via convergence matrixes.

Results: Past-three month prevalence for individual items included: told you not to use any birth control (58.4%), made you have sex without a condom so you would get pregnant (52.6%), hurt you physically because you did not agree to get pregnant (49.2%), and told you he would have a baby with someone else if you didn't get pregnant (45.0%). Psychometric analyses indicated a two-

factor solution comprising pregnancy coercion (eigenvalue=3.22) and condom manipulation (eigenvalue=3.11; overall alpha=0.86). Approximately 82% of IPV survivors experienced RC (pregnancy coercion=76.6%; condom manipulation=59.5%). IDIs highlighted women's multiple, severe experiences with RC. The extent of women's described RC experiences via IDIs were largely consistent with continuous RC summary score.

Conclusions: The RC Scale demonstrated strong transferability to the Nairobi context, as indicated by high eigenvalues and Cronbach's alpha; emergent sub-scales were similar to those reported in the US. Further, results indicate that RC is prevalent and severe for women experiencing IPV in Nairobi; the continuous summary score may be a more appropriate measure to understand number of RC behaviors experienced in this setting. Linkage to woman-centered support services is needed to maximize IPV survivors' reproductive health in light of coercive experiences that may introduce risk for contraceptive non-use and resulting unintended pregnancy.

4.2 Introduction.

Intimate partner violence (IPV), or physical, sexual, or emotional violence perpetrated by an intimate partner, increases women's risk for adverse sexual and reproductive health outcomes, including unintended pregnancy, sexually transmitted infections (STIs)/HIV, and induced abortion.¹⁻³ IPV impacts sexual and reproductive health directly via sexual violence perpetration and indirectly through psychological and behavioral mechanisms. Partner pressure and interference is one indirect pathway that may limit women's reproductive control and decision-making.⁴⁻⁶ Specifically, reproductive coercion (RC), or the interference in contraceptive and reproductive decisions through either direct intervention or threats/coercion, has been linked to poor reproductive outcomes in the United States (US).⁷⁻¹¹ To date, however, there is a dearth of research regarding RC behaviors and impact in low- and middle-income countries (LMICs), where women

face unique pressures surrounding childbearing.¹²⁻¹⁴

RC has been measured almost exclusively through the Reproductive Coercion Scale (RCS), which was developed and refined in the US among clinic-based adolescents and corroborated with adult samples.^{7,9,15} In the US, the RCS is reliable in measuring recent pregnancy coercion and condom manipulation sub-factors ($\alpha=0.76$).¹⁶ RC work within LMICs is more limited, though emergent work is exploring the unique roles of sociodemographic and cultural factors in RC behaviors.^{10,17,18}

To date, only two studies have adapted the RCS to a local LMIC context (Cote d'Ivoire $\alpha=0.93$; northern India $\alpha=0.73$).^{10,11,18} Both studies described substantial measurement adaptation to focus on both in-law and partner perpetrated RC. While quantitative data examining transferability of the RCS to LMICs is limited, qualitative research highlights the occurrence of fertility pressures in high fertility LMIC settings.⁶ Specifically, unique contributors that may amplify risk include social pressure demanding high fertility and initiation of childbearing immediately after marriage,^{13,14} fluidity of partnerships,¹⁹ and constrained physical and economic circumstances hindering access to contraceptive or abortion services.^{13,14}

Emergent research in Nairobi, Kenya suggests the occurrence of RC and limited knowledge of reproductive safety strategies to protect against contraceptive-related partner pressure and violence;²⁰ these narratives arose in the context of formative research to inform a safety intervention for IPV survivors in Nairobi's informal settlements (myPlan Kenya). Context-specific research is needed to understand the dynamics of RC in Nairobi and other LMIC settings where women may have limited influence in negotiation and decision-making, and restricted options for seeking care or garnering support.^{19,21,22} Utilizing an explanatory mixed-methods design, this study aimed to test and refine the RCS to examine the prevalence and severity of RC within a population of

reproductive age women experiencing IPV. Refined and validated RC measures can be integrated into research and practice guidelines to adequately capture women's RC experiences in LMICs.

4.3 Methods.

4.3.1 Overview of Study.

This study utilizes mixed-methods data from the myPlan Kenya randomized controlled trial (RCT), conducted from April-October 2018 in three urban informal settlements of Nairobi, Kenya.^{23,24} Analyses use baseline RCT data and in-depth interviews (IDIs) conducted at three-month follow-up with women who indicated baseline experience of RC.

Research occurred in Korogocho/Kariobangi, Dandora, and Huruma/Mathare informal settlements of Nairobi; study settlements are characterized by high IPV, fertility, and unmet need for family planning.²⁵⁻²⁷ All research was conducted in close collaboration with Ujamaa-Africa, a Nairobi-based violence prevention and response organization, and included the use of experienced community health volunteer (CHV) research assistants who regularly served the study population. All study procedures were approved by Johns Hopkins Bloomberg School of Public Health (JHSPH) and the National Commission for Science and Technological Innovation (NCOSTI) Institutional Review Boards (IRB).

4.3.2 Quantitative Data Collection.

Quantitative recruitment utilized community-based, non-probability sampling. Potential participants learned of the study through distributed recruitment flyers and community event presentations; this recruitment strategy was deemed most appropriate to reach women who may have never disclosed violence experiences or sought help. Quantitative eligibility criteria comprised female, age 18-35, in a relationship where physical or sexual IPV or fears for safety

occurred in the past three months, residence in study settlements with no plans to move within the next six months, and fluency in English or Kiswahili.

Following screening and oral informed consent, interviewer-assisted, tablet-based baseline data collection was completed in a private room prior to intervention receipt. Immediately following baseline survey, participants received a list of local resources, facilitated by a staff member to ease connection. Procedures followed best practices for violence-related research.²⁸

4.3.3 Quantitative Measures.

The quantitative instrument was piloted with Ujamaa research staff to verify feasibility and acceptability. Surveys were available in English and Kiswahili. The English version was translated into Kiswahili and back-translated into English by two Ujamaa staff members.

RC was measured using the full 9-item RCS^{7,16} and two additional items based on formative work: In the past three months has your partner: 1) Forced you to remove your IUD/coil or implant, 2) Forced you to use birth control when you did not want to? As the second item examined coerced use of contraception, rather than coerced non-use of contraception, the decision was made a priori to analyze separately and not include in psychometrics for the RCS. For each RCS and additional item, participants were asked whether or not the specific behavior occurred within the past three months; this time frame was chosen to calculate difference-in-difference analyses in RC for the RCT. RC items were skipped for women indicating pregnancy gestation >3 months given the three month time frame. RC assessments were handled as both binary (never/ever past-three-month experience for individual items and overall RC using all loaded items for the RCS) and as a continuous, additive summary score.

4.3.4 Quantitative Sample

The baseline sample for the parent study comprised 352 participants, of whom nineteen were dropped from the analytic sample for current pregnancy >3 months; an additional 6 participants were missing RC information for one or more item, yielding a sample of 327 participants with complete RC data. Analysis followed the complete case approach;²⁹ sensitivity analyses examined demographic characteristics of non-assessed and missing RC data and indicated no systematic differences in the directionality and statistical significance of results.

4.3.5 Quantitative Analyses

Analyses were conducted in STATA 16 (StataCorp, College Station, TX), with statistical significance set at $p=0.05$. Exploratory quantitative analyses first examined the distribution of RC, and extent and nature of missing data. Prevalence of individual RC items was calculated.

Psychometric testing was run to assess transferability of the RCS to the Kenyan context. Psychometric criteria, including eigenvalues (strength of a factor), factor loadings (strength of each item), and scree tests (plots to indicate number of factors that emerge from a set of items) were used to determine the number of items to be retained. Exploratory factor analysis (EFA) and parallel analysis were conducted based on tetrachoric correlation matrices with promax rotation, given the correlation between items.³⁰ Factor analysis guided the selection of items based on 0.40 factor loading criteria.³⁰ Cronbach's alpha value of 0.70 was set as the threshold for high internal consistency of the scale and sub-scales.³⁰ Psychometric properties and internal reliability were assessed first on the 9-item original RCS and then inclusive of the additional item on forced removal of IUD/implant.

Prevalence of the overall scale and emergent sub-scales were then calculated. Given the high prevalence of RC, a continuous summary score was also computed by summing the equal-weighted binary items that loaded for the RCS.

4.3.6 Qualitative Data Collection

After completion of the quantitative portion, a purposive sampling frame was used to select participants for IDIs focused on RC. All participants (both intervention and control) who completed baseline and follow-up surveys and indicated that they experienced RC at baseline were eligible for the qualitative study. Retention at three-month follow-up was high (88.6%) and non-differential by RC experience. Eligible women were stratified based on intervention status and site to obtain a mix of experiences; recruitment occurred per site until adequate sample size was met (n=30)

Semi-structured interviews were used to ensure consistency. Open-ended questions helped women expand their thoughts and relay personal experiences regarding RC. The data collection team piloted the guide and provided feedback to clarify question wording. The guide was translated into Kiswahili, back-translated by two data collectors into English, and results compared to ensure reliability of wording.

Following extensive training, three RCT data collectors administered the IDIs. All data collectors had experience in violence-related work within the informal settlements. Each participant (n=30) took part in one in-depth, semi-structured interview. Interviews took place in the Ujamaa offices in the week after follow-up data collection; all were conducted in private settings to protect confidentiality in accordance with best practices for violence related research.²⁸ All IDIs took place in Kiswahili or English, were audio-recorded, transcribed verbatim, and translated into English for analysis in Atlas.ti software.

4.3.7 Qualitative Data Analysis

Transcripts were coded by two trained qualitative researchers using an inductive thematic analysis approach^{33,34} to identify emerging themes from the transcripts and develop an initial set of codes. An incremental, stepwise approach was used to assess inter-rater reliability; after every five transcripts were coded, the researchers compared codes and discrepancies were discussed until consensus achieved. Dual coding was used until thinking was synced and minimal discrepancies occurred across coders. Coding was complete when all transcripts had been thoroughly coded and themes began to repeat without presenting any new information (saturation).³⁵

Quotes were coded as RC experience if inclusive of explicit statements of RC or partner's behaviors leading to RC, including partner pressure to have a child, threats upon contraceptive request, prohibition of use of contraception, or direct contraceptive sabotage. Separate codes were used to examine women's thoughts on partners' intentions surrounding RC, experience of unintended pregnancy as the result of RC, and forced use of family planning. Quotes coded as RC-related codes were downloaded from Atlas.ti; matrices of code themes were created and organized by RC experiences. Sociodemographic information (site and age) was pulled for each quote; as themes and sub-themes were constructed, underlying patterns in sociodemographic information were examined.

4.3.8 Triangulation of Quantitative and Qualitative Data

To utilize the mixed-methods nature of the data, convergence matrixes were created to assess congruence between quantitative items (continuous summary score) and qualitative experiences (RC experience described in IDI) per each participant in the qualitative phase (n=30).³⁶

4.4 Results.

4.4.1 Sample Characteristics.

Analytical sample characteristics are outlined in Table 4.1. Participants were approximately evenly distributed across sites, with highest enrollment in Korogocho (40.7%). The mean age of IPV survivors was 26.6, with the majority completing less than secondary education. Participants were largely Christian (92.1%) and of Kikuyu ethnicity (41.3%). The majority of IPV survivors were married at time of baseline interview (85.3%) and parous (mean number of children=2.1); however, among women who had ever been pregnant, nearly 55% indicated that their last pregnancy was unintended. Moreover, approximately 8% of participants had a concurrent partner and 54% knew that their partner had a concurrent partner.

Table 4.1 Sample Characteristics (n=327 Women Experiencing IPV)

Sample Characteristics	n (%)
Study Site	
Korogocho	133 (40.7)
Dandora	113 (34.6)
Huruma	81 (24.8)
<i>Age (Years; Mean (sd))</i>	<i>26.6 (4.7)</i>
Highest Level of Education Completed	
Primary or less	168 (51.4)
Some secondary	79 (24.2)
Secondary	68 (20.8)
Vocational/University +	12 (3.7)
Ethnicity	
Kikuyu	135 (41.3)
Luo	81 (24.8)
Luhya	56 (17.1)
Borana	11 (3.4)
Kamba	33 (10.1)
Other	11 (3.4)
Religion	
Christian	301 (92.1)
Muslim	24 (7.3)

Other	2 (0.6)
Migrated to Nairobi in Past Five Years	83 (25.4)
Current Relationship Status	
Boyfriend	40 (12.2)
Husband	279 (85.3)
Separated/Other	8 (2.5)
<i>Length of Relationship (Years; Mean (sd))</i>	<i>6.4 (4.4)</i>
<i>Number of Children (Mean (sd))</i>	<i>2.1 (1.1)</i>
Intendedness of Last Pregnancy	
Wanted Then	149 (45.6)
Wanted Later	112 (34.3)
Wanted Not At All	66 (20.2)
Participant Has Concurrent Partners	25 (7.7)
Partner Has Concurrent Partners	177 (54.1)
Unemployed	308 (94.5)

*Italics indicate continuous items with mean (sd)

4.4.2 Reproductive Coercion Scale Item Prevalence and Psychometrics.

Prevalence of individual RC items are presented in Table 4.2. The most prevalent items included: told you not to use any birth control (58.4%); made you have sex without a condom so you would get pregnant (52.6%); hurt you physically because you did not agree to get pregnant (49.2%); and told you he would have a baby with someone else if you did not get pregnant (45.0%). Forced use of family planning was less common than forced non-use of family planning, though 13.5% of IPV survivors indicated that they had been forced to use a method when they did not want to.

Factor loadings based on a promax rotation are also presented in Table 4.2 for the original RCS and RCS with the additional context-specific item (Item 10). Rotated eigenvalues and loadings suggested a two factor solution—the first indicative of condom manipulation (eigenvalue=3.22) and the second of pregnancy coercion (eigenvalue=3.11). The full RCS and emergent sub-scales demonstrated high reliability (overall Cronbach's $\alpha=0.86$; condom manipulation $\alpha=0.85$; pregnancy coercion $\alpha=0.78$).

Upon inclusion of the additional context-specific item in exploratory factor analysis, eigenvalues for both factors increased, however, internal consistency slightly decreased ($\alpha=0.84$). The additional item “forced you to remove your IUD/coil or implant” did not load on either factor (factor loadings <0.4).

Table 4.2 Factors Loadings for Original RCS and Additional Item (n=327 women experiencing IPV)

	n (%)	Original Items			Original + Additional		
		Factor 1	Factor 2	Unique	Factor 1	Factor 2	Unique
<i>Original RCS Items</i>							
1. Told you not to use any birth control (like the pill, shot, coil, etc.).	191 (58.4)	-0.07	0.59	0.70	-0.08	0.59	0.70
2. Said he would leave you if you didn't get pregnant	141 (43.1)	0.02	0.70	0.49	0.02	0.69	0.51
3. Told you he would have a baby with someone else if you didn't get pregnant	147 (45.0)	-0.07	0.80	0.42	-0.08	0.80	0.42
4. Taken your birth control (like pills) away from you or kept you from going to the clinic to get birth control	118 (36.1)	0.07	0.48	0.73	0.06	0.49	0.72
5. Hurt you physically because you did not agree to get pregnant	161 (49.2)	0.29	0.48	0.53	0.29	0.47	0.53
6. Made you have sex without a condom so you would get pregnant	172 (52.6)	0.42	0.39	0.49	0.42	0.38	0.49
7. Taken off the condom while you were having sex, so you would get pregnant	139 (42.5)	0.74	0.06	0.40	0.75	0.05	0.38
8. Put holes in the condom so you would get pregnant	71 (21.7)	0.82	-0.07	0.40	0.82	-0.09	0.41
9. Broken the condom on purpose while you were having sex so you would get pregnant	98 (30.0)	0.88	-0.02	0.25	0.88	-0.03	0.27
<i>Additional Items</i>							
10. Forced you to remove your IUD/coil or implant	98 (30.0)	--	--	--	0.11	0.27	0.88
11. Forced you to use birth control when you did not want to**	44 (13.5)	--	--	--	--	--	--
Eigenvalues indicate two factor solution--selected factors 1 and 3 based on highest loadings from promax rotation							

Psychometric Properties of original items: eigenvalue factor 1=3.22; eigenvalue factor 2=3.11 alpha=0.86
Psychometric properties original + additional items: eigenvalue factor 1=3.36; eigenvalue factor 2=3.22; alpha=0.84
**Not included in the exploratory factor analysis a priori because item was in the opposite direction

4.4.3 Reproductive Coercion Summary Scores.

Given factor loading scores <0.4 indicating that the additional item did not load in this context, summary scores for the RCS were calculated using only the original nine RCS items. Prevalence of overall RC experience, and pregnancy coercion and condom manipulation factors are presented in Table 4.3.

Two summary scores were calculated for overall RC—82% indicated any experience of RC within the past three months per the binary measure, with a mean continuous score of 3.8 (sd=3.0). Past three-month experience of pregnancy coercion was more prevalent than condom manipulation (76.6% vs. 59.5%); these factors were not mutually exclusive.

Table 4.3 Prevalence of Reproductive Coercion Items (n=327 women experiencing IPV)

	Overall (n=327)
<i>Summary Scores for Overall RC:</i>	
Binary*	272 (81.7)
Continuous (mean (sd))**	3.8 (3.0)
<i>Factor 1: Condom manipulation^φ</i> Item 6. Made you have sex without a condom so you would get pregnant Item 7. Taken off the condom while you were having sex, so you would get pregnant Item 8. Put holes in the condom so you would get pregnant Item 9. Broken the condom on purpose while you were having sex so you would get pregnant	197 (59.5)
<i>Factor 2: Pregnancy coercion^φ</i> Item 1. Told you not to use any birth control (like the pill, shot, ring, etc.). Item 2. Said he would leave you if you didn't get pregnant Item 3. Told you he would have a baby with someone else if you didn't get pregnant Item 4. Taken your birth control (like pills) away from you or kept you from going to the clinic to get birth control Item 5. Hurt you physically because you did not agree to get pregnant	255 (76.6)

*binary summary score calculated based on any experience from items 1-9

**continuous summary score summed across experiences from items 1-9 (range 0-9)

^φ Condom manipulation and pregnancy coercion factors are not mutually exclusive

4.4.4. Qualitative Themes Examining RC Experience.

IDIs explored the severity of IPV survivor's RC experiences and partners' contraceptive interference behaviors. Survivors often underwent multiple forms of RC, spanning both pregnancy coercion and condom manipulation. Emergent themes classifying survivors' experiences included partner pressure against contraceptive use; IPV with contraceptive discussions; and direct contraceptive interference.

Partner pressure against contraceptive use

Partner pressure and outright refusal to use any form of contraception were the most widely discussed forms of RC. Accusations of prostitution and threats to leave the relationship and/or children both during initial discussions about contraception or upon discovery of contraceptive use were pervasive.

[Upon suspicion of contraceptive use] he said that he'd rather get another wife because he cannot live with someone who does things on their own. I thought, 'Instead of ruining my marriage, I'd rather stop using the injection.' I told him that I had used it but he should forgive me. I stayed for a while then I got this child.

-35-year-old IPV survivor, Korogocho

I felt bad because the child was three months. He wanted another child at that time yet he was not taking care of the one that we had. So, I decided to take the pills. He came back from work when I had not anticipated and he found them on the table when I was about to take them. He asked, 'What is this?' He read the back and saw what was written. He asked me why I was using them. He said that I wanted to have extramarital affairs that was why I was taking the pills. I stopped using them and I went and got an injection.

-24-year-old IPV survivor, Korogocho

Partner pressure often centered around strong opinions that family planning harmed women's bodies. These beliefs generally focused on longer-acting methods, particularly the IUD and implant. Many participants felt that their partner's opposition was motivated by desire for more children rather than health concerns.

He interferes because every time he comes home, all he says is, 'Let me not hear that you have put anything in your body or an injection.' That is all he keeps saying. It gives me sleepless nights that he does not want implants.

-25-year-old IPV survivor, Huruma

IPV with contraceptive discussions

While some discussions around contraceptive use were cordial, many exacerbated ongoing physical and sexual IPV. Discussions that resulted in IPV often kept women from attempting to continue use of contraception: "I could not use them by then, because I was afraid. Anytime my partner would come across my clinic card he would thoroughly beat and injure me. That is why I was afraid" (31-year-old, IPV survivor, Korogocho).

I took like two weeks then tried talking to him. So, it resulted in a fight. When I talked to him the second time, it got violent and he tried to assault me, he told me that I had known a lot because I know many men and that's why I wanted to go for family planning so that I don't give birth. He would impregnate me to keep me from going out.

-24-year-old IPV survivor, Huruma

He has hit me when we were discussing family planning issues because he did not want to hear me. There are times he tried to choke me, pull my hair. Our discussions have not been good, so when I say it's violent, I mean it is violent.

-20-year-old IPV survivor, Huruma

Direct contraceptive interference

Partners directly interfered in contraceptive use through a number of behaviors. Specifically, women discussed partner interference in pill use, including burning, flushing, hiding, and throwing away pills.

I don't know how my husband knows where the pills are. Even if I put them in the make-up bag, he will find them. He has found them more than thrice and it is a place you would not expect him to search. He throws them away and you know when you start taking them today, you should do it daily. If you skip, you are not helping yourself. You are messing up yourself. So, I stopped.

-28-year-old IPV survivor, Dandora

I did not want to get a child because of our standard of living and our constant fights. So, I had started using the pills but when he found them he took them and threw them away. Then came the night and he demanded sex and I ended up with the pregnancy.

-28-year-old IPV survivor, Dandora

Many women viewed the injectable as a contraceptive method that could be used covertly; however, some still encountered challenges concealing use from their partners and experienced RC upon learning of use.

As for the three months injection that I had been previously using, he used to give me money once in a while since I never told him what the injection was all about. Seemingly, he secretly went to the doctor who was administering the injection to me and asked him what kind of injection he was giving me. After getting the injection, there is always a card that one is given and it indicates the date one is to go for the next injection. So when this time reached, he refused to give me money for the injection, insisting that he would give me the following day. He was at home this particular day, we had sex and I found myself pregnant. That is how I realized that his major intention was to get me pregnant.

-23-year-old IPV survivor, Dandora

He changed my hospital card. I left my hospital card as I was leaving. It seems that as I was leaving, he was observing me so he noticed that I was on family planning. He changed the dates so I was checking yet I had already conceived and could not be removed.

-20-year-old IPV survivor, Dandora

Several partners threatened to remove the implant themselves or accompany the women to the clinic for removal, leading women to discontinue use. Other participants discussed partners searching for signs of implant use: "If he discovers I've used Norplant [implant], he will remove it. He told me he will remove it himself. He does not like that topic (28-year-old IPV survivor, Dandora).

He had threatened to leave me if I got the implant. I told him that if it gets to that, it is okay. I went ahead and got the implant and when I came back, the first day, he wanted to remove it. The moment I told him that I had had it removed, he had sex with me forcefully so that I get pregnant.

-24-year-old IPV survivor, Dandora

Sometimes he asks, ‘Are you using family planning?’ I tell him, ‘No, I don’t.’ One day he demanded that I hold here. I showed him my arm, but because I was wearing a long-sleeved dress that had hidden it, he could not notice.

-31-year-old IPV survivor, Huruma

Only one woman discussed her partner pressuring her to discontinue IUD use. This conversation centered around pricking of the IUD strings: “He complained that the coil was pricking him. I came to realize that it was not pricking him; it was only because I told him. He wanted me to stop so that I can get a child” (28-year-old IPV survivor, Dandora).

Both male and female condom use was low—the majority of partners would not even entertain discussion of condom use. Women who did attempt to use condoms with their partners described partner condom removal.

I tell him, ‘Since you do not want to be tested, you will wear a condom.’ Since he has the desire, and I’ve refused, he will wear it. He wears it then removes it. You understand?

-31-year-old IPV survivor, Huruma

I use it after there has been violence but sometimes, he removes it and there is nothing that you can do to him. If you start arguing with him, he will assault you.

-28-year-old IPV survivor, Dandora

4.4.5 Triangulation Between Quantitative and Qualitative Reports of RC.

The quantitative RC measure, RC summary score, was largely consistent with IPV survivors’ RC experiences described in IDIs (Table 4.4). Women with highest RC summary scores (range: 7-9) described severe experiences of RC, including burning condoms, throwing away pill packs, and IPV upon family planning discussions, including the use of forced sex with the intent for the woman to get pregnant. Women with lower RC summary scores (range: 1-3) often described partner pressure to conceive or partner disapproval of contraception. Of note, one participant’s (KOR067) qualitative experience did not align with her summary score. In the IDI, this participant showed

difficulty understanding the word “interfere,” initially stating that her husband interfered in her methods because he supported her using contraception and later stating that he has never interfered; while this participant does indicate that her partner disapproves of condom use, she is considered a deviant case because her summary score is not congruent with described experience.

Several participants characterized their partners’ interference as inconsistent. Specifically, these participants detailed that their partner was sometimes cooperative with contraceptive use, but interfered or pressured against use at other times. Participants who described inconsistency in intention or behaviors had RC summary scores in the 3-4 range.

Several women indicated limited choice in contraceptive methods due to partner pressure towards a specific method (summary score range: 4-7). Some of these women described sole partner approval of standard days method and disapproval of hormonal methods; others highlighted partner approval of only one hormonal method of contraception and pressure to use this method.

Table 4.4 Convergence Matrix of Qualitative Experience and Quantitative Score

Participant	Qualitative synopsis	RC Summary Score
DAN011	Partner changed injectable dates on hospital card; burnt condoms that were given to them at the hospital	9
KOR022	Threw away pills; IPV upon finding pill packs; partner threatened to leave if use of contraception besides counting days; forced sex	9
KOR067*	No experience of pregnancy coercion; partner would never agree to condom use because he believes women are the ones to practice FP	9
DAN023	Partner found injectable card and refused to let her go for services; strong dislike towards all methods, except counting days	8
HUR024	Partner does not approve of FP use; accused of prostitution; told to remove implant; physical violence upon FP discussion; condom refusal	8
HUR039	IPV upon FP discussion; feels partner wants to impregnate her to keep her from going out; partner searches house for pills and hospital card; checks her body for implant	8

DAN020	Partner flushed pills down the toilet; physical/emotional violence upon discussions of family planning; condom refusal	7
HUR089	Partner will only allow her to use injectables, though she would prefer implant; IPV upon discussions about FP; forced sex to intentionally impregnate; use of EC because of FP interference	7
KOR033	Had previous poor experience with FP and now partner will only allow counting days; partner wants to avoid pregnancy but does not like contraception; IPV with FP discussion; condom refusal	7
DAN026	Partner does not like pills nor condoms; previously several disagreements and violence over FP, but have now agreed that she would use implant	6
DAN037	Chased away from home, physical/sexual violence after discussions on FP; partner complaint about IUD; threw away pills; condom refusal	6
DAN075	Partner does not approve of FP use & threats if he found out she was using; IPV upon discussion about FP; condom refusal	6
HUR074	Partner does not approve of FP use; searches body for implant; agrees to condom use then forgets or removes when he is drunk	6
KOR032	Partner left her because she does not want to continue having children; IPV with FP discussions; condom refusal	5
KOR038	Partner only approves of the IUD; fights given that participant's preference is the injectable; condom refusal	5
KOR054	Partner disapproval of all FP; forbid her to get the injectable; IPV with FP discussions	5
DAN025	Partner threw away pill packs; threatened to remove implant if ever found her using; partner is open to female condoms but will remove	4
DAN028	Partner sometimes accepts FP but then feels family pressure and changes his mind; threatened to leave her and remove implant; forced sex as result of FP discussions	4
DAN053	Partner deliberately bursting condoms; condom refusal; partner wanted her to use implant but she did not want this method	4
HUR055	Partner forced to stop using injectable after experience of side effects; condom refusal; forced sex	4
HUR075	Refusal to use any FP; searches body for implant; searches bag for pills	4
HUR079	Partner does not approve of long-acting methods; partner previously allowed FP use but not now; condom refusal	4
KOR012	Had children from previous marriage so partner pressured to have his own children; frequent forced sex that required family intervention	4
DAN078	Partner believes FP harms the body; arguments and questioning over FP use; condom refusal	3

HUR077	Arguments/IPV over going to clinic for FP; FP is not a priority to partner and often changes his mind on use	3
KOR023	Partner often changes his mind on whether she can use FP; controls when she stops and starts pills; arguments with FP discussions; condom refusal	3
HUR001	Physical violence upon FP discussion; condom refusal	2
KOR020	Partner disapproval of FP, but no direct interference; IPV with FP discussions	2
HUR040	Partner threw away pills	1
KOR011	Pressure through discussions to have another child	1

Abbreviations: emergency contraception (EC); family planning (FP); intimate partner violence (IPV)

*deviant case

4.5 Discussion.

Results from this mixed-methods study, including Cronbach’s alpha of 0.86 and eigenvalues >3 for a correlated two factor-solution for RC, indicate strong transferability of the original RCS to a population of IPV survivors in Nairobi’s informal settlements. Moreover, items factored into the same sub-scales of pregnancy coercion and condom manipulation as seen in the US ($\alpha=0.85$; pregnancy coercion $\alpha=0.78$).¹⁶ IDI data bolstered quantitative items by describing specific RC behaviors, including condom refusal, violence upon IPV discussion, and direct contraceptive interference. Convergence matrixes further corroborate transferability of the RCS to the Nairobi context via largely congruous display of RC summary score and qualitative experience.

These mixed-methods results highlight the multiple, severe RC experiences that IPV survivors endure in Nairobi’s informal settlements. An 82% past three-month RC prevalence is markedly higher than US-based estimates of RC specific to IPV populations; previous studies report prevalence ranging from 4% recent RC experience among young women in Pennsylvania to 35% lifetime RC among young women seeking in Northern California.^{8,37} The high prevalence of RC within a population of women experiencing physical and sexual violence supports previous US literature indicating that IPV survivors may be particularly vulnerable to RC.³⁸⁻⁴¹

Of note, an additional context-specific item was examined, but did not load in the factor analysis. This item indicated that 30% of women had been forced by their partner to remove their IUD or implant in the past three months. Qualitative data demonstrate that while coercion to remove long-acting reversible contraceptive (LARC) methods was discussed, it was often done through the use of pressure or threats, rather than physical force; clarification in item wording specific to the role of pressure surrounding LARC removal may improve factor loading. The second item, “in the past three months, has your partner forced you to use birth control when you did not want to?” was not included in factor analysis as it examined forced use of a contraceptive method rather than forced non-use; however, 13.5% of women indicated RC through forced use of contraception. While not included in the RCS, this item may be relevant when examining women’s preferred use of contraception given qualitative data indicating partner pressure and approval only of specific methods; it may also be an important consideration in LMIC settings and populations where women’s pregnancy intentions are not focused on averting births. Prevalence of these items and corroboration with qualitative data indicates the importance of continued examination and testing of context-specific RC items.

A unique contribution of this study is the measurement of RC as a continuous summary score. Triangulation of RCS items with IDI data allowed comparison of the quantitative summary score with women’s lived experiences; further, it helped disentangle measurement challenges surrounding RC intention. One inherent limitation in measuring RC is that some items ask women to interpret intentions that may not be explicitly stated. The convergence matrix revealed that women with lower RC summary scores not only experience fewer RC behaviors, but that their partners may also be inconsistent in their behaviors and motivations for RC perpetration. For example, DAN028 described her partner previously being supportive of family planning use but then feeling family pressure to conceive; similarly, HUR077 described her partner changing his mind on family planning use because it was not a priority for him. Scoring RC items continuously

may not only allow for a more nuanced measure of severity, but could also help disentangle malicious intent and persistent controlling behaviors from those that are more inconsistent.

Results from this study should be interpreted in light of several limitations. Foremost, women who did not indicate RC during the quantitative phase were excluded from the qualitative phase. While this sampling mechanism was undertaken to probe in-depth into women's RC experiences, it did not allow for assessment of congruence among women with no RC, leading to uncertainty surrounding specificity of the quantitative items. Quantitative items focus specifically on pronatalist coercion perpetrated by a male intimate partner on a female partner; other forms of RC, including RC perpetrated by family members as has been revealed in Cote d'Ivoire and India,^{11,18} were not assessed. Qualitative interviews further revealed the difficulty that women had in recalling temporality of recent violence, contraceptive use, and RC experiences. As such, the past-three-month time frame may have been difficult for women to discern—a concern echoed by the interview team. This study sought to examine RC among a non-probability sample of IPV survivors in Nairobi's informal settlements; additional work is needed to provide population-based estimates of RC and similarly assess transferability of RC measures to other settings with unique characteristics.

These results have several implications for family planning and violence services. Most notably, they highlight that RC is pervasive for IPV survivors in Nairobi's informal settlements. Further, partner interference can occur in many forms and at varying severity levels. Health care providers should be alert to potential partner interference when providing contraceptive services. Harm reduction techniques, namely covert use of contraception, may help women protect themselves from unintended pregnancies. Qualitative data indicate that contraceptive methods that have traditionally been used covertly, namely the injectable and the implant, can still be challenging to conceal. Contraceptive counseling should maximize women's contraceptive preferences and

previous experiences to ensure that women can select methods that are most suitable for their bodies, including methods that minimize detectable side effects. Integration of IPV support services within family planning and healthcare clinics could help increase access to safe, supportive services for women concurrently experiencing IPV and RC.

4.6 Conclusion.

This mixed-methods study demonstrates transferability of the RCS to an IPV population in Nairobi, Kenya given strong eigenvalues and Cronbach's alpha; triangulation of IDI data and quantitative summary score corroborated transferability. Strengths include an explanatory mixed-methods design to classify and understand women's RC experiences. Understanding the psychometric properties of the RCS can help ease transferability of the scale to other LMICs, while also taking into consideration context-specific variation. Continued research is needed to understand RC's predictors, health-related impact, strategies to prevent RC, as well as men's perceptions of contraception and reasons for interference. Continued woman-centered research and practice should focus on increasing women's autonomy in selecting contraceptive methods in line with their reproductive preferences to maximize safety, and ultimately, improve health and well-being.

4.7 References.

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Chapter 5: Correlates and contributors of reproductive coercion at the community, family, couple, and individual levels among intimate partner violence survivors in Nairobi, Kenya

5.1 Abstract.

Background: Reproductive coercion (RC) is the interference in contraceptive and reproductive decisions. Research in the United States indicates that multi-level factors including education, ethnicity, marital status, pregnancy intention, and gender norms may be associated with RC. To date, correlates and contributors of RC are relatively understudied in low- and middle-countries (LMICs), where women face societal pressure to conceive and may be afforded more limited reproductive decision-making.

Methods: An explanatory mixed-methods design was used to explore correlates and contributors of partner-perpetrated RC at the community, family, couple, and individual levels among intimate partner violence survivors (IPV) in Nairobi, Kenya. Women experiencing IPV were recruited via community-based sampling from three informal settlements of Nairobi. Quantitative analyses utilize baseline data from the myPlan Kenya trial (n=327). Multivariable linear regression was used to examine the association between postulated correlates and the primary outcome (continuous RC score), and secondary outcomes (RC factors of pregnancy coercion and condom manipulation; not mutually exclusive). Models were first adjusted for site only, with fully adjusted models accounting for significant covariates from site-only models. In-depth interviews (IDIs; n=30) conducted at three-month follow-up among women indicating RC experience at baseline explored women's perceived contributors to RC via inductive thematic analysis.

Results: Within the past three months, over 80% of IPV survivors experienced any RC, with 3.8 RC types on average. Factors associated with RC in fully adjusted models included retrospective pregnancy intention ($B=1.1$; $p=0.009$), partner's concurrent partnership ($B=1.1$; $p=0.001$), and

inconvenient method use ($B=0.8$; $p=0.02$); increased couple communication was protective against RC ($B=-0.1$; $p=0.002$). Trend towards association were additionally observed for expense of contraception with pregnancy coercion ($B=0.4$; $p=0.08$), and identification with Muslim religion with condom manipulation ($B=0.6$; $p=0.06$). IDIs further revealed potential contributors to RC, including partner's desire for children; partner misconceptions and fear of contraceptive side effects; cultural norms surrounding family planning use within marriage; decision-making power disparities reinforced by economic drivers; partner's fear of abandonment; and impact of other children on childbearing.

Conclusions: Individual- and couple-level correlates, namely pregnancy intention, concurrent partnerships, and couple communication, are crucial for understanding RC for Nairobi's IPV survivors. IDIs revealed additional contributors that were not examined via quantitative measures, including women's views on partner pregnancy intentions and partner perceptions of contraception; these partner contributors and perspectives should be integrated into future RC research in LMICs. Knowledge of risk factors for RC can assist healthcare practitioners in ensuring women are using contraceptive methods most suited to their personal circumstances and aligned with their reproductive preferences.

5.2 Introduction.

Reproductive coercion (RC), or interference in contraceptive and reproductive decisions, limits women's autonomy and undermines their health and well-being.¹ RC is a type of psychological abuse that can occur both in tandem and in absence of physical and/or sexual intimate partner violence (IPV).^{1,2} RC behaviors vary substantially—RC can occur both directly through contraceptive interference or indirectly via pressure or threats,^{1,3} with known sub-types including pregnancy coercion and condom manipulation.⁴ In the United States (US), where RC was initially

characterized, RC is associated with poor reproductive outcomes, specifically increased risk of unintended pregnancy.^{2,3,5-7} Much less is known about RC behaviors and outcomes in low- and middle-income countries (LMICs), which are often high fertility settings where women face distinct community, family, and partner pressures for childbearing.

Though ultimate responsibility for RC and IPV falls with the perpetrator, contextual factors may make individuals particularly vulnerable to RC. Heise's socioecological framework for violence prevention and response may be helpful for understanding correlates of RC across community, family, couple, and individual levels.⁸ At the community level, norms promoting masculinity and inequitable gender roles have been linked to IPV, but not exclusively studied for RC.⁹⁻¹² Norms related to childbearing and fertility, may also influence women's perceptions of RC and fertility intentions.¹³ At the family level, pregnancy pressure has been explored in relation to RC in Cote d'Ivoire and India;^{7,14} proximity to family members may promote familial pressure to conceive. The couple is a key socioecologic level given the dyadic nature of RC. Relationship status, cohabitation, and length of relationship may indicate strength of relationship.¹⁵⁻¹⁷ Further, concurrent partnerships may also be associated with RC, as men with other partners may feel less pressured for one partner to bear his children or could serve as a further sign of relationship quality and stability. A woman's involvement in pregnancy decision-making and her communication skills surrounding childbearing discussions with her partner may further serve as proxies for couple relationship dynamics. Moreover, several individual level factors may also contribute to RC. Previous studies indicate the impact of age, ethnicity, education, and immigration status on RC.^{2,15,16,18} In Nairobi, religion, education, and unemployment may also impact a woman's choice of partner and ability to negotiate with or leave a coercive partner. Reproductive health history, including parity, number of pregnancies, and retrospective pregnancy intention, may further impact the desire for additional children; limited studies with men in the US reveal discordant pregnancy intentions as a proximate determinant for RC.^{19,20} Lastly, knowledge surrounding contraceptive

methods and access to contraceptive services may also be constrained by physical and economic circumstances.^{21,22}

Studies examining correlates of RC from studies conducted in LMICs are more limited given the dearth of quantitative data specific to RC in these settings. To date, only two studies have examined the Reproductive Coercion Scale (RCS),^{4,5} the validated instrument for measuring RC, in a LMIC (Cote d'Ivoire and India).^{6,7,14} These studies both focused on partner-perpetrated RC and childbearing pressures initiated by in-laws via substantial context-specific adaption to the RCS. The Cote d'Ivoire study found that in-law perpetrated RC was associated with ethnicity and marriage;⁷ correlates for partner-perpetrated RC were not reported. The India study did not report correlates of RC.¹⁴

Qualitative evidence further demonstrates unique drivers for RC in LMICs compared to lower fertility settings.²³ For example, women face immense social pressure demanding high fertility and initiation of childbearing immediately after marriage.^{21,22} Fluidity of partnerships and familial pressure may further limit autonomy and negotiation surrounding childbearing.²⁴ Further quantitative and qualitative research is needed to understand how context-specific characteristics and situations may increase women's risk of RC.

Nairobi's informal settlements provide unique contexts for examining RC's correlates and contributors. Recent research embedded within a safety strategies intervention (myPlan Kenya) described severe RC among intimate partner violence (IPV) survivors.^{25,26} IPV survivors are a particularly vulnerable sub-population to study RC dynamics given previous literature demonstrating that IPV survivors' heightened risk for RC and unintended pregnancy.^{3,17,27,28} In order to further understand who may be at increased risk of RC and how women's situations may

contribute to RC, this explanatory mixed-methods study examines correlates and contributors of RC among women experiencing IPV in three informal settlements of Nairobi. Quantitative data examine correlates across community, family, couple, and individual socioecologic levels, with qualitative data further characterizing women's experiences to explore contributors that may not be captured via quantitative measures.

5.3 Methods.

5.3.1 Overview of Study.

This study utilizes mixed-methods data from the myPlan Kenya randomized controlled trial (RCT), conducted from April-October 2018 in three urban informal settlements in Nairobi, Kenya (Korogocho/Kariobangi, Dandora, and Huruma/Mathare). Quantitative analyses use baseline data. Qualitative data were collected via in-depth interviews (IDIs) conducted at three-month follow-up with women who indicated baseline experience of RC.

All data were collected in collaboration with Ujamaa-Africa, a Nairobi-based violence prevention and response organization, and assisted by experienced community health volunteer (CHV) research assistants who served IPV survivors within the three study communities. Study settlements are characterized by high fertility, IPV, and unmet need for family planning.^{29,30} The entire study team underwent a month-long training prior to launch of data collection. All study procedures were approved by Johns Hopkins Bloomberg School of Public Health (JHSPH) and the National Commission for Science and Technological Innovation (NCOSTI) Institutional Review Boards (IRB).

5.3.2 Quantitative Data Collection.

Potential participants learned of the study through flyers and community event presentations. This community-based, non-probability sampling strategy was deemed most appropriate to reach women who may have never disclosed violence experiences or sought formal services.

Upon participant contact, screening and oral consent activities were conducted. Eligibility criteria comprised female, age 18-35, in a relationship where physical or sexual partner violence or partner-related fears occurred in the past three months, residence in study settlements with no plans to move within the next six months, and fluency in English or Swahili.

Baseline data collection occurred from April-July 2018. Survey data collection was completed on a tablet in a private room. Following screening and consent, participants completed the interviewer-assisted baseline survey and received a list of local psychosocial, health and economic resources, facilitated by a staff member to ease connection. Procedures follow best practices for violence-related research.³¹

5.3.3 Quantitative Measures.

The survey was piloted with research staff to ensure feasibility and acceptability. Surveys were available in both English and Kiswahili. The English version was translated into Kiswahili and back-translated into English by two staff members.

All independent and dependent variables were assessed at baseline. The primary dependent variable of interest, RC, was measured using the full nine-item RCS developed in the US^{4,5} and validated for use in this setting (overall Cronbach's $\alpha=0.86$; sub-scale condom manipulation $\alpha=0.85$; sub-scale pregnancy coercion $\alpha=0.78$); Aim 1). For each item, participants were asked whether or not

the specific behavior occurred within the past three months. Previous studies have used a binary measure of RC with any RC experience coded as an overall affirmative response. Given the high prevalence of RC in this population (82%), a continuous summary score was deemed more appropriate to examine the range of RC experiences. This additive summary score was computed by summing the binary items that loaded for the RCS (Range 0-9; Aim 1).

Secondary dependent variables comprised additive summary scores for RC sub-scales (loaded items for pregnancy coercion (Range 0-5) and condom manipulation (Range 0-4) factors, respectively). These sub-scales were not mutually exclusive, as many women experienced both pregnancy coercion and condom manipulation.

Independent variables, or postulated correlates for RC, were examined at the community, family, couple, and individual levels (Table 5.1). Psychometrics are presented from baseline analyses.³²

Table 5.1. Key Independent Variables and Measurement Approach

<i>Level</i>	<i>Independent Variable</i>	<i>Item (alphas from existing literature)</i>
Community	Gender norms	Gender Equitable Men Equitable Gender Norms Subscale ⁹ ($\alpha=0.77$); Range 6-18 with higher scores indicative of more equitable gender norms
Family	Cohabitation with family	Do you currently live with your family? (Response categories: your own family, your in-laws, neither)
Couple	Relationship status	When you enrolled in the study, you told us you were in a relationship with someone that caused you fear, or experienced physical or sexual violence from. What is your current relationship status with that partner?
	Length of relationship	How long have you been/were you together with that partner?
	Cohabitation with current partner	Do you currently live with that partner?
	Concurrent partners	3. Have you had other partners in the last three months? 4. Do you know if your partner has had other partners in the last three months?
	Communication	5-item Reproductive Autonomy Communication Sub-Scale ¹⁶ ($\alpha=0.74$); Range 5-20 with higher scores indicative of increased partner communication

	Decision-Making	4-item Reproductive Autonomy Decision-Making Sub-Scale ¹⁶ ($\alpha=0.65$); Range 4-12 with higher scores indicative of more autonomous decision-making
Individual	Age	What is your age?
	Education	What is the highest level of education you have completed?
	Migration	Have you moved to Nairobi within the last five years?
	Ethnicity	What is your ethnicity/tribe?
	Religion	What religion do you practice?
	Employment	Are you currently employed?
	Number of pregnancies	How many times have you been pregnant?
	Number of children	How many children have you given birth to?
	Retrospective pregnancy intention	Now I would like to ask a question about your last birth. At the time you became pregnant, did you want to become pregnant then, did you want to wait until later, or did you not want to have any more children at all?
	Perceived access to contraception	Which of the following are reasons to not use methods to avoid or delay a pregnancy? (responses are not mutually exclusive) F. Difficult to obtain G. Too far to travel H. Too expensive I. Inconvenient to use J. Health effects

5.3.4 Analytic Sample.

The baseline sample for the parent study comprised 352 participants, of whom 19 were dropped from the analytic sample for current pregnancy >3 months; an additional six participants were missing RC information for one or more item, yielding a sample of 327 participants with complete RC data. Missing correlate data was <2%, with the exception of retrospective pregnancy intention and perceived access to contraception (<10%) due to errors in programming of the baseline survey. Mean imputation was used for continuous items with minimal missing data. Single imputation with sensitivity analyses were applied to examine systematic biases that could have resulted with imputation of pregnancy intention and perceived access items. Given minimal differences in single imputation and complete case approaches, single imputation was applied, and Aim 2 analyses limited to 327 participants with complete RC data.

5.3.5 Quantitative Analyses.

Exploratory analyses examined the distribution of RC and potential correlates, including extent and nature of missing data. Exploratory analyses examined distributions of binary and continuous full RC score, and summary scores for pregnancy coercion and condom manipulation sub-scales.

Distributions of potential correlates were examined overall and by RC severity (split by median RC score). Dichotomization at RC median was chosen to maximize statistical power and to ease visual representation given the continuous nature of the primary outcome; dichotomization was inclusive of those with no RC experience (i.e. summary score=0). Chi-squared (binary/categorical) and t-tests (continuous) were calculated to assess significant differences in correlates by high/low levels of RC.

Multivariable linear regression was first used to examine the association between each postulated correlate and the primary dependent variable (continuous RC score), adjusted for site only; this decision was made a priori given heterogeneity in study communities. This process was repeated to calculate multivariable linear regression coefficients for secondary outcomes of pregnancy coercion and condom manipulation sub-scale summary scores. All models were then further adjusted for all correlates that were significant at the $p < 0.1$ level in the site-only models to ensure that observed correlate effects were indeed independent and not due to other potential confounding variables. All analyses were conducted in STATA 16 (StataCorp, College Station, TX), with statistical significance set at $p = 0.05$.

5.3.6 Qualitative Data Collection.

After completion of follow-up quantitative data collection, purposive sampling selected participants for IDIs. Three-month follow-up retention was high (89% across sites) and attrition was non-differential on RC or IPV severity. Both intervention and control participants who completed baseline and follow-up surveys and indicated that they experienced RC at baseline were eligible for IDI. Eligible women were stratified based on intervention status and site to obtain a mix of experiences; recruitment occurred per site until adequate sample size was met (n=30).

Following extensive training, three data collectors for the RCT served as interviewers for the IDIs. Semi-structured interviews were used to ensure consistency. Open-ended questions helped women expand their thoughts and relay personal experiences regarding RC. The guide was translated into Kiswahili, back-translated by two interviewers into English, and results compared to ensure reliability of wording.

Each participant (n=30) took part in one in-depth, semi-structured interview. Interviews took place in private settings in the Ujamaa offices in the week following follow-up data collection, with measures taken to protect confidentiality in accordance with best practices for violence-related research.³¹ All IDIs were conducted in Kiswahili or English, were audio-recorded, transcribed verbatim, and translated into English for analysis in Atlas.ti software.

5.3.7 Qualitative Data Analysis.

Transcripts were coded by two trained qualitative researchers using an inductive thematic analysis approach^{35,36} to identify emerging themes from the transcripts and develop an initial set of codes. An incremental, stepwise approach was used to assess inter-rater reliability; after every five transcripts were coded, the researchers compared codes and discussed inconsistencies until consensus was achieved. Dual coding was used until thinking was synced and minimal

discrepancies occurred across coders. Coding was complete when all transcripts had been thoroughly coded and themes began to repeat without presenting any new information (saturation).³⁷

Codes that could encompass contributors of RC (Table 5.2) were examined and quotes for these codes downloaded from Atlas.ti. Codes included childbearing and family planning perceptions at different socioecological levels (community, family, peers, partner, individual); further, the woman and peers' experiences with contraception; perceived childbearing intentions of the partner and the woman; and challenges of using contraception. Matrices of code themes were created, with sociodemographics incorporated to identify patterns.

Table 5.2 Qualitative Codes Examined as RC Contributors

childbearpercept_educat	fpconcept_fam	fpexper_peer	fpchall_logistics
childbearpercept_money	fpconcept_peer	discuss_part	fpchall_other
childbearpercept_health	fpconcept_part	intent_part	rc_intent
childbearpercept_family	fpconcept_woman	fpchall_sideeffects	condpercept_part
fpconcept_comm	fpexper_woman	fpchall_cost	cond_norm

5.3.8 Integration of Quantitative and Qualitative Data.

To utilize the mixed-methods nature of this study, quantitative and qualitative findings were compared in the Discussion.³⁸

5.4 Results.

5.4.1 Distribution of Primary Dependent Variable (RC).

Exploratory statistics examined RC binary and continuous measures (Table 5.3). The full binary score indicated that 82% of IPV survivors experienced any RC behavior within the past three months. Continuous measures reported a mean score of 3.8 types of RC (sd=3.0), 2.3 types of pregnancy coercion (sd=1.8), and 1.5 types of condom manipulation (sd=1.5).

Table 5.3 Distribution of Reproductive Coercion (n=327)

	Overall (n=327)
	n (%)
Overall RC	261 (81.3)
Continuous RC Summary Scores* (mean (sd))	
Overall RC	3.8 (3.0)
Pregnancy Coercion**	2.3 (1.8)
Condom Manipulation**	1.5 (1.5)

Range for Summary Scores: Overall RC (0-9); Pregnancy Coercion (0-5); Condom Manipulation (0-4)

**Not mutually exclusive

5.4.2 Distribution of Independent Variables.

Baseline distribution of potential correlates for RC across the socioecologic framework are outlined in Table 5.4. At the community level, participants were approximately evenly distributed across study sites, and reported a high mean gender norms score (16.6), indicative of equitable gender norms. At the family level, 80.1% of participants lived independently of either their own family or in-laws.

At the couple level, 85.3% of women were married and many of these relationships were long-standing (6.4 years on average). Fluidity of partnerships was high, with approximately 54% of IPV survivors reporting that they knew their partner had another partner and 8% reporting their own concurrent partner within the last three months. IPV survivors perceived their reproductive decision-making to be relatively autonomous (mean=9.8; range=0-12), whereas they reported weaker couple communication (mean=12.3; range=0-20).

At the individual level, study participants were on average 27-years-old, had less than a secondary school education (51.4%), and were unemployed (94.5%). Many participants were Kikuyu (41.3%) and identified as Christian (92.1%); approximately one-quarter had migrated to Nairobi within the past five years. Mean number of pregnancies and mean number of births were approximately equal

(2.1). Among ever pregnant women, unintended pregnancy was high—only 46% of women reported that they wanted their last pregnancy at that time. The majority of participants seeking to delay or limit pregnancy found contraception to be accessible; primary hindrances to accessing contraception were health effects (59.3%) and inconvenient use (42.8%).

Significant differences across high/low RC groups were seen for partner’s concurrent partnership ($p<0.001$), involvement in pregnancy decision-making ($p=0.02$), couple communication ($p<0.001$), pregnancy intention ($p=0.008$), and expense ($p=0.01$) when accessing contraception.

Table 5.4 Baseline Distribution of Factors Across the Socioecologic Framework (n=327)

	Overall (n=327)	RC Summary Score<4 (n=162)	RC Summary Score ≥4 (n=165)	p-value
n (%)				
<i>Community Level</i>				
Study Site				0.09
Korogocho	133 (40.7)	65 (40.1)	68 (41.2)	
Dandora	113 (34.6)	49 (30.3)	64 (38.8)	
Huruma	81 (24.8)	48 (29.6)	33 (20.0)	
<i>Gender Norms (Mean (sd))</i>	<i>16.6 (2.0)</i>	<i>16.5 (2.0)</i>	<i>16.6 (2.1)</i>	<i>0.81</i>
<i>Family Level</i>				
Cohabitation with Family				0.55
Neither	262 (80.1)	129 (79.6)	133 (80.6)	
Own family	61 (18.7)	32 (19.8)	29 (17.6)	
In-laws	4 (1.2)	1 (0.6)	3 (1.8)	
<i>Couple Level</i>				
Current Relationship Status				0.93
Boyfriend	40 (12.2)	21 (13.0)	19 (11.5)	
Husband	279 (85.3)	137 (84.6)	142 (86.1)	
Separated/Other	8 (2.5)	4 (2.5)	4 (2.4)	
<i>Length of Relationship (Years; Mean (sd))</i>	<i>6.4 (4.4)</i>	<i>6.5 (4.5)</i>	<i>6.2 (4.3)</i>	<i>0.58</i>
Cohabitation with Current Partner	280 (85.6)	140 (86.4)	140 (84.9)	0.69
Participant Has Concurrent Partners	25 (7.7)	10 (6.2)	15 (9.1)	0.32

Partner Has Concurrent Partners	177 (54.1)	68 (42.0)	109 (66.1)	<0.001
<i>Involvement in Pregnancy Decision-Making (Mean (sd))</i>	9.8 (2.2)	9.5 (2.3)	10.1 (2.1)	0.02
<i>Couple Communication (Mean (sd))</i>	12.3 (3.5)	13.1 (3.1)	11.5 (3.6)	<0.001
<i>Individual Level</i>				
<i>Age (Years; Mean (sd))</i>	26.6 (4.7)	26.7 (4.7)	26.5 (4.7)	0.65
18-20	32 (9.8)	15 (9.23)	17 (10.3)	0.85
21-25	124 (37.9)	62 (38.3)	62 (37.6)	
26-30	90 (27.5)	42 (25.9)	48 (29.1)	
31-35	81 (24.8)	38 (23.0)	38 (23.0)	
Highest Level of Education Completed				0.81
Primary or Less	168 (51.4)	82 (50.6)	86 (52.1)	
Some Secondary	79 (24.2)	37 (22.8)	42 (25.5)	
Secondary	68 (20.8)	36 (22.2)	32 (19.4)	
Vocational/University+	10 (3.1)	7 (4.3)	5 (3.0)	
Migrated to Nairobi in Past Five Years	83 (25.4)	36 (22.2)	47 (28.5)	0.19
Ethnicity				0.85
Kikuyu	135 (41.3)	62 (38.3)	73 (44.2)	
Luo	81 (24.8)	40 (24.7)	41 (24.9)	
Luhya	56 (17.1)	31 (19.1)	25 (15.2)	
Borana	11 (3.4)	5 (3.1)	6 (3.6)	
Kamba	33 (10.1)	18 (11.1)	15 (9.1)	
Other	11 (3.4)	6 (3.7)	5 (3.0)	
Religion				0.26
Christian	301 (92.1)	153 (94.4)	148 (89.7)	
Muslim	24 (7.3)	8 (4.9)	16 (9.7)	
Other	2 (0.6)	1 (0.6)	1 (0.6)	
Unemployed	308 (94.5)	149 (92.6)	159 (96.4)	0.13
<i>Number of Pregnancies (Mean (sd))</i>	2.1 (1.3)	2.1 (1.3)	2.2 (1.3)	0.58
<i>Number of Births (Mean (sd))</i>	2.1 (1.1)	2.1 (1.1)	2.1 (1.1)	0.96
Intendedness of Last Pregnancy				0.008
Wanted Then	149 (45.6)	84 (51.9)	65 (39.4)	
Wanted Later	112 (34.3)	56 (34.6)	56 (33.9)	
Wanted Not At All	66 (20.2)	22 (13.6)	44 (26.7)	
Perceived Barriers to Contraceptive Access*				

Health effects	194 (59.3)	96 (59.3)	98 (59.4)	0.98
Inconvenient to use	140 (42.8)	61 (37.7)	79 (47.9)	0.06
Too expensive	67 (20.5)	24 (14.8)	43 (26.1)	0.01
Difficult to obtain	61 (18.6)	31 (19.1)	30 (18.2)	0.83
Too far to travel	37 (11.3)	18 (11.1)	19 (11.5)	0.91

Continuous variables (Mean (sd)) indicated in italics

Chi-squared statistics to assess difference across RC level for binary and categorical variables; t-tests for continuous variables

*not mutually exclusive

5.4.3 Association Between Correlates and RC.

Linear regression coefficients between correlates and overall RC summary score and summary scores for individual RC factors (pregnancy coercion and condom manipulation) are presented in Table 5.5.

Summary RC: At the couple level, partner's concurrent partnership was associated with increased RC score ($B=1.5$; 95% CI= 0.8-2.1; $p<0.001$). More autonomous pregnancy decision-making was associated with slightly increased RC ($B=0.1$; 95% CI= 0.0-0.3; $p=0.05$), whereas increased couple communication was slightly protective against RC ($B=-0.2$; 95% CI= -0.3--0.1; $p<0.001$). At the individual level, not wanting the last pregnancy at all was associated with increased RC score ($B=1.3$; 95% CI= 0.5-2.2; $p=0.002$). Perceived hindrance to accessing contraception of inconvenient use was also significantly associated with increased RC ($B=1.0$; 95% CI=0.4-1.7; $p=0.002$). No correlates at the community or family levels were associated with RC.

In the fully adjusted models, at the couple level, partner's concurrent partnership was associated with increased RC ($B=1.1$; 95% CI=0.5-1.7; $p=0.001$) and couple communication was protective for RC ($B=-0.1$; 95% CI=-0.2-0.1; $p=0.002$). At the individual level, not wanting previous pregnancy at all ($B=1.1$; 95% CI=0.3-1.9; $p=0.009$) and perceived access of inconvenient use ($B=0.8$; 95% CI=0.2-1.4; $p=0.02$) were associated with increased RC. Involvement in pregnancy decision-making was no longer statistically significant.

Pregnancy coercion: At the couple level, partners' concurrent partnership was associated with increased pregnancy coercion ($B=0.8$, 95% CI=0.4-1.2; $p<0.001$). Similar to overall RC, involvement in pregnancy decision-making was associated with slightly increased pregnancy coercion ($B=0.1$; 95% CI=0.0-0.2; $p=0.004$) and couple communication with slightly decreased pregnancy coercion ($B=-0.2$; 95% CI=-0.2--0.1; $p<0.001$). At the individual level, retrospective pregnancy intention was also associated with pregnancy coercion, though attenuated ($B=0.8$; 95% CI=0.3-1.3; $p=0.002$). Hindrances to perceived access to contraception associated with pregnancy coercion included: expense ($B=0.5$; 95% CI=0.0-1.0; $p=0.03$) and inconvenient use ($B=0.6$; 95% CI=0.2-1.0; $p=0.005$). No correlates at the community or family levels were associated with the pregnancy coercion, however, a non-significant trend towards reduced pregnancy coercion was observed for living with one's own family ($B=-0.4$; 95% CI: -0.9-0.1; $p=0.08$).

In fully adjusted models, at the couple level, partner's concurrent partnership was associated with increased pregnancy coercion ($B=0.7$; 95% CI=0.2-0.9; $p=0.005$) and couple communication was associated with decreased pregnancy coercion ($B=-0.1$; 95% CI=-0.2- -0.1); $p<0.001$). At the individual level, not wanting last pregnancy at all ($B=0.6$; 95% CI=0.1-1.1; $p=0.01$) and inconvenient use ($B=0.4$; 95% CI=0.0-0.8; $p=0.03$) were associated with increased pregnancy coercion; trend towards increased pregnancy coercion was further observed for perceived access hindrance of expense ($B=0.4$; 95% CI=-0.1- 0.9; $p=0.08$).

Condom manipulation: For the condom manipulation factor, couple-level association for partners' concurrent partnership remained ($B=0.6$; 95% CI= 0.3-1.0; $p<0.001$). At the individual level, identification with the Muslim religion was associated with increased condom manipulation ($B=0.7$; 95% CI=0.1-1.4; $p=0.03$), as was pregnancy intention ($B=0.5$; 95% CI=0.1-1.0; $p=0.02$)

and inconvenient use ($B=0.5$; 95% CI=0.1-0.8; $p=0.009$). Trend towards increased condom manipulation was seen for women who were unemployed ($B=0.7$; 95% CI=0.0-1.4; $p=0.07$).

In fully adjusted models, partner's concurrent partnership was associated with increased condom manipulation at the couple level ($B=0.5$; 95% CI=0.2-0.9; $p=0.003$) and inconvenient use with increased condom manipulation at the individual level ($B=0.4$; 95% CI=0.1-0.8; $p=0.01$). Trend towards increase in condom manipulation was observed for Muslim religion ($B=0.6$; 95% CI=0.0-1.3; $p=0.06$) and pregnancy intention ($B=0.4$; 95% CI=0.0-0.9; $p=0.06$).

Table 5.5 Multivariable Linear Regression between Correlates and RC Score (n=327)

	Adjusted for Site Only			Fully Adjusted Models		
	Full RC Score	Factor 1 (Preg. Coercion)	Factor 2 (Condom Manip.)	Full RC Score	Factor 1 (Preg. Coercion)	Factor 2 (Condom Manip.)
<i>B (95% CI)</i>						
<i>Community Level</i>						
<i>Gender Norms</i>	0.0 (-0.2, 0.2)	0.0 (-0.1, 0.1)	0.0 (-0.1, 0.1)	0.1 (-0.1, 0.2)	0.0 (-0.1, 0.1)	0.0 (0.0, 0.1)
<i>Family Level</i>						
Cohabitation with Family						
Neither	ref	ref	ref	ref	ref	ref
Own family	-0.3 (-1.1, 0.4)	-0.4 [‡] (-0.9, 0.1)	0.1 (-0.3, 0.6)	-0.1 (-0.8, 0.7)	-0.2 (-0.7, 0.2)	0.2 (-0.2, 0.6)
In-laws	0.9 (-2.0, 3.9)	0.9 (-0.9, 2.6)	0.1 (-1.5, 1.6)	1.5 (-1.2, 4.3)	1.3 (-0.3, 2.9)	0.3 (-1.2, 1.9)
<i>Couple Level</i>						
Current Relationship Status						
Boyfriend	ref	ref	ref	ref	ref	ref
Husband	0.2 (-0.7, 1.2)	0.2 (-0.4, 0.8)	0.1 (-0.4, 0.6)	-0.1 (-1.0, 0.9)	-0.2 (-0.7, 0.4)	0.0 (-0.5, 0.5)
Separated/ Other	-0.1 (-2.4, 2.1)	-0.4 (-1.8, 1.0)	0.3 (-0.9, 1.4)	-0.3 (-2.4, 1.9)	-0.6 (-1.8, 0.7)	0.2 (-1.0, 1.3)
<i>Length of Relationship</i>	0.0 (-0.1, 0.1)	0.0 (-0.1, 0.0)	0.0 (0.0, 0.1)	0.0 (-0.1, 0.1)	0.0 (-0.1, 0.0)	0.0 (0.0, 0.1)
Cohabitation with Current Partner	0.4 (-0.6, 1.3)	0.5 (-0.1, 1.0)	-0.1 (-0.6, 0.4)	0.3 (-0.5, 1.2)	0.3 (-0.2, 0.9)	-0.1 (-0.6, 0.4)

Participant Concurrent Partners	0.8 (-0.4, 2.0)	0.4 (-0.3, 1.1)	0.3 (-0.4, 0.9)	0.0 (-1.2, 1.2)	0.1 (-0.5, 0.8)	-0.1 (-0.7, 0.6)
Partner Concurrent Partners	1.5** (0.8, 2.1)	0.8** (0.4, 1.2)	0.6** (0.3, 1.0)	1.1** (0.5, 1.7)	0.5** (0.2, 0.9)	0.5** (0.2, 0.9)
<i>Pregnancy Decision- Making Involvement</i>	<i>0.1</i> <i>(0.0, 0.3)*</i>	<i>0.1</i> <i>(0.0, 0.2)**</i>	<i>0.0</i> <i>(-0.1, 0.1)</i>	<i>0.0</i> <i>(-0.1, 0.2)</i>	<i>0.1</i> <i>(0.0, 0.2)</i>	<i>0.0</i> <i>(-0.1, 0.0)</i>
<i>Couple Comm.</i>	-0.2** (-0.3, -0.1)	-0.2** (-0.2, -0.1)	<i>0.0[±]</i> <i>(-0.1, 0.0)[†]</i>	-0.1** (-0.2, -0.1)	-0.1** (-0.2, -0.1)	<i>0.0</i> <i>(-0.1, 0.0)</i>
<i>Individual Level</i>						
<i>Age</i>	<i>0.0</i> <i>(-0.1, 0.1)</i>	<i>0.0</i> <i>(-0.1, 0.0)</i>	<i>0.0</i> <i>(0.0, 0.0)</i>	<i>0.0</i> <i>(-0.1, 0.0)</i>	<i>0.0</i> <i>(-0.1, 0.0)</i>	<i>0.0</i> <i>(-0.1, 0.0)</i>
18-20	ref	ref	ref	ref	ref	ref
21-25	-0.4 (-1.6, 0.7)	-0.1 (-0.7, 0.6)	-0.4 (-1.0, 0.2)	-0.7 (-1.8, 0.4)	-0.2 (-0.9, 0.4)	-0.5 (-1.1, 0.0)
26-30	-0.5 (-1.7, 0.7)	0.0 (-0.7, 0.7)	-0.5 (-1.1, 0.1)	-0.7 (-1.9, 0.4)	-0.1 (-0.8, 0.6)	-0.7 (-1.3, -0.1)
31-35	-0.5 (-1.7, 0.8)	-0.2 (-0.9, 0.6)	-0.3 (-1.0, 0.3)	-0.7 (-1.9, 0.5)	-0.3 (-1.0, 0.4)	-0.5 (-1.1, 0.2)
Highest Level of Education Completed						
Primary or Less	ref	ref	ref	ref	ref	ref
Some Secondary	0.0 (-0.8, 0.8)	0.2 (-0.3, 0.6)	-0.1 (-0.5, 0.3)	0.0 (-0.8, 0.7)	0.0 (-0.4, 0.5)	-0.1 (-0.5, 0.3)
Secondary	-0.2 (-1.0, 0.7)	0.0 (-0.5, 0.5)	-0.1 (-0.6, 0.3)	-0.3 (-1.1, 0.5)	0.0 (-0.5, 0.4)	-0.2 (-0.6, 0.2)
Vocational/ University +	-1.0 (-2.8, 0.7)	-0.2 (-1.3, 0.9)	-0.8 (-1.8, 0.1)	-0.4 (-2.1, 1.3)	0.2 (0.8, 1.2)	-0.6 (-1.5, 0.3)
Migrated to Nairobi in Past Five Years	0.3 (-0.5, 1.0)	0.1 (-0.4, 0.5)	0.2 (-0.2, 0.6)	0.4 (-0.3, 1.1)	0.2 (-0.3, 0.6)	0.2 (-0.2, 0.6)
Ethnicity						
Kikuyu	ref	ref	ref	ref	ref	ref
Luo	-0.1 (0.9, 0.8)	-0.1 (-0.6, 0.4)	-0.0 (-0.5, 0.4)	0.0 (-0.8, 0.8)	0.0 (-0.4, 0.5)	0.0 (-0.4, 0.4)
Luhya	-0.3 (-1.2, 0.7)	0.0 (-0.6, 0.6)	-0.3 (-0.8, 0.1)	-0.1 (-0.9, 0.8)	0.2 (-0.3, 0.8)	-0.3 (-0.7, 0.2)
Borana	0.3 (-1.6, 2.1)	0.0 (-1.1, 1.2)	0.2 (-0.7, 1.2)	0.1 (-2.2, 2.5)	0.3 (-0.7, 1.4)	0.4 (-0.5, 1.4)
Kamba	-0.2 (-1.3, 0.9)	-0.2 (-0.9, 0.4)	0.0 (-0.6, 0.6)	0.1 (-1.0, 1.2)	0.0 (-0.7, 0.6)	0.1 (-0.5, 0.7)
Other	-1.0 (-2.8, 0.9)	-0.6 (-1.7, 0.5)	-0.4 (-1.3, 0.6)	0.2 (-1.6, 2.0)	0.2 (-0.9, 1.3)	0.0 (-0.9, 1.0)

Religion						
Christian	ref	ref	ref	ref	ref	ref
Muslim	1.1 (-0.2, 2.3) [±]	0.3 (-0.4, 1.1)	0.7* (0.1, 1.4)	0.8 (-0.4, 2.0)	0.1 (-0.6, 0.8)	0.6 (0.0, 1.3) [±]
Other	0.3 (-3.9, 4.4)	0.7 (-1.8, 3.2)	-0.4 (-2.6, 1.7)	-0.2 (-4.2, 3.8)	0.4 (-2.0, 2.7)	-0.5 (-2.6, 1.7)
Unemployed	0.8 (-0.6, 2.2)	0.2 (-0.6, 1.1)	0.7 (0.0, 1.4) [±]	0.2 (-1.2, 1.5)	-0.3 (-1.1, 0.5)	0.4 (-0.3, 1.2)
Number of Pregnancies	0.1 (-0.1, 0.4)	0.1 (-0.1, 0.2)	0.1 (0.0, 0.2)	0.1 (-0.2, 0.3)	0.0 (-0.1, 0.2)	0.0 (-0.1, 0.2)
Number of Children	0.1 (-0.2, 0.4)	0.0 (-0.2, 0.2)	0.1 (-0.1, 0.2)	0.0 (-0.3, 0.3)	0.0 (-0.2, 0.1)	0.0 (-0.2, 0.2)
Intendedness of Last Pregnancy						
Wanted Then	ref	ref	ref	ref	ref	ref
Wanted Later	0.6 [±] (-0.1, 1.3)	0.3 (-0.1, 0.8)	0.3 (-0.1, 0.6)	0.4 (-0.3, 1.1)	0.2 (-0.3, 0.6)	0.2 (-0.1, 0.7)
Wanted Not At All	1.3* (0.5, 2.2)	0.8** (0.3, 1.3)	0.5* (0.1, 1.0)	1.1** (0.3, 1.9)	0.6* (0.1, 1.1)	0.4 [±] (0.0, 0.9)
Perceived Access to Contraception						
Difficult to Obtain	0.2 (-0.6, 1.1)	0.1 (-0.4, 0.6)	0.1 (-0.3, 0.5)	0.1 (-0.7, 1.0)	0.1 (-0.4, 0.6)	0.0 (-0.4, 0.5)
Too far to Travel	0.3 (-0.7, 1.3)	0.1 (-0.5, 0.7)	0.2 (-0.3, 0.7)	0.2 (-0.8, 1.2)	0.0 (-0.6, 0.6)	0.1 (-0.4, 0.7)
Too Expensive	0.7 [±] (-0.1, 1.5)	0.5* (0.0, 1.0)	0.1 (-0.3, 0.6)	0.4 (-0.4, 1.2)	0.4 [±] (-0.1, 0.9)	0.0 (-0.4, 0.5)
Inconvenient to Use	1.0** (0.4, 1.7)	0.6** (0.2, 1.0)	0.5** (0.1, 0.8)	0.8* (0.2, 1.4)	0.4* (0.0, 0.8)	0.4* (0.1, 0.8)
Health Effects	0.3 (-0.3, 1.0)	0.3 (-0.1, 0.7)	0.0 (-0.3, 0.3)	-0.2 (-0.9, 0.5)	0.1 (-0.3, 0.5)	-0.2 (-0.6, 0.1)

[±]p<0.1; *p<0.05; **p<0.01

Full RC Score Fully-Adjusted Models Include: site, participants concurrent partner, involvement in pregnancy decision-making, couple communication, religion, pregnancy intention, perceived access—too expensive, perceived access—inconvenient use

Pregnancy Coercion Fully-Adjusted Models Include: site, cohabitation with family, partner's concurrent partner, involvement in pregnancy decision-making, couple communication, pregnancy intention, perceived access—expense, perceived access—inconvenient use

Condom Manipulation Fully-Adjusted Models Include: site, partner's concurrent partner, couple communication, education, religion, unemployment, pregnancy intention, perceived access—inconvenient use

5.4.4 Qualitatively Identified Contributors to RC.

Contributors to RC that emerged from the IDIs comprised: partner's desire for children; partner misconceptions and fear of contraceptive side effects; cultural norms surrounding family planning

use within marriage; decision-making power disparities reinforced by economic drivers; partner's fear of abandonment; and impact of other children on childbearing. While these results span multiple levels of the socioecological framework, participants generally focused their discussions at the couple level (partner's internalization of cultural norms, partner's pregnancy intentions, etc. and impact on relationship). As such, these results are presented by overall theme rather than by level within the framework.

Partner's desire for children

The most widely discussed contributor to RC was the participant's partner wanting to have a child or additional children and discordance of this desire with the participant's own reproductive intentions. Participants described childbearing discussions with their partners; however, most women indicated that they were not successful in convincing their partner to respect their own intentions: "Yes, I talk to him and he says, 'I want babies. I want babies,' yet I'm not ready" (22-year-old, Huruma).

Partner's reproductive intentions were often described as a constant desire for more children, and women believed that pregnancy was the source of their partners' happiness: "He only wants you to be pregnant. Once you deliver, he wants you to be carrying another pregnancy. That is what makes him happy" (35-year-old, Korogocho).

Some women believed that their partners used their distrust of family planning as an excuse to not use contraception, when instead they desired additional children.

When you tell him about family planning, he says he wants a second child. He will tell you he wants a girl because I currently have a boy. He will tell you, 'Why are we doing family planning yet I'm waiting for a girl?' Or he asks you, 'Who are you planning the family for, who has said I cannot raise.' He does not want anything to do with family planning.

-28-year-old, Dandora

Partner misconceptions and fear of contraceptive side effects

Partner's fear of contraceptive side effects, as well as myths and misconceptions surrounding side effects, were prominent. Notably, partners often told stories of community members to dissuade women from using contraceptive methods, including anecdotes of infertility or harm that would be brought to the body and/or child with the use of contraception.

He tries to interfere yet I'm trying to avoid pregnancy because he believes when a woman stays for a lengthy period, she will not be able to give birth and that is not my belief.
-20-year-old, Huruma

What happened was he told me not to use family planning because you can give birth to an abnormal child. That is why he does not want family planning, because it has too many side-effects.
-28-year-old, Dandora

Some partners appeared genuinely concerned about contraceptive side effects, either due to a woman's own previous experience or known friend or family member's experience. Often, women described that their partners had concerns with particular methods, but were agreeable to them using alternative methods.

He told me that his elder sister had used the coils; she didn't know that they were harming her and she ended up getting cancer and she died. He told me that the injection was good; it does not have any effects so I can use it.
-35-year-old, Korogocho

Cultural norms surrounding family planning use within marriage

Several participants discussed their partners using norms to justify decisions to not use family planning methods or restrict their partner from using contraception. Norms included customary beliefs showing children as a sign of wealth, religious beliefs against limiting children, and community norms dictating men as the final decision-makers in familial matters.

Participants readily discussed a disconnect where men viewed children as a sign of wealth and women saw them as a financial burden: “He believes in the children being born close to each other. He believes that from the ancient customs, when one has a lot of kids, it is a sign of wealth” (24-year-old, Dandora). Participants further described their partners’ hesitancy to break with these customs and their preference to do as their mothers had done.

There is nothing that I have not tried to tell him but he refused. He told me that his mother had 16 children. I told him, ‘That was in the olden days, not now. Forget about the olden days, we are talking about now.’ He told me to never talk to him about such things. He wants same number of kids like his mother, 16, yet only three are alive.

-35-year-old, Korogocho

Two women further discussed the role of religion surrounding childbearing norms and family planning decision-making:

Also, most Wariahs do not like issues to do with family planning. They will tell you that you should give birth and fill the earth. Another will tell you it’s bad but they don’t know why. Everyone usually has their own opinion.

-30-year-old, Huruma

Participants further discussed norms as a way for men to justify themselves as the final decision-makers within relationships, leaving women feeling like they had “no voice.” While norms describing women’s increased promiscuity with any contraceptive method use were commonly discussed, the man’s role as the final decision-maker was most prominent in condom use discussions.

How do you tell that to a man? If he were an outsider, it would be easier to convince him. He is no stranger, he would not agree. He would ask me why I want him to use a condom. The men like to have the final word. The opinion women have does not count.

-29-year-old, Korogocho

Decision-making power disparities reinforced by economic drivers

Economic factors were often closely entwined with decision-making power. Women discussed both their own views and their partner's opinions that if you did not "bring anything to the table," you could not make the decisions. Namely, men being the sole breadwinners for the family afforded them decision-making power, including power over reproductive and family planning decisions.

He knows best how he is prepared for a child because he is the one that always look for money. Now you see when he is ready he is the only one who has a right to tell me and again, if it's me who wants a baby, we will be able to come to an understanding. We can never disagree.

-23-year-old, Dandora

I decided to use the injection method since my children were still young...He was the sole breadwinner and he would do whatever he pleased. I had nothing; it was a very stressful period...The situation I'm in where you don't have a job and the man is the breadwinner. He can do whatever he pleases. If he wants to beat you he can. He's the decision-maker in the house and he's the head of the house. If you cannot bring anything to the table, you have no say in that house, you can be controlled. What can one do? You become the weakling of the house.

-29-year-old, Korogocho

Partner's fear of abandonment

Many women described RC stemming from their partner's fear of the woman leaving or abandoning them. For women who described partners with this fear, childbirth was generally viewed as means to trap women within a relationship, as cultural norms often do not allow women to take the children upon separation: "He believes that when you have a lot of kids, even when you separate, you can't go and raise them elsewhere" (24-year-old, Dandora). Keeping women within the relationship was particularly salient for women undergoing recurrent IPV, as it increased women's difficulty to leave an abusive partner.

Most men believe that if you don't get a lot of children with him, you would leave him. That's what they think; that if you have a few children, if he mistreats you, you would leave him because you can take care of those children. That's what they usually say.

-32-year-old, Dandora

Some participants further described forced pregnancy as a tactic to make them unattractive to other men or to minimize competing priorities, such as school or work outside the home.

He thought that if I do not get pregnant, I will go back to school because he did not want me to go back to school. He knew if I would have gone back to school, I would have left him; therefore, he saw the best way to do is to convince me to get pregnant again so that I stay with him.

-24-year-old, Huruma

Impact of other children on childbearing

Some participants discussed difficulty negotiating childbearing with their partner if they had given birth to children from a previous partnership. Specifically, participants described that their partners were concerned they would be go back to their previous partners (the fathers of their children) unless they had a had a child with their current partner; childbirth was viewed as a way to solidify the relationship.

When a man marries you with a child, you cannot tell him that you will stay together until the day you decide to get a child for him. He will feel like there is no trust. He might feel like you might go back to the father of the child. For him to be convinced that I have decided to live with him, he wants a child with you.

-29-year-old, Dandora

One participant additionally mentioned that her partner would not allow her to use family planning until she gave birth to at least one child, though she had preferred to delay: “He used to refuse, insisting that I first need to get children before I start using it” (34-year-old, Korogocho).

5.5 Discussion.

Results highlight that partner’s concurrent partnerships, poor couple communication, and inconvenient access to contraception may be associated with increased RC vulnerability; qualitative

data further underscore the importance of partner roles and communication in childbearing decisions, and how discordance may contribute to RC. Notably, associated correlates congregated at the couple and individual levels across the socioecological framework. While the importance of community and family factors should not be underestimated, quantitative results underscore the importance of individual and couple factors in understanding RC and its sub-factors.

Quantitative results reveal that not wanting previous pregnancy was associated with increased RC score ($B=1.1$; $p=0.002$); these results persisted for both pregnancy coercion and condom manipulation. Results should be interpreted cautiously given the cross-sectional nature of the data, as RC experience could also increase unintended pregnancy. While men's pregnancy intentions were not examined in the quantitative phase, IDI data demonstrates that discordant pregnancy intentions were a commonly discussed driver of RC, and women who experienced RC described their partners' immense desire for children. Moreover, while explored from the woman's point of view, women felt that their partners' intentions were clearly revealed during their discussions on childbearing; as such, men's pregnancy intentions should be considered in future quantitative work on RC. Partner's concurrent partnerships were also associated with increased RC ($B=1.1$, $p=0.001$), with positive associations retained for pregnancy coercion and condom manipulation. Interestingly, women reporting their own concurrent partnerships did not have significantly increased RC, though qualitative data described partner's fear of abandonment as a potential contributor of RC. Relationship quality and roles within the partner dyad, as well as other concurrent sexual partners and fear of external partnership, remain crucial pieces in disentangling pregnancy intentions, contraceptive use dynamics, and motivations for RC.

Disaggregating pregnancy coercion and condom manipulation factors may help us understand who is susceptible to different types of RC. Overall, correlates were largely similar across sub-factors, with a few notable exceptions. Specifically, couple communication and expense trended towards

significance exclusively for pregnancy coercion, and Muslim religion for condom manipulation. Results highlighting increased pregnancy coercion for women who believed contraception was too expensive ($B=0.4$, $p=0.08$) should be further examined to understand if access and cost barriers are method-specific. Women experiencing RC may opt for methods that can be used covertly,^{42,43} and with recent Kenyan literature reporting out-of-pocket costs for injectable,⁴⁴ methods that are easiest to conceal may be difficult to access given cost barriers. Further, correlates associated exclusively with increased condom manipulation, specifically Muslim religion ($B=0.6$; $p=0.06$), require further understanding of cultural practices and norms that inhibit use of barrier methods. RC has previously been reported to be associated with religion in Cote d'Ivoire,⁷ though notably this study examined in-law perpetrated RC and was not exclusive to condom manipulation.

Qualitative data further elucidate the intricacies of RC contributors at the couple dyad level and difficulty in relying solely on quantitative measures to understand RC drivers, particularly from one partner. IDI themes emphasize partner's distrust for family planning, including fear of side effects based on both misconceptions and founded in peers' experiences and fear that women will seek external partners, highlighting a need for further research to understand men's perceptions of family planning, rather than only women's perceived hindrances. Similarly, research with men in western Kenya has previously reported men's fear that family planning could increase women's sexual agency and called for increased engagement and research with men to dispel misconceptions.⁴⁵ Further, equitable gender norms, as measured in the quantitative data, may not be the best way to understand cultural norms that exacerbate RC. Specifically, qualitative data discussed norms indicative of the positive benefits of having many children, including children as a symbol of wealth. While these results are aligned with other research examining motivations for childbearing in sub-Saharan Africa,⁴⁶ a disconnect persists at the couple level between sources of happiness versus burden of childbearing. This discrepancy in motivations may be attributed to distribution of childcare responsibilities or strength of relationship; further research is needed to

understand dyadic drivers of RC, which may be perpetuated by gender and power imbalances across the socioecological framework.

This study is not without limitations. Namely, the cross-sectional design limits interpretations surrounding temporality. Whenever possible, quantitative data were triangulated with data from IDIs to contextualize and add depth, including that related to sequencing. While the purposive qualitative sampling strategy allowed for in-depth description of women's RC experiences, including factors that may have contributed to women's RC experience, sampling was limited to only IPV survivors who indicated RC experience at baseline; therefore, disaggregation of qualitative themes by RC status was not possible. Given the high burden of RC, summary scores were used to reflect number of types of RC experienced; this measure may not be indicative of frequency or severity of RC incurred. Further, several quantitative measures were not collected due to survey length given that this data was embedded within a larger RCT (i.e. prospective pregnancy intention and partner's pregnancy intention). IDI data was used to supplement these measures in order to gain a more holistic understanding of situations and characteristics that could lead to RC, though we urge future research to encompass these measures. Lastly, this non-probability sample was limited to IPV survivors in three economically disadvantaged urban areas of Nairobi; these results may or may not be generalizable to general Nairobi populations or IPV populations in similar LMIC settings.

Several research recommendations can be gleaned from these mixed-methods results. Foremost, RC research must involve men to understand their motivations for perpetration; previous studies specific to IPV have been incredibly valuable in uncovering men's views on social norms, gender and power household and economic roles, and decision-making as important drivers,⁴¹ and this type of research would be similarly valuable for RC. While many of the qualitative themes described control over decision-making and the need to assert dominance in sexual relationships, others,

including fear of contraceptive side effects and partner's desire for children, were not always maliciously motivated; these contributors should be further disentangled to understand intention behind RC. Further, quantitative data suggest that correlates for pregnancy coercion and condom manipulation may be unique, and that these factors should be examined individually in research aiming to understand factors associated with RC.

5.6 Conclusion.

This mixed-methods study reveals characteristics that may be associated with increased vulnerability to RC for IPV survivors, and its sub-forms of pregnancy coercion and condom manipulation, and situations that may contribute to women's RC experience. Dissemination of results to violence and family planning service providers could increase understanding of contextual factors that may put women at risk of RC, namely the presence of other partnerships and poor couple communication. Particularly for women indicating difficulty in accessing contraception, including inconvenient use and cost, standard screening questions may not capture their full experiences—healthcare providers are urged to consider women's circumstances and preferences to prescribe the most appropriate contraceptive method for their situation. While ultimately responsibility for violence lies with the perpetrator, early recognition of associated factors that could make women susceptible to RC may serve as an important step towards preventing RC or mitigating further harm. Intervention work with men and couples should further address relational power imbalances that perpetuate RC experience.

5.7 References.

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Chapter 6: Understanding the link between reproductive coercion and covert use of contraception as a potential safety strategy for women experiencing violence in Nairobi's urban informal settlements

6.1 Abstract.

Background: Reproductive safety strategies are mechanisms that women undertake to protect themselves against reproductive coercion (RC) or partner interference in contraceptive use. One such safety strategy is covert use of family planning, which affords women family planning use without husband knowledge or approval. Little is known about the impact RC has on covert use or additional reproductive safety strategies women use in light of RC experience. The aim of this study was to examine the relationship between RC and covert use of contraception among intimate partner violence (IPV) survivors in Nairobi, Kenya using an explanatory mixed-methods design.

Methods: Women experiencing IPV were recruited via community-based sampling from three informal settlements of Nairobi; quantitative analyses utilize baseline data from the myPlan Kenya trial (n=321). Descriptive statistics examined RC and contraceptive use patterns. Multinomial (covert and overt vs. non-use) and logistic (covert vs. overt) regression adjusted for site examined the association between RC and covert use; models were further adjusted for partner's concurrent partnership. In-depth interviews (IDIs; n=30) conducted at three-month follow-up among women indicating RC experience at baseline further explored women's reproductive safety strategies, specifically covert use of contraception.

Results: Approximately fifty percent of women used contraception covertly within the past three months (51.4%), compared to 27.1% using overtly and 21.5% not using contraception. On average, participants experienced 3.8 types of overall RC, with 2.3 types of pregnancy coercion and 1.5 types of condom manipulation. Multinomial logistic regression indicated increased relative risk of covert use compared to non-use for women experiencing RC (RRR=1.10; p=0.05), whereas RC

indicated decreased relative risk of overt use (RRR=0.89; p=0.05). Decreased relative risk of overt use persisted for the pregnancy coercion factor (RRR=0.76; p=0.005). Neither covert nor overt use were significantly associated with condom manipulation. In fully adjusted models, associations remained for overall RC and covert use (RRR=1.11; p=0.04) and pregnancy coercion and overt use (RRR=0.78; p=0.02). Logistic regression models indicated increased odds of covert use compared to overt use for overall RC (OR=1.23; p<0.001), pregnancy coercion (OR=1.51; p<0.01), and condom manipulation (OR=1.23; p=0.02). Qualitative results highlighted reasons for using covertly, mechanisms, challenges, and repercussions of disclosure, as well as potential ideas for additional reproductive safety strategies.

Conclusions: RC experience was associated with increased covert use among Nairobi's IPV survivors. Given the cross-sectional design, it is possible that women who use methods covertly could also experience increased RC; however, IDIs reveal that this relationship is often cyclic. Women continued to use covertly regardless of RC experience to maximize their fertility preferences. These results reveal that women-implemented safety strategies, particularly covert use, may be important harm reduction strategies for women experiencing IPV and RC. Integration of reproductive safety strategies into family planning and violence services can improve safe use of contraceptive methods to maximize women's fertility preferences.

6.2 Introduction.

Ensuring that women can make informed reproductive and contraceptive choices, free from pressure or interference, is essential to maximizing women's health. Recent literature highlights that women's reproductive autonomy may be constrained by reproductive coercion (RC), or interference in contraceptive and reproductive decisions, through either direct contraceptive

interference or partner pressure.¹⁻³ RC has been linked to increased risk of unintended pregnancy,^{2,4,5} further hindering women's control over their health and life course trajectories.

To date, the majority of RC research has been conducted in the United States (US), including research on RC's prevalence, correlates, and outcomes;⁴ these topics have been understudied in low- and middle-income countries (LMICs),⁶ though qualitative evidence indicates that women may face social pressure to conceive while seeking to limit births given their social and economic constraints.⁷⁻⁹ While research in high income settings is beginning to uncloak drivers of RC, and national screening and surveillance efforts have been implemented in the US,¹⁰⁻¹² little is known about how to prevent RC and mitigate its adverse effects. RC's behaviors and drivers are not well characterized in LMICs,^{13,14} leading to limited transferability of screening and response efforts.

The majority of current RC interventions operate in tandem with existing violence and reproductive health support services.¹⁵⁻¹⁷ Recommended interventions include integrating screening for RC within clinic settings, provider awareness training, and the inclusion of small information cards as part of the clinic visit.¹¹ Specifically, the Addressing Reproductive Coercion in Health Settings (ARCHES) intervention may be valuable in decreasing RC and IPV, while increasing self-efficacy, recognition of abuse, and use of safety strategies; to date, this is the only RC intervention that has been implemented in a LMIC context.¹⁸ For these interventions to be effective, however, women must first access violence and health services.

Woman-implemented safety strategies may protect against RC and help women avoid its consequences. Safety strategies for decreasing violence or minimizing its impact have been deemed helpful for women experiencing IPV in LMICs and urban informal settlements of Nairobi specifically.¹⁹⁻²¹ Much less is known about woman-implemented safety strategies to decrease RC and its effects in both high and low-income contexts. Potential strategies that could reduce RC

altogether include thoughtful communication between partners regarding sexual and reproductive health decision-making, mitigating additional stressors within the relationship, or temporary separation. Strategies that minimize the consequences of RC include utilizing informal networks for assistance in accessing services, economic empowerment to leverage resources, or use of contraception without partner knowledge (i.e. covert use).

Covert use of contraception allows women to circumvent male control through concealment of their contraceptive use.²² Recommended covert strategies include use of contraceptive methods that require minimal partner compliance, such as injectables and emergency contraception (EC).^{3,10,11,23} While these strategies are recommended in current ACOG guidelines,¹⁰ to date, no studies have quantitatively examined covert use in response to RC. Qualitative evidence among serodiscordant couples in Western Kenya, however, suggests that covert use may be an appropriate strategy to avoid unwanted births when fertility intentions cannot be agreed upon.²⁴

Covert use of contraception may be particularly important for women experiencing IPV, given relationship instability and controlling partner behaviors. To date, limited studies have examined the association between covert use and IPV in LMICs. Longitudinal evidence from Uganda found that IPV was a predictor of covert use,²⁵ whereas qualitative evidence from India suggested that covert use may increase women's risk of violence if the partner learned of use.²⁶ IPV survivors may be a particularly high-risk population given that IPV could encourage women in unstable relationships to use covertly, as well as a repercussion of use if discovered.

A more thorough analysis of covert use dynamics, including the impact of RC on covert use, is critical to ensure that use of reproductive safety strategies does not incur harm in the context of abusive partnerships. Using quantitative and in-depth interview (IDI) data, this study aimed to

explore the relationship between RC and covert use among IPV survivors in Nairobi; other potential reproductive safety strategies were additionally examined via IDIs.

6.3 Methods.

6.3.1 Overview of Study.

This study was embedded within the myPlan Kenya randomized controlled trial (RCT), conducted from April-October 2018 in three urban informal settlements of Nairobi, Kenya.^{27,28} This analysis uses baseline data from the myPlan RCT and IDIs conducted at three-month follow-up with women who indicated RC experience at baseline.

All research was conducted in close collaboration with Ujamaa-Africa, a Nairobi-based violence prevention and response organization, known to participants in the study communities of Korogocho/Kariobangi, Dandora, and Huruma/Mathare. Data collection was further assisted by community health volunteer (CHV) research assistants who worked with IPV survivors in these communities. Research assistants underwent a month-long training prior to data collection. All study procedures were approved by Johns Hopkins Bloomberg School of Public Health (JHSPH) and the National Commission for Science and Technological Innovation (NCOSTI) Institutional Review Boards (IRB).

6.3.2 Quantitative Data Collection.

Quantitative recruitment used community-based, non-probability sampling, specifically flyers and community event presentations. This sampling strategy was deemed most appropriate to reach women who may have never disclosed violence experiences or sought formal services.

Upon participant contact, screening and oral consent activities were conducted. Eligibility criteria comprised female, age 18-35, in a relationship where physical or sexual IPV or partner-related fears occurred in the past three months, residence in study settlements with no plans to move within the next six months, and fluency in English or Kiswahili.

Interviewer-assisted, tablet-based data collection occurred in a private room. Quantitative baseline measures for RC and covert use were collected prior to administration of intervention or control condition for all participants. Following completion of baseline data collection, staff-facilitated local resources were provided to each participant. All procedures follow best practices for violence-related research.²⁹

6.3.3 Quantitative Measures.

Quantitative items were piloted with research staff to ensure feasibility and acceptability. Surveys were available in both English and Kiswahili. The English version was translated into Kiswahili and back-translated into English by two staff members.

The independent variable of interest, RC, was measured using the full nine-item RCS developed in the US.^{16,30} For each item, participants were asked whether the specific behavior occurred within the past three months; this time frame was chosen to calculate difference-in-difference analyses in RC for the RCT. Psychometrics within this context demonstrated high reliability (Cronbach's $\alpha=0.86$), and a two factor solution comprising pregnancy coercion and condom manipulation. Previous studies have used a binary measure of RC with an affirmative response to any RC behavior indicative of RC. However, given the high prevalence of RC in the study population (82%), a continuous summary score was deemed more appropriate for understanding the range of RC experiences; continuous scores were computed by summing the binary items for the RCS, and items

that loaded for pregnancy coercion and condom manipulation, respectively, with equal weighting applied for each item. Measures for pregnancy coercion and condom manipulation factors were not mutually exclusive.

The dependent variable, covert use of contraception, was adapted from IRIS, an early form of myPlan, and is similar to the direct covert use assessment within some Demographic and Health (DHS) surveys.^{31,32} Specifically, the item asked “In the past three months, have you used birth control without your partner's knowledge to avoid getting pregnant by him?” To assess covert use, all women were first asked if they or their partner had done something or used a method to delay or avoid getting pregnant within the last three months. Women indicating affirmative responses were then asked most recent method used and whether they used a method without their husband's knowledge within the past three months. Using these items, two measures were created for covert use: 1) a binary measure indicating covert or overt use among all contraceptive users within the last three months (n=252); 2) a categorical measure among all women with complete contraceptive data (mutually exclusive categories: non-users, overt users, covert users; n=321).

The decision was made a priori to adjust all analyses for site, given heterogeneity in study communities. Assessment for confounding included covariates at the community, family, couple, and individual levels that could be associated with both RC and covert use independently. Assessed covariates were the same as those utilized from Aim 2. After confounding assessment (described further in *6.3.5 Quantitative Analyses*), partner's concurrent partnership, in addition to site, were included in fully adjusted models.

6.3.4 Quantitative Analytic Sample.

A total of 352 participants completed baseline data collection. Participants were excluded from analysis given lack of RC data due to current pregnancy status (n=19), missing RC data due to participant non-response (n=6), and missing contraceptive use data due to non-response (n=6). Sensitivity analyses were run to examine potential biases in excluding these participants; single imputation with sensitivity analyses were adopted for missing covariate data (<8%). Adopting a complete case approach for the primary exposure and outcome, 321 women were included in the analytic sample.

6.3.5 Quantitative Analyses.

Distributions in key demographic factors, specifically factors at the community, family, couple, and individual levels that may be associated with RC, were examined overall and by covert use of contraception categories. Chi-squared/Fisher's exact test and ANOVA were used to test for statistical significance across covert use categories. Method mix between covert and overt users was also compared via Fisher's exact tests.

Mean and standard deviation of RC and RC sub-scales were examined across contraceptive use categories (non-use, overt use, and covert use). ANOVA was used to test for significant differences in means across the three categories.

Prior to examining the relationship between RC (independent variable) and covert use (dependent variable), potential confounders were assessed. P-values of <0.1 served as threshold for potential inclusion.³³ Aim 2 regression analyses examining the association between correlates and RC served as the first assessment for confounding definition (confounder must be associated with the independent variable). Initial distributions of key demographic factors by covert use categories

served as assessment for the second criteria (confounder must be a risk factor for the dependent variable). Given these criteria, models were additionally adjusted for partner's concurrent partnership.

Multinomial logistic regression models examined the association between RC and RC sub-scales (continuous summary scores) and categorical covert use item (covert or overt vs non-use of contraception). This approach was chosen to allow comparison of covert and overt use as separate categories and to maximize sample size given that reasons for covert and overt use may differ based on RC experience, relative to non-use of contraception. Models were first adjusted for site only, then additionally adjusted for partner's concurrent partnership.

Logistic regression models then further examined covert vs. overt use of contraception among users of contraception (n=252), adjusted first for site only and then adjusted for partner's concurrent partnership. All quantitative analyses were conducted in STATA 16, with statistical significance set at $p=0.05$.

6.3.6 Qualitative Data Collection.

After completion of the quantitative portion, a purposive sampling frame was used to select participants for IDIs focused on RC. All participants (both intervention and control) who completed baseline and follow-up surveys and indicated that they experienced RC at baseline were eligible for the qualitative study. Eligible women were stratified based on intervention status and site to obtain a mix of experiences; recruitment occurred per site until adequate sample size was met (n=30).

Following extensive qualitative training, RCT data collectors administered the IDIs. All data collectors had violence-related work experience within the informal settlements and understood the acceptability of questions.

Semi-structured interviews were used to ensure consistency. Open-ended questions helped women expand their thoughts and relay personal experiences regarding RC. The guide was translated into Kiswahili, back-translated by two data collectors into English, and results compared to ensure reliability of wording.

Each participant (n=30) took part in one in-depth, semi-structured interview, for up to 30 interviews. Interviews took place in the Ujamaa offices in the week following follow-up data collection, and were conducted in private settings with measures taken to protect confidentiality in accordance with best practices for violence related research.²⁹ All IDIs took place in Kiswahili or English, were audio-recorded, transcribed verbatim, and translated into English for analysis in Atlas.ti software.

6.3.7 Qualitative Data Analysis.

Transcripts were coded by trained qualitative researchers using an inductive thematic analysis approach,^{36,37} to identify emerging themes from the transcripts and then develop an initial set of codes. An incremental, stepwise approach was used to assess inter-rater reliability; after every five transcripts are coded, the researchers compared codes and discrepancies that occurred were discussed until consensus achieved. Dual coding was used until thinking was synced and minimal discrepancies occurred across coders. Coding was complete when all transcripts had been thoroughly coded and themes began to repeat without presenting any new information (saturation).³⁸

Safety strategies codes included discussions of intentional behaviors aimed at reducing RC and its effects. These codes encompassed covert use (strat_covert), reproductive strategies covered in myPlan, including thoughtful partner communication and minimizing damage (strat_myPlan), and safety strategies used but not specifically discussed in myPlan (strat_other). Given widespread discussions on covert use, challenges of using contraception covertly were additionally coded (covertchall_sideeffects, covertchall_logistics, covertchall_partner). Coding for safety strategies that women had not previously used, but believed could be helpful to mitigate impact of RC (strat_idea) were also incorporated. Quotes coded as reproductive safety strategies were downloaded from Atlas.ti and matrices of code themes were created and organized by emergent safety strategy sub-themes. Sociodemographic data (age and site) were integrated to assist in identifying patterns in themes.

Two stories incorporating both RC and covert use were selected to serve as representative narratives of women's experiences, given cyclic and intertwined nature of RC and covert use uncovered during thematic analysis. Pseudonyms were used in place of the participant's real names.

6.4 Results.

6.4.1 Sample Characteristics and Contraceptive Use Patterns.

Sample characteristics overall and stratified by covert use of contraception are presented in Table 6.1. Women were on average 27-years-old, married, and cohabitating with their current partner. Number of pregnancies and number of births were approximately equal (2.1). Unintended pregnancy was high, with 34.3% of women reporting wanting their last pregnancy later and 19.9% wanting it not at all. Concurrent partnerships were prominent, with 7.5% of women reporting another partner and 53.9% reporting knowledge of their partner's concurrent partnership.

Nearly 80% of women used a contraceptive method within the last three months. Of women using contraception, most common methods used were injectables (60.3%), implants (18.2%), and pills (13.0%). Approximately fifty percent of women were using contraception covertly within the last three months (51.4%), compared to 27.1% of women using contraception overtly and 21.5% of women not using contraception at all.

Trend toward significant difference in covert use patterns was observed across study sites ($p=0.07$). Women whose partners had concurrent partnerships were more likely to be covert users or non-users than overt users ($p=0.04$), and women who were more autonomous decision-makers were likely to use contraception covertly ($p=0.009$). At the individual level, unemployment ($p=0.001$) and increased number of pregnancies ($p=0.07$) were observed with covert use of contraception, compared with overt use and non-use. Women who indicated health effects as an impediment to accessing contraception were more likely to be non-users ($p=0.09$).

Table 6.1 Sample Demographics by Covert Use Outcome (n=321)

		Covert Use of Contraception			
	Total Sample (n=321)	Non-Use (n=69)	Overt Use (n=87)	Covert Use (n=165)	p-value
	n (%)				
<i>Community Level</i>					
Study Site					
Korogocho	133 (41.4)	25 (36.2)	41 (47.1)	67 (40.6)	0.07
Dandora	110 (34.3)	33 (47.8)	25 (28.7)	52 (31.5)	
Huruma	78 (24.3)	11 (15.9)	21 (24.1)	46 (27.9)	
<i>Gender Norms (Mean (sd))</i>	<i>16.6 (2.0)</i>	<i>16.4 (2.0)</i>	<i>16.4 (2.1)</i>	<i>16.7 (2.0)</i>	<i>0.18</i>
<i>Family Level</i>					
Cohabitation with family					
Neither	256 (79.8)	54 (78.3)	72 (82.8)	130 (78.8)	0.83
Own family	61 (19.0)	15 (21.7)	14 (16.1)	32 (19.4)	
In-laws	4 (1.3)	0 (0.0)	1 (1.2)	3 (1.8)	

Couple Level					
Current Relationship Status					0.11
Boyfriend	39 (12.2)	13 (18.8)	6 (6.9)	20 (12.1)	
Husband	275 (85.7)	53 (76.8)	80 (91.6)	142 (86.1)	
Separated/Other	7 (2.2)	3 (4.4)	1 (1.2)	3 (1.8)	
<i>Length of Relationship (Mean (sd))</i>	6.3 (4.4)	7.0 (5.3)	6.1 (3.9)	6.2 (4.2)	0.32
Cohabitation with Current Partner	276 (86.0)	55 (79.7)	79 (90.8)	142 (86.1)	0.14
Participant Has Concurrent Partners	24 (7.5)	5 (7.3)	3 (3.5)	16 (9.7)	0.20
Partner Has Concurrent Partners	173 (53.9)	41 (59.4)	37 (42.5)	95 (57.6)	0.04
<i>Involvement in pregnancy decision-making (Mean (sd))</i>	9.8 (2.2)	9.5 (2.1)	9.3 (2.3)	10.2 (2.1)	0.009^φ
<i>Couple communication (Mean (sd))</i>	12.3 (3.5)	12.3 (3.5)	12.7 (3.1)	12.1 (3.6)	0.43 ^φ
Individual Level					
<i>Age (Mean (sd))</i>	26.6 (4.7)	27.6 (5.1)	26.0 (4.6)	26.4 (4.6)	0.18
18-20	32 (10.0)	7 (10.1)	9 (10.3)	16 (9.7)	0.38
21-25	123 (38.3)	22 (31.9)	37 (42.5)	64 (38.8)	
26-30	85 (26.5)	15 (21.7)	23 (26.4)	47 (28.5)	
31-35	81 (25.2)	25 (36.2)	18 (20.7)	38 (23.0)	
Highest level of education completed					
Primary or less	164 (51.1)	37 (53.6)	48 (55.2)	79 (47.9)	0.68
Some secondary	79 (24.6)	13 (18.8)	18 (20.7)	48 (29.1)	
Secondary	67 (20.9)	16 (23.2)	18 (20.7)	33 (20.0)	
Vocational/University +	11 (3.4)	3 (4.4)	3 (3.5)	5 (3.0)	
Migrated to Nairobi in past five years	82 (25.6)	12 (17.4)	21(24.1)	49 (29.7)	0.14
Ethnicity					
Kikuyu	132 (41.1)	26 (37.7)	36 (41.4)	70 (42.4)	0.98
Luo	80 (24.9)	17 (24.6)	21 (24.1)	42 (25.5)	
Luhya	55 (17.1)	11 (15.9)	15 (17.2)	29 (17.6)	
Borana	11 (3.4)	2 (2.9)	4 (4.6)	5 (3.0)	
Kamba	32 (10.0)	10 (14.5)	8 (9.2)	14 (8.5)	
Other	11 (3.4)	3 (4.4)	3 (3.5)	5 (3.0)	
Religion					
Christian	295 (91.9)	62 (89.9)	79 (90.8)	154 (93.3)	0.48
Muslim	24 (7.5)	6 (8.7)	7 (8.1)	11 (6.7)	
Other	2 (0.6)	1 (1.5)	1 (1.2)	0 (0.0)	
Unemployed	302 (94.4)	58 (85.3)	82 (94.3)	162 (98.2)	0.001

<i>Number of Pregnancies (Mean (sd))</i>	<i>2.1 (1.3)</i>	<i>1.9 (1.6)</i>	<i>2.1 (1.2)</i>	<i>2.2 (1.2)</i>	0.07
<i>Number of Births (Mean (sd))</i>	<i>2.1 (1.1)</i>	<i>2.1 (1.4)</i>	<i>2.1 (1.0)</i>	<i>2.1 (1.1)</i>	<i>0.88</i>
Intendedness of Last Pregnancy					
Wanted Then	147 (45.8)	36 (52.2)	40 (46.0)	71 (43.0)	0.45
Wanted Later	110 (34.3)	18 (26.1)	33 (37.9)	59 (35.8)	
Wanted Not At All	64 (19.9)	15 (21.7)	14 (16.1)	35 (21.2)	
Perceived Access to Contraception*					
Health effects	191 (59.5)	49 (71.0)	50 (57.5)	92 (55.8)	0.09
Inconvenient to use	138 (43.0)	33 (47.8)	37 (42.5)	68 (41.2)	0.64
Too expensive	64 (19.9)	13 (18.8)	15 (17.2)	36 (21.8)	0.67
Difficult to obtain	60 (18.7)	10 (14.5)	16 (18.4)	34 (20.6)	0.55
Too far to travel	36 (11.2)	6 (8.7)	11 (12.6)	19 (11.5)	0.73
Past 3-month Contraceptive Use	252 (78.5)	0 (0.0)	87 (27.1)	165 (51.4)	-- ^ϕ
Method Mix*					0.71 ^ϕ
Injectables	149 (60.3)	--	50 (58.8)	99 (61.1)	
Implant	45(18.2)	--	19 (22.4)	26 (16.1)	
Pill	32 (13.0)	--	8 (9.4)	24 (14.8)	
Emergency Contraception	5 (2.0)	--	1 (1.2)	4 (2.5)	
Male Sterilization	3 (1.2)	--	1 (1.2)	2 (1.2)	
IUD	2 (0.8)	--	1 (1.2)	1 (0.6)	
Female Condom	2 (0.8)	--	1 (1.2)	1 (0.6)	
Rhythm Method	2 (0.8)	--	1 (1.2)	1 (0.6)	
Withdrawal	2 (0.8)	--	1 (1.2)	1 (0.6)	
Female Sterilization	1 (0.4)	--	1 (1.2)	0 (0.0)	
Male Condom	1 (0.4)	--	0 (0.0)	1 (0.6)	
Diaphragm	1 (0.4)	--	1 (1.2)	0 (0.0)	
LAM	1 (0.4)	--	0 (0.0)	1 (0.6)	
Other Traditional Method	1 (0.4)	--	0 (0.0)	1 (0.6)	

*Method mix examined most recent method used, whereas covert use item asked about any use in the past three months; assessed among women using a family planning method in the last three months (n=252)

^ϕnot assessed as potential confounder as conceptually on the causal pathway between RC and covert use

Italics indicate continuous variables (mean (sd))

Chi-squared and Fishers exact test (categorical/binary) and ANOVA (continuous) variables

6.4.2 Reproductive Coercion Patterns (Primary Exposure).

The distribution of RC and pregnancy coercion and condom manipulation sub-factors overall and across covert use categories are outlined in Table 6.2. On average, participants experienced 3.8 types of overall RC, with 2.3 types of pregnancy coercion and 1.5 types of condom manipulation. Women who had experienced more types of overall RC were more likely to use contraception covertly ($p=0.05$).

Table 6.2. Distribution of Reproductive Coercion Across Covert Use Categories (n=321)

	Overall (n=321)	No Use (n=69)	Overt Use (n=87)	Covert Use (n=165)
	Mean (sd)			
Reproductive Coercion	3.8 (3.0)	3.7 (2.9)	2.7 (2.8)	4.4 (2.9)*
Pregnancy Coercion	2.3 (1.8)	2.3 (1.8)	1.5 (1.6)	2.7 (1.8)
Condom Manipulation	1.5 (1.6)	1.3 (1.5)	1.2 (1.5)	1.7 (1.6)

*Ranges for Summary Scores: Overall RC (0-9); Pregnancy Coercion (0-5); Condom Manipulation (0-4)
ANOVA used for significance testing; * $p<0.05$; ** $p<0.001$

6.4.3 Association Between Reproductive Coercion and Covert Use of Contraception.

Multinomial regression results adjusted for site only indicated that a one unit-increase in RC score was associated with increased relative risk of covert use compared with non-use (RRR=1.10; $p=0.05$), whereas a one-unit increase in RC score was associated with decreased overt use of contraception compared to non-use (RRR=0.89; $p=0.05$; Table 6.3). The decreased effect of RC on overt use was reiterated for the pregnancy coercion factor (RRR=0.76; $p=0.005$); risk of covert use also increased with pregnancy coercion, though these results were not significant ($p=0.06$). Condom manipulation was not significantly associated with either covert or overt use, compared to non-use of contraception.

When fully adjusted, overall RC remained statistically significantly associated with covert use of contraception (RRR=1.11; $p=0.04$). Pregnancy coercion was associated with decreased risk of overt use (RRR=0.78; $p=0.02$). Condom manipulation was not associated with covert nor overt use in fully adjusted multinomial models.

Additional logistic regression models were run to examine the impact of RC on covert vs. overt contraceptive use among users of contraception. RC was associated with increased odds of covert use, compared to overt use (OR=1.23; p<0.001). This association was amplified for pregnancy coercion (OR=1.51; p<0.01), and remained consistent for condom manipulation (OR=1.23; p=0.02). Fully-adjusted models reported slightly attenuated, though significant, results for overall RC, pregnancy coercion, and condom manipulation.

Table 6.3. Multinomial and Logistic Regression Results

Multinomial Logistic Regression Model Comparing Covert and Overt Contraceptive Users to Non-Users (n=321)						
	Adjusted for Site Only			Fully Adjusted Model [‡]		
	No Use (n=69)	Overt Use (n=87)	Covert Use (n=165)	No Use (n=56)	Overt Use (n=82)	Covert Use (n=159)
	RRR (95% CI)					
Overall RC	ref	0.89* (0.80-1.00)	1.10* (1.00-1.21)	ref	0.92 (0.81-1.03)	1.11* (1.00-1.23)
Pregnancy Coercion	ref	0.76** (0.62-0.92)	1.15 (0.98-1.36)	ref	0.78* (0.64-0.95)	1.17 (0.99-1.38)
Condom Manipulation	ref	0.96 (0.78-1.20)	1.19 (0.98-1.43)	ref	1.01 (0.81-1.26)	1.21 (1.00-1.47)
Logistic Regression Model Comparing Covert and Overt Contraceptive Users, Among Users of Contraception (n=252)						
	Adjusted for Site Only			Fully Adjusted Model [‡]		
	No Use (n=69)	Overt Use (n=87)	Covert Use (n=165)	No Use (n=70)	Overt Use (n=82)	Covert Use (n=159)
	OR (95% CI)					
Overall RC	--	ref	1.23** (1.11-1.35)	--	ref	1.21** (1.10-1.34)
Pregnancy Coercion	--	ref	1.51** (1.29-1.79)	--	ref	1.49** (1.26-1.76)
Condom Manipulation	--	ref	1.23* (1.03-1.46)	--	ref	1.19* (1.00-1.43)

*p<0.05, **p<0.01

[‡]model additionally adjusted partner's concurrent partnerships based on <0.1 threshold and conceptual basis

6.4.4 Narratives Linking RC and Covert Use.

Two narratives explore typical trajectories of RC and covert use. In the first, Carol experienced RC as a result of covert use, and in turn, continued to use contraception covertly.

Carol had been with her partner for three years and recently learned that he had a child with another woman. Her last pregnancy was unintended—she became pregnant after her partner changed the dates on her family planning card so she did not return for her injectable on time. Her partner leaves little money for her and her children and Carol feels that she must be plan for her children’s futures. To help ease the family burden, she uses the injectable covertly; now, however, she ensures that she hides the family planning card so that he cannot find it. Recently, Carol experienced abnormal bleeding, which led to her partner growing suspicious about her family planning use. He beat her thinking that she was using contraception without his knowledge, but she continues to use.

-20-year-old, Dandora

In the second scenario, Susan’s partner knew of her initial contraceptive use and her partner approved of some contraceptive methods, however, she still experienced RC. She felt the need to use other contraceptive methods covertly in order to protect herself against unintended pregnancy.

Susan’s partner did not like family planning methods, but had agreed to her using the injectable because it was short-term. During the ten years that Susan used the injectable, however, her partner often forced her to stop, causing Susan to have multiple pregnancies. She felt like he was only satisfied when she was pregnant and knew that they did not have the financial resources to support these pregnancies. Susan recently chose to switch to the implant because she knew that her partner could not interfere in this longer-term method. She did not want her partner to know that she has switched methods because she does not think that he will agree to her using the implant.

-28-year-old, Huruma

6.4.5 Qualitative Themes Exploring Covert Use to Mitigate Impact of RC.

Covert use of contraception was the most widely discussed safety strategy by women experiencing RC. As such, qualitative results focus primarily on covert use, including reasons, mechanisms, challenges, and repercussions of disclosure. Other potentially useful strategies to protect women’s reproductive safety, besides covert use, are presented at the end; many of these additional strategies have not been used by women themselves, but are ideas for how women could keep themselves safe when faced with RC.

Reasons for Covert Use

The majority of women discussed using contraception covertly given their known partner disapproval of contraception. Generally, they discussed their partner was against all methods of family planning, either due to myths and misconceptions about the method or due to known peer experiences.

He doesn't support me, he said he doesn't want. I just do it without his knowledge. I told you that he is against it. He does not want the injections because he saw someone bleed to death because of the injection. She could not afford to pay the cash that was demanded so she bled to death.

-20-year-old, Dandora

Several women, however, discussed the partner approving of the standard days method, though their own preference was for a more effective method. In order to use a modern method of contraception, they resorted to covert use.

He forced me to use a different method, he wanted the one for counting days and I did not want it [standard days]...I used it [the injectable] without his knowledge. I think it is safe for me to use the injection because he does not know, he thinks I'm normal.

-24-year-old, Korogocho

For women with known partner disapproval, covert use was most often seen as a way to avoid future arguments.

He asked me why I was not getting pregnant then I told him, 'It's too early, we can use family planning.' When he refused, I figured, instead of arguing with him, I'd rather just use family planning behind his back.

-27-year-old, Dandora

Among women using covertly, they felt the need to do so for several reasons, including wanting a manageable number of children, partners limited engagement in childrearing, and "lack of future if I kept on getting pregnant" (19-year-old IPV survivor, Huruma).

I felt that I had to protect myself since I already had four kids, one had died, yet he [my partner] was still was against it [family planning]. Norplant contraceptives were free at the time in our area so I tried it out...I wanted to have kids just enough since it was difficult to cater for the expenses. I wanted a manageable number.

-33-year-old, Dandora

My husband does not like it so I use my wits. He says that he wants kids but I can't get too many children and my life will be difficult. The woman has to be intelligent; don't just get unplanned children.

-20-year-old, Dandora

Mechanisms of Covert Use

Participants had many, often differing, opinions on the best contraceptive methods to use covertly and tactics to conceal use. While most women described the injectable as the least detectable method, others found the implant or IUD to better suit their needs given the longer period of protection against unintended pregnancy.

He still does but I can't stop. Even if he hits me, it [the injectable] is already in my body so there's nothing he can do. However, now I'm hiding the card, even if he searches everywhere, he can't get it.

-20-year-old, Dandora

My husband does not want family planning. He only prefers I use when the child is still an infant but once the child is over a year old, he wants me to stop. The conversation was difficult. But as the wife there is a way I convince him, that's why I was able to use the coil because I don't experience any side effects. The other reason I opted for the coil was because I did not want him to know I was on family planning.

-28-year-old, Dandora

Regardless of contraceptive method used, all women agreed that the method should cause the least suspicion, allow for continuous use, and best fit women's individualized situations to take into account previous RC experiences, logistics, and potential side effects.

If one wants family planning, that's their choice. Even if he's against it, it is rather you continue with a method like mine which just stays in the body. It doesn't leave any mark. I could have also used Norplant but not pills since he can find those. Use a method that you feel is suited for your situation.

-19-year-old, Huruma

A few women disclosed that their partners learned of their initial covert use, however, they were able to continue to use clandestinely through lying about removal or length of method protection. In particular, women described telling their partners that they were using a short-acting method or that their method lasted for a shorter period, especially if their partner agreed to contraceptive use initially.

The way I protect myself is when he tells me that he does not want family planning, I tell him that I'm not using, and I have removed it. When I tell him that I will not remove, it causes a confrontation. I tell him, 'I don't use, I have removed it. I have no idea why I have not gotten pregnant.'

-28-year-old, Dandora

He told me that we need to go to the chemist so that I can get a family planning injection. That was when we were able to have an understanding and it bore fruits. When it started affecting me, I could not tell him that I was told that I will get a long term one. I kept quiet.

-28-year-old, Huruma

Challenges of Using Covertly

The most often discussed challenge of using covertly was partner suspicion surrounding lack of pregnancy. While many partners inquired about the delay in fertility, women were able to divert the conversations to a certain extent. Some women discussed that these conversations becoming more difficult after extended periods of time.

He really tries to stop me. He asks, 'What do you use?' I tell him, 'I don't use anything. I just stay like that.' 'Then why aren't you getting pregnant?' I tell him, 'It depends on someone's body, the way you carry yourself.' I have never told him, he doesn't know which one I use up to this date.

-32-year-old, Dandora

Side effects related to contraceptive use were also a commonly cited barrier for women using covertly. These side effects, including nausea, cramping, and menstrual abnormalities, often led to disclosure of covert use.

I wanted the injection because I took the pills without his knowledge and when I took them, I felt nauseated. He told me, “Why are you experiencing nausea? Are you pregnant?” I told him, “I just feel like vomiting, I don’t know what is wrong.” That was until I told him that the doctor had said that it was the medicine, I was taking that was causing the problem, that I should change them. He told me to try them but if they were a problem, I stop using them.

-31-year-old, Huruma

While some women discussed the role of providers in providing contraceptive methods to women without partner knowledge or approval, they also indicated the difficulty in concealing use when partners were present at doctor visits.

He has never known, There was a time I had a stomach pain and therefore he took me to a hospital. So while he stood outside the door, the doctor asked me if I was using Norplant, of which I immediately told him to speak in low tone lest my partner overhears. He never knew I was into family planning and in any case he came to know, it would bring me problems. The doctor then told me if I continue feeling unwell, I should get back to that particular hospital and have it removed.

-23-year-old, Dandora

Some women discussed logistical challenges of using contraception covertly; these women often experienced severe RC. Women with logistical challenges often went to great lengths to conceal use from their partners, including keeping drugs in other locations or hiding clinic cards.

Keeping them at the neighbor’s place is challenging because you can miss to take the drugs and end up having sex with your husband on the same day and get pregnant. That is one of the challenges but I still support the idea of keeping it at the neighbor’s place because if I keep them at the house, he will get them and throw them away. Then when he gets them, he will know that I pills yet I don’t want it to happen.

-24-year-old, Huruma

Repercussions of Disclosing Covert Use

Few women discussed peaceful resolutions when disclosing their covert use of contraception to their partner or upon discovery, but many felt that it was better to tell their partner of use, regardless of his agreement. Some women stated that covert use had caused more chaos or stress in their lives due to their partner's reaction when learning of use. One woman discussed that her partner was upset particularly because she had made this decision alone and this situation ended the relationship.

He asked why. I wish we would have even sat down and talked a bit and maybe even found an alternative solution. Why did I have to do it alone? Eventually, I decided to let go. I therefore cannot tell you which method he wanted to—I can't predict which method he would have told me.

-29-year-old, Korogocho

Several women described how to decrease violent reactions when disclosing covert contraceptive use to their partner. All women said that this subject should be approached gently and at a time when he was sober. One participant further specified that it was helpful to have parents present during the conversation: "With time and even now, he has changed. When I decide to tell him, my parent must be present. I would explain to him their benefits. Maybe then he would agree" (19-year-old, Huruma).

Additional Ideas to Increase Reproductive Safety

IPV survivors offered several additional ideas for strategies to increase reproductive safety when faced with RC and IPV. The most common discussed strategy was to "sweet talk" their partner, be complacent in his requests, or even pretend to be his inferior. Women believed that these tactics would shift the power dynamics to help the partner believe he was the decision-maker.

That is the one I said you pretend to be weak, you pretend you don't know anything, like you're a fool. You pretend to be his inferior when he comes in. You agree with everything

he says. You back down and when you back down, he might sometimes get ashamed and also back down.

-32-year-old, Dandora

Women discussed several ways that providers could assist in concealing covert use of contraception. Some women discussed the importance of providers inquiring whether women had a place to hide their contraceptive methods and tailoring their care to their specific situation. One woman's clinic privately called her to remind her of her return date for the injectable, rather than keep records within her home.

He usually tells me not to use it. However, I am close with one of the people who work at the facility where I go to get injected. I would therefore still get injected and not go back to the house with the book written the return date, but would instead leave it in that chemist. I then leave my phone number and tell them, 'When you feel that I have forgotten and haven't come back, call me and remind me.' In the meantime, I tell him that I'm not using it.

-30-year-old, Huruma

Lastly, IPV survivors focused on the need to educate male partners about family planning and decrease stigmatization surrounding family planning use. Some believed that social networks or healthcare providers could be used to increase positive discussions, whereas others sought more government support for family planning.

They should also educate women and make it a routine that every time a woman goes to the clinic, she comes with her partner. That way, you can be talked to together and reason together. In this way, they will have helped women and also those men to understand the benefits of family planning.

-24-year-old, Dandora

6.5 Discussion.

This mixed-method analysis is the first to quantify the association between RC and covert use, with findings indicating that RC was associated with increased relative risk of covert use ($p=0.04$), compared to non-use. Pregnancy coercion was further associated with decreased relative risk of

overt use ($p=0.02$) and condom manipulation trended towards significant association with covert use ($p=0.06$), compared to non-use. Among users of contraception, odds of covert use was 20% higher for women experiencing overall RC ($p<0.001$) and 50% higher for women experiencing pregnancy coercion ($p<0.001$), compared to overt use. While covert use has been reported both quantitatively and qualitatively in other sub-Saharan African contexts,^{22,32,39-42} these results demonstrate that women experiencing RC are able to initiate self-implemented safety strategies to protect against unintended pregnancy. Moreover, a 51% prevalence of covert use among IPV survivors is markedly higher than recent population-based direct (7%) and indirect (23%) estimates,³² illustrating the complexities in reproductive decision-making within abusive partnerships. IDIs help contextualize quantitative results to assist in disentangling temporarily concerns given the cross-sectional design. Further, qualitative analysis allows for a more thorough understanding of women's reasons for use, challenges they face while attempting to exercise their reproductive choices, and the often cyclic nature of RC and covert use. These narratives are particularly crucial for contextualizing condom manipulation and RC results, and indicate that women may often face multiple types of RC and attempt to use several methods of contraception covertly before utilized successfully.

One finding that was not examined quantitatively, but was pervasive throughout IDIs, concerned partner disapproval of *specific* methods or *sole approval* of the Standard Days Method. Specifically, participants highlighted immense partner disapproval of hormonal contraceptive methods and felt the need to use contraception covertly in order to maximize method effectiveness. Partner disapproval of any contraception is measured in the DHS,⁴³ however, this item is only assessed in relation to reasons for non-use, rather than partner's opinions and non-use of specific methods. Further, standard covert use and contraceptive decision-making measures do not examine use of a specific method, but rather ask more generally about partner approval of contraception and knowledge of use.³² Male disapproval of hormonal methods has been reported in other East African

contexts, including Uganda⁴⁴ and western Kenya,⁴⁵ where men have relayed concerns regarding the side effects of these methods. Future research could be enhanced with more comprehensive items to specify partner knowledge of current and recent method use, as well as approval and disapproval of specific types of contraception.

Qualitative themes further explored innovative reproductive safety strategies, including covert use; IDIs specifically highlighted covert use as a strategy to avoid arguments about family planning. For women already using covertly, IPV survivors suggested lying about the duration of effectiveness or diverting arguments surrounding delays in fertility to conceal use. These strategies underscore the means that women go to prevent pregnancy and the difficulty in maneuvering discordant pregnancy intentions, specifically in the context of unhealthy relationships. Further, almost all women preferred that their partners knew about their contraceptive use—for women who wished to disclose use, they discussed conversational tactics, including ensuring that the partner was sober or involving the partner's parents in discussions. While these strategies have not been explored exclusively for covert use, they have been reported in other LMICs as harm reduction strategies to reduce IPV.^{21,46-48} Integration of these strategies into family planning and violence services may increase safety for women using contraception covertly or facing IPV within similar urban LMIC contexts.

Limitations of this analysis include disconnect between recent method and covert use measures, as the covert use item asked of any covert method use within the last three months and recent method item focused on most recent contraceptive method used. Of note, some covert users reported their most recent method as a method that could not be used covertly (i.e. male sterilization, withdrawal, male condom). These participants may have used other methods covertly during the three-month time frame, though they reported methods requiring male compliance at most recent use. Moreover, participants who self-selected into this study and self-presented as an IPV survivor could have been

more likely to seek help and utilize reproductive safety strategies, including covert use of contraception. Further, lack of prospective pregnancy intention data limited analysis of current pregnancy intentions, specifically to understand why some women may have not been using contraception. Without prospective intention data, it is difficult to ascertain whether non-users of contraception were in need of contraception or instead seeking a pregnancy. To attempt to overcome this limitation, additional logistic regression models were run to compare covert vs. overt use among users of contraception. Sample size considerations further limited comparison of multinomial and logistic models, specifically for the condom manipulation sub-factor. Lastly, IDIs were limited to women who indicated RC experience at baseline; while this sampling strategy did not allow comparison in covert use for women with and without RC experience, it supported in-depth probing into women's RC and reproductive safety strategy use. Further, it increased our understanding of the cyclic nature of RC and covert use for women experiencing IPV and helped disentangle temporality concerns of the cross-sectional quantitative design. Given that the study sample was limited to IPV survivors who self-selected for participation into the study, these results may or may not be generalizable to women in this setting who have not experienced recent IPV.

Family planning policies and programs within Nairobi and similar LMIC contexts can glean several implications from these mixed-methods results. First, women seeking to use contraception covertly face immense difficulty in doing so and warrant provider support in both initial uptake and continuation of method use. Many women discussed side effects of contraception, including menstrual abnormalities and cramping, eventually leading to disclosure of covert use. When prescribing contraceptive methods, providers must understand women's needs to conceal use and potential repercussions if partners learn of use; severity of these repercussions is particularly salient for women concurrently experiencing IPV, as disclosure may exacerbate abuse. Further, while many women described that the ideal scenario included disclosure, they valued use of an effective method and pregnancy prevention more. Contraceptive counseling should align with women's

priorities—providers must weigh extent of partner influence, severity of potential repercussions, medical history, and pregnancy intention to evaluate the best methods to suit women’s lives and situations. Moreover, providers may be helpful in assisting with method concealment, including ensuring privacy from partners during clinic visits and when contacting clients for follow-up. Lastly, these results highlight the urgency for positive community dialogue and increased education surrounding family planning, particularly for men and boys to offset harmful gender and power dynamics. Though contraceptive methods are known and available to women, IPV survivors face a number of barriers to contraceptive use, including RC and violence upon disclosing use. In order to maximize couples’ fertility goals, dispelling myths and misperceptions about contraception must be addressed in tandem with violence prevention and response services. Positive community norms surrounding fertility and contraception, as well as promotion of healthy relationships and stigmatization of violence, can ultimately increase couple communication and relationship quality, while enhancing women’s health and well-being.

6.6 Conclusion.

Covert use of contraception may be a viable self-implemented reproductive safety strategy for women experiencing RC in LMICs. RC and covert use were often intertwined—women whose partners learned of covert use often faced RC, however, continued to use covertly, underscoring the immense desire of women to avoid pregnancy regardless of abuse incurred. Reproductive safety strategies, particularly ways to safely use contraception covertly, should be integrated into standard procedures for violence and contraceptive counseling services, regardless of disclosure of abuse or RC experience, to reduce IPV and minimize adverse reproductive health outcomes, including unintended pregnancy. While joint pregnancy decision-making is the ultimate goal for healthy relationships, this may not be the reality for women concurrently experiencing IPV and who hold limited relationship power—covert use affords women experiencing RC and IPV the opportunity

to limit or space their births in accordance with their health concerns, financial resources, and reproductive preferences.

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Chapter 7. Conclusions

7.1 Review of Results.

RC is prevalent and severe for women experiencing IPV in Nairobi. An 82% past three-month RC prevalence is markedly higher than US-based estimates of RC specific to IPV populations, with previous studies ranging from 4% recent RC in Pennsylvania to 35% lifetime RC in Northern California.^{1,2} The high prevalence of RC within a population of women experiencing physical and sexual violence supports previous US literature indicating that IPV survivors may be particularly vulnerable to RC.³⁻⁶ Given the high prevalence of RC within this population, further analyses (Aims 2-3) modelled RC as a continuous summary score to indicate number of types of RC experienced. This metric may also increase understanding of the severity of RC, as mixed-methods analyses indicated that qualitative experience was highly congruent with continuous score. This dissertation research was the first utilization of RC as a continuous metric.

Psychometric properties, including alphas and eigenvalues of the overall RCS and sub-scales, indicated that the RCS performed well within the Nairobi context. Moreover, items factored into the same sub-scales (pregnancy coercion and condom manipulation) as seen in the US.⁷ These sub-scales can be useful in understanding the types of violence that women experience, particularly in contexts where condom use is low and may be normalized as a disease prevention mechanism, rather than a contraceptive method.⁸⁻¹⁰ Further, disaggregation of these factors for Aims 2-3 helped increase understanding of who is susceptible to different types of RC (Aim 2) and how types of RC are associated with reproductive safety (Aim 3).

Correlates and contributors of RC (Aim 2) revealed unique contextual factors that may make some IPV survivors vulnerable to RC. Results highlighted the importance of couple roles and

communication in childbearing decisions, with quantitative findings reporting that healthier couple communication may be protective against RC. Further, quantitative findings revealed that a woman not wanting her last pregnancy was associated with increased RC. Men's pregnancy intentions were not examined in quantitative data; however, IDIs discussed discordant pregnancy intentions as a driver of RC, as women often preferred to limit childbearing and partners felt a continued desire for children. Further examination of RC contributors via IDIs revealed additional themes not examined quantitatively, including partner's distrust of contraception, particularly due to perceived side effects, as well as fear that women should seek external partners.

Aim 3 utilized mixed-methods to quantify the association between RC and covert use, with findings indicating increased relative risk of covert use and decreased relative risk of overt use for women experiencing RC, compared to non-use. While covert use has been reported both quantitatively and qualitatively in other sub-Saharan African contexts,¹⁴⁻¹⁹ the relationship between RC and covert use has never been quantified; these results demonstrate that women experiencing RC and IPV may be able to initiate self-implemented safety strategies to protect against unintended pregnancy. Moreover, a 51% prevalence of covert use among IPV survivors is higher than recent population-based estimates,¹⁷ illustrating the complexities in reproductive decision-making within abusive partnerships. IDIs contextualized these results to assist in understanding mechanisms and disentangling temporality concerns given the cross-sectional design. Further, women's experiences with RC and covert use indicate that women may often face multiple types of RC and attempt to use several methods of contraception covertly before utilized successfully.

7.2 Strengths and Limitations.

This dissertation research strengthens the literature base surrounding RC among IPV survivors in LMICs and draws on a number of methodological strengths, including:

1. *Examination of RC in an IPV Population:* There is a dearth of research surrounding RC behaviors for women concurrently experiencing IPV, particularly in LMICs. Understanding the types of violence that this vulnerable population experience and potential correlates that may increase risk of RC can help providers understand who is most susceptible. Further, knowledge of sexual and reproductive strategies that women find most helpful when faced with RC and IPV can inform practice guidelines for this population of women at high risk of adverse health outcomes.
2. *In-country Expertise:* All data were collected in conjunction with Ujamaa research staff and local CHVs trained in quantitative and qualitative data collection. This team was well-versed in violence research methods, including violence-related referrals, and were known to IPV survivors within study communities. Their expertise and presence throughout the study period was pivotal for all measurement development, recruitment, and data collection activities. Further, their expertise was drawn on to assist with the interpretation of these dissertation research findings.
3. *RC Measurement Development:* RC measures were informed by formative qualitative data collected from both community service providers and IPV survivors in July 2017. The decision to include the full RCS in place of the abridged version was made given the observed hesitance surrounding condom use and perceived high levels of RC in this context. Furthermore, discussions surrounding forced IUD and implant removal were prevalent during formative data collection, allowing addition of context-specific RC items. The inductive measurement development process, including incorporation context-specific items, and piloting items with study staff/CHVs to ensure applicability to the target population is a major strength in ensuring transferability of the RCS to a new setting.
4. *Mixed-methods Design:* All three aims used IDIs to supplement cross-sectional data and delve deeper into the lives and stories of IPV survivors experiencing RC. IDIs allowed extensive examination of behaviors and severity of RC experienced, contributors of RC,

and protective strategies for RC that could not be fully examined through quantitative measures. To date, few studies have neither quantified nor qualified RC in LMICs; combining these two methods per aim enhanced understanding of women's experiences with RC.

- a. Specifically, for Aim 1, the RC continuous score was compared with IDI data to understand number of types of RC experienced, and potential severity and motivation behind RC. One inherent limitation of measuring RC is that both behavior (i.e. put holes in a condom) and intention behind behavior (i.e. so you would get pregnant) must be assessed. Comparison of quantitative and qualitative measures via convergence matrix revealed that women with lower RC scores not only experienced fewer RC behaviors, but that their partners were more inconsistent in their behaviors and motivations. Through examination of number of types of RC experienced, continuous score may be a better metric for understanding ongoing, malicious behaviors vs. those that are inconsistent.
- b. In Aim 2, many women discussed contributors of RC that were not assessed via quantitative items, including partners' fear of side effects and unfaithfulness within a relationship. This exploration of RC contributors specific to IPV survivors in LMICs created a more thorough picture of women's perceived motivation behind RC and factors that may increase susceptibility to RC. These unique contributors serve as important items to examine quantitatively in future work, both with IPV survivors and among general LMIC populations.
- c. Aim 3 explored reproductive safety strategies, specifically covert use of contraception, both quantitatively and qualitatively. A mixed-methods lens for exploring reasons, challenges, and consequences of covert use provided further detail regarding understudied strategies in LMICs, particularly for women who may be at risk of increased violence if used incorrectly. Further, use of qualitative

data via narrative approach explored the cyclic nature of RC and covert use to disentangle some of the temporality concerns with using cross-sectional quantitative data.

5. *Measuring RC as a Continuous Score:* A unique contribution of this study is the measurement of RC as a continuous summary score; no published data to date has examined RC using a continuous metric. Measuring RC as a continuous score may not only allow for a more nuanced measure, particularly within a high prevalence population, but as evidenced via convergence matrixes for Aim 1, may also help disentangle intent and consistency of controlling behaviors.

This dissertation research is not without limitations; however, alternative strategies were applied to mitigate these limitations when possible:

1. *Cross-sectional Design:* A cross-sectional design was adopted given the high prevalence of long-acting contraception and injectables in this context. Moreover, three months follow-up, in line with the parent study, is a relatively short time period to assess the effect of RC on covert use. This design limits arguments surrounding causality, as temporality between independent and dependent variables could not be established; this was particularly of concern for Aim 3 examining the association between RC and covert use of contraception. While limited by the cross-sectional nature of the quantitative data for this dissertation research, the explanatory mixed-methods design was utilized to supplement quantitative data with IDI data whenever possible in order to help disentangle temporality concerns. Future research aims to assess temporality and focus on the longer-term impact of RC on contraceptive use and other sexual and reproductive health outcomes.
2. *In-depth Interview Sampling:* Women who did not indicate RC during the quantitative phase were not included in the qualitative phase. While this sampling mechanism was undertaken to probe in-depth into women's RC experiences, it did not allow for assessment

of congruence among women with no RC, leading to uncertainty surrounding specificity of the quantitative items (Aim 1). Further, it did not allow disaggregation of discussed contributors (Aim 2) or covert use reasons, mechanisms, and challenges (Aim 3) by RC experience.

3. *Abbreviated Quantitative Measurement:* Quantitative measures were limited due to survey length, as this dissertation research was embedded within a larger RCT. Further, pregnancy intention and perceived access to contraception data was limited due to programming errors within the quantitative survey. These data would have been helpful to understand why some women may have not been using contraception. Without prospective intention data, it is difficult to ascertain whether non-users of contraception were in need of contraception or instead were seeking a pregnancy. To attempt to overcome this limitation, contributors of RC were examined qualitatively and explored discordance of intention (Aim 2) and logistic regression models were run to compare covert vs. overt use among users of contraception (Aim 3).
4. *Generalizability:* The non-probability sample for the parent study was comprised solely of recent IPV survivors who self-selected into the study. While these dissertation research findings may not be generalizable to the general population, they highlight RC behaviors, correlates, and reproductive safety strategies for a high-risk group that may otherwise lack access to health and violence support services. Of note, further analyses demonstrate that this study sample reported higher covert use than captured by 2014 DHS surveys for IPV survivors. Therefore, these findings are presented as generalizable only to women who self-selected into this study; findings may or may not be generalizable to women who have not experienced or identified as an IPV survivor. Future work in this setting aims to examine the validity of the RCS in a sample inclusive of women who do not present as IPV survivors.

5. *Examination of RC Solely from a Woman's Perspective:* This study was only able to examine reproductive decision-making and RC from a woman's perspective. While a more comprehensive measurement approach would include couple dyads to examine level of agreement, given the impact of RC on women and risk of including male partners in violence-related research, the decision was made to focus only on the female partner for this study. Future work aims to understand RC drivers and motivations from the male partner's perspective, particularly given discussed contributors surrounding partner's fears of contraceptive side effects and infidelity.

7.3 Research Implications.

Researchers can glean several implications from this dissertation research. Foremost, results revealed that the RCS was transferable to an urban East African setting. To date, the RCS has only been implemented in two LMIC settings, Cote d'Ivoire and India, though both involved substantial adaptation of measures.^{20,21} Optimization of the RCS to the Nairobi context, including assessment of psychometric properties within a population of violence survivors, may help ease transferability of this scale to other high violence, urban LMIC settings. Moreover, quantitative data suggested that correlates for pregnancy coercion and condom manipulation may be unique, and as such, these factors should be examined individually in research aiming to understand factors associated with RC. Further, the modelling of RC as a continuous summary score was, to our knowledge, the first time this metric had been applied to understand number of RC types; this measure may be more appropriate within other high violence and RC settings.

While the original RCS demonstrated high reliability, steps remain to improve RCS item wording to ensure that items are both comprehensible to women and indicative of the types of RC that they are experiencing in LMICs. Specifically, future research should utilize wording that asks

consistently about RC behaviors and intentions. For example, the first item “told you not to use any birth control” was the most prevalent item; however, it did not specify the intent behind this behavior. As demonstrated by the qualitative phase, women believed their partners had several motivations for not wanting them to use contraception, ranging from intentional impregnation and “ruining their lives” to genuine concern about health-related side effects of contraceptive methods. The latter would not be classified as RC, however, behaviors might be conflated as such, leading to overestimates of RC prevalence. While previous research has noted difficulty disentangling intention and behavior,^{22,23} women throughout IDIs felt that their partners’ intentions were clearly revealed during their own discussions on childbearing. Clarifying intentions within the item wording can ensure that measures are capturing RC, as evidenced by coercive intentions and power imbalances.

Further, future research is encouraged to undergo qualitative research prior to RCS implementation in order to understand context-specific RC behaviors and continue to test appropriate additions and modifications to the RCS. While the additional context-specific item did not load within the factor analysis, forced removal of IUDs/implants was relatively prevalent in this context (30%). Research in southwest Nigeria similarly reported partner coercion related to IUD removal, specifically for younger women,²⁴ highlighting that use of long-acting reversible contraception (LARC) may be culturally unacceptable as spacing methods and more appropriate once desired number of children has been achieved. Continued research within Kenya and similar LMIC contexts should aim to examine forced removal of LARCs and potential impact on subsequent reproductive and sexual health outcomes, particularly given that IDI data suggested women were pressured against use of longer-acting methods, though these methods were not “forcibly” removed. While global priorities encourage uptake of longer-acting methods,²⁵ partner approval and interference continue to serve as a barrier to use and must be understood in order to increase women’s autonomy in reproductive decision-making.

Qualitative data, across aims of this dissertation research, revealed important contextual considerations that could be applied during future quantitative data collection. Particularly, it is recommended that men's pregnancy intentions are assessed in quantitative work with women, as well as explored further in qualitative research among men and boys. Relationship quality and gender and power roles within the partner dyad, as well as concurrent sexual partners and fear of external partnerships, remain crucial pieces in disentangling pregnancy intentions, contraceptive use dynamics, and motivations for RC. As suggested by previous studies, community norms surrounding men's roles and household decision-making are crucial drivers of IPV;¹³ similarly, RC research must involve men to understand their motivations for RC perpetration. While many of the qualitative themes described control over decision-making and the need to assert dominance in sexual relationships, others, including fear of contraceptive side effects and partner's desire for children, were not always maliciously motivated; these contributors should be further disentangled to understand intention behind RC. Further, while many studies highlight the role of partner disapproval in contraceptive discontinuation,²⁶⁻²⁸ few studies have aimed to understand men's perceptions of family planning, focusing instead on women's hindrances. In order to understand contraceptive use dynamics and maximize women's reproductive preferences, men's perspectives on contraception and reasons for RC perpetration must be addressed by future research.

One finding that could not be examined using quantitative measures, but was commonly discussed throughout IDIs, concerned partner disapproval of specific methods or sole approval of the Standard Days Method. Specifically, participants highlighted immense partner disapproval of hormonal contraceptive methods and felt that the need to use contraception covertly in order to maximize method effectiveness. Male disapproval of hormonal methods has been reported in other East African contexts, including Uganda²⁹ and western Kenya,³⁰ where men have relayed specific concerns regarding the side effects of these methods. Standard covert use and contraceptive

decision-making measures do not examine use of *specific* methods, but rather ask more generally about partner approval of contraception and knowledge of any contraceptive use.¹⁷ Future research could be enhanced through more comprehensive covert use items to specify partner knowledge of current and recent methods, as well as approval and disapproval of specific types of contraception.

Lastly, findings add to a limited literature base surrounding RC for IPV survivors in LMICs. While previous literature indicates the increased risk of RC for women concurrently experiencing IPV,^{3,6,7,31,32} limited research has focused exclusively on this population; none of these studies have examined RC for IPV survivors in LMICs. Through analysis of correlates and contributors, this dissertation research can help researchers understand who is most vulnerable to RC, particularly for women already experiencing severe, and often recurring, violence. Further, this dissertation research adds to the dearth of data on the sexual and reproductive health safety strategies for RC in LMICs. Exploration of safety strategies used in light of RC experience is pivotal for future intervention work to increase sexual safety and reproductive autonomy in LMIC settings overall, and particularly for women experiencing IPV.

7.4 Practice and Policy Implications.

Results hold several practice and policy implications, both for IPV survivors within Kenya and more broadly for IPV survivors experiencing RC within LMICs. Foremost, examination of RC within a sample of women experiencing IPV affords a better understanding of the full range of violence that women in this setting are facing. Results highlight not only the types of violence that women are experiencing, but also the severity of abuse. In order to meet global family planning goals, providers must be aware of coercive partner behaviors that prohibit uptake and continuation.

To date, there is a dearth of violence referral and response services within Nairobi's informal settlements, with little integration between sexual and reproductive health and violence services. These findings can inform and shape IPV and RC screening for both CHVs and the limited violence-related formal services that exist within this setting. Specifically, given the pervasiveness of RC for IPV survivors in Nairobi's informal settlements, health care providers should be alert to partner interference when providing contraceptive services to ensure that contraceptive provision and counseling occurs in a safe, private environment. Providers should provide contraceptive counseling that maximizes women's contraceptive preferences and past experiences to ensure women can select methods that are not only suitable for their bodies, but will also not put them at greater risk of harm. Qualitative data indicated that contraceptive methods that have traditionally been used covertly, namely the injectable and the implant, can still be challenging for women to conceal use; contraceptive counseling must consider these experiences for method selection. Integration of IPV support services within family planning and healthcare clinics could help increase access to safe, supportive services for women concurrently experiencing IPV and RC.

Results surrounding RC correlates and contributors can further help family planning and violence services providers understand who is most at risk for RC experience. Dissemination of results to violence and family planning service providers could increase understanding of contextual factors that may put women at risk of RC, namely the presence of other partnerships and poor couple communication. While ultimately responsibility for violence lies with the perpetrator, early recognition of signs that could make women susceptible for RC may serve as an important step towards preventing RC or mitigating further harm.

Further, these dissertation research results highlight a number of perceived barriers to accessing contraception. Standard screening questions may not capture women's full experiences, including perceived barriers of inconvenient use and cost—healthcare providers are urged to consider

women's circumstances and preferences to prescribe the most appropriate contraceptive methods to suit women's situations. Community-level barriers, including myths and misperceptions surrounding contraception may also limit women's uptake and continuation of methods, particularly if the partner is fearful of use. Increased reproductive health education to dispel contraceptive myths must be implemented in tandem with violence prevention and response services. Positive community norms surrounding fertility and contraception, as well as promotion of healthy relationships, positive gender roles, and stigmatization of violence, can ultimately increase couple communication and relationship quality, while enhancing women's health and well-being.

Moreover, understanding the links between types of RC and covert use can help set family planning policies and inform violence response. First, women seeking to use contraception covertly face immense difficulty in doing so and warrant provider support in both initial uptake and continuation of method use. Many women discussed side effects of contraception, including menstrual abnormalities and cramping, eventually leading to disclosure of covert use. When prescribing contraceptive methods, providers must understand women's needs to conceal use and potential repercussions if partners learn of use; severity of these repercussions is particularly salient for women concurrently experiencing IPV, as disclosure may exacerbate abuse. Contraceptive counseling must align with women's priorities—providers must weigh extent of partner influence, severity of potential repercussions, medical history, and pregnancy intentions to evaluate the best contraceptive methods to suit women's lives and situations.

7.5 Conclusions.

These dissertation research results report the severity and complexity of RC for women experiencing violence in Nairobi's informal settlements. Violence and family planning providers

must be aware that this type of violence is not only prevalent for IPV survivors, but should also recognize behaviors and contributors. Further use of reproductive safety strategies, namely covert use of contraception, may help maximize women’s reproductive preferences in light of RC experience. Future work aims to understand contraceptive beliefs and misconceptions among men and boys to ultimately address positive norms change surrounding healthy relationships and balancing couple fertility goals. All results will be shared with in-country stakeholders, inclusive of local NGOs, health clinics, and CHVs, to increase recognition of the violence that is curtailing reproductive autonomy for IPV survivors in Nairobi’s informal settlements.

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31. Park J, Nordstrom SK, Weber KM, Irwin T. Reproductive coercion: Uncloaking an imbalance of social power. *Am J Obstet Gynecol.* 2016;214(1):74-78.
32. Miller E, Decker MR, Mccauley HL, et al. A family planning clinic partner violence intervention to reduce risk associated with reproductive coercion. *Contraception.* 2011;83(3):274-280. doi:10.1016/j.contraception.2010.07.013

Curriculum Vitae

Shannon N. Wood, M.Sc.

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EDUCATION

- Doctor of Philosophy in Population, Family, and Reproductive Health** Apr 2020
Johns Hopkins Bloomberg School of Public Health, Maryland, USA
- Master of Science in Reproductive and Sexual Health Research** Sep 2012
London School of Hygiene and Tropical Medicine, London, UK
- Bachelor of Arts with Honors in Medical Humanities** May 2011
Baylor University, Texas, USA
-

PROFESSIONAL EXPERIENCE

- Graduate Student Researcher PMA Ethiopia** Nov 2018-present
Performance Monitoring for Action, Maryland, USA
Principal Investigators: Dr. Linnea Zimmerman
- Graduate Student Researcher Women and Girls Empowerment Module** Mar 2017-present
Performance Monitoring and Accountability 2020, Maryland, USA
Principal Investigators: Dr. Amy Tsui and Dr. Caroline Moreau
- Graduate Student Researcher myPlan Adaptation Nairobi** Oct 2016-present
Johns Hopkins Bloomberg School of Public Health, Maryland, USA
Principal Investigator: Dr. Michele Decker
- Graduate Student Researcher PMA** Aug 2015-present
Performance Monitoring for Action, Maryland, USA
Principal Investigator: Dr. Scott Radloff
- Graduate Student Researcher Malawi IMPower Evaluation Study** Feb 2016-Mar 2017
Johns Hopkins Bloomberg School of Public Health, Maryland, USA
Principal Investigator: Dr. Michele Decker
- Graduate Student Researcher HIV/Intimate Partner Violence Study** Oct 2015 – Apr 2016
Johns Hopkins Bloomberg School of Public Health, Maryland, USA
Principal Investigator: Dr. Michele Decker
- Epidemiologic Research Analyst/ Biostatistician** Apr 2013 - Jun 2015
National Cancer Institute, National Institutes of Health, Maryland, USA
Principal Investigators: Drs. Louise Brinton, Nicolas Wentzensen, Michael Cook
- Reproductive Health Consultant** May 2010 - Aug 2015
Bethlehem Home Community-Based Organization, Nyando District, Kenya
Principal Investigator: Dr. Lisa Baker

AWARDS

Endowed Fellowship in Family Planning, Johns Hopkins School of Public Health	May 2019
Dr. Michael Koenig Memorial Fund, Johns Hopkins School of Public Health	May 2018
Endowed Fellowship in Family Planning, Johns Hopkins School of Public Health	May 2017
Distinguished Achievement Award, Kelly Government Solutions	Jan 2015
Honors College Travel Award, Baylor University	May 2011
Dean's List, Baylor University	May 2011
Dean's List, Baylor University	Dec 2010

PRESENTATIONS

Invited Presentations

1. *Reproductive Health and Gender-Based Violence: Mechanisms, Measurement, and Interventions*. Sexual Assault Resource Unit Event, Johns Hopkins University, Baltimore, USA; Apr 2019.
2. *PMA2020 Women's and Girls' Sexual and Reproductive Health Empowerment (WGE) Module Final Results*. PMA2020 WGE Cross-Site Summary Session, Kigali, Rwanda; Nov 2018.
3. *Community Partnered Technology for Partner Violence Prevention and Response*. Stakeholder Dissemination Event, Nairobi, Kenya; Nov 2018.
4. *PMA2020 Women's and Girls' Sexual and Reproductive Health Empowerment Module Qualitative Results and Next Steps*. Department of Population, Family, and Reproductive Health Noon Seminar, Johns Hopkins Bloomberg School of Public Health, Baltimore, USA; Apr 2018.
5. *Violence, Safety, and Health Among Urban Women in Nairobi*. Gender-Based Violence Course, Johns Hopkins Bloomberg School of Public Health, Baltimore, USA; Mar 2018.
6. *PMA2020 Women's and Girls' Empowerment (WGE) Module Qualitative Cross-Site Results*. PMA2020 WGE Workshop and Summary Session, Cape Town, South Africa; Oct 2017.

Conference Presentations (Oral)

1. *Reproductive Coercion Among Intimate Partner Violence Survivors in Nairobi, Kenya: Prevalence, Severity, and Recommendations for Safety Augmentation*. National Conference on Health and Domestic Violence, Chicago, USA; Apr 2020 (accepted).
2. *Understanding the Role of Partner Support and Knowledge of Method Use in Adoption and Discontinuation of Female-Controlled Reversible Contraception in a National Cohort of Ugandan Women*. Population Association of America Annual Meeting, Washington, DC, USA; Apr 2020 (accepted).
3. *Effects of Modern Contraception on Women's Sexual Experience in Low- and Middle-Income Countries: A Systematic Scoping Review*. Population Association of America Annual Meeting, Washington, DC, USA; Apr 2020 (accepted).
4. *Women's Dilemmas Regarding Family Planning Decisions: Results from a Three-Country Qualitative Study*. International Conference on Family Planning, Kigali, Rwanda; Nov 2018.
5. *Sexual Violence Prevention Through Empowerment Self-Defense: A Cluster-Randomized Implementation Trial with Adolescent Women in Malawi*. 5th Annual Sexual Violence Research Initiative Forum, Rio de Janeiro, Brazil; Sep 2017.

6. *Chinamwali as a Rite of Passage and Associations with Forced Sex Victimization Amongst Primary and Secondary School Girls in Malawi*. Safety and Violence Initiative: International Conference on Violence Prevention, Cape Town, South Africa; Sep 2016.
7. *The Association Between Witnessing Intimate Partner Violence and Later Experience of Physical And Sexual Intimate Partner Violence in Kampala, Uganda*; Sexual Violence Research Initiative Forum, Bangkok, Thailand; Oct 2013.

Conference Presentations (Poster)

1. "He tells you your work is to give birth." *Reproductive coercion among informal settlements in Nairobi, Kenya*. International Conference on Family Planning, Kigali, Rwanda; Nov 2018.
2. *The exploration of sexual health outcomes across four settings through the application of a Women's and Girls' Sexual and Reproductive Health Empowerment Framework*. International Conference of Family Planning, Kigali, Rwanda; Nov 2018.
3. *Exploring women's reproductive empowerment in sub-Saharan Africa: A multi-country qualitative study to inform quantitative survey development*. Population Association of America Annual Meeting, Denver, USA; Apr 2018.
4. *Assessing female sexual and reproductive health empowerment in Uganda and Ethiopia: Developing an assessment score*. Population Association of America Annual Meeting, Denver, USA; Apr 2018.
5. *Chinamwali as a Rite of Passage and Associations with Forced Sex Victimization Amongst Primary and Secondary School Girls in Malawi*. 5th National Conference on Health and Domestic Violence, San Francisco, California, USA; Sep 2017.
6. *Sexual Violence Prevention through Empowerment Self-Defense: A Cluster-Randomized Implementation Trial with Adolescent Women in Malawi*. 5th National Conference on Health and Domestic Violence, San Francisco, California, USA; Sep 2017.
7. *Reproductive Health and Contraceptive Use in Rural Kenya*; Yale Global Health and Innovation Conference, New Haven, Connecticut, USA; Apr 2012.
8. *Reproductive Health and Contraceptive Use in Rural Kenya*; Royal Medical Society of Edinburgh, Edinburgh, United Kingdom (best in International Health); Mar 2012.

BIBLIOGRAPHY

Peer Reviewed Publications

1. **Wood SN**, Kennedy SR, Hameeduddin Z, Asira B, Tallam C, Akumu I, Glass N, Decker MR. "Being married doesn't mean you have to reach the end of the world:" Safety planning experiences from intimate partner violence survivors and providers in three urban informal settlements in Nairobi, Kenya. *J Interpers Violence*. 2019 Oct 5.
2. **Wood SN**, Glass N, Decker MR. An integrative review of safety strategies for women experiencing intimate partner violence in low- and middle-income countries. *Trauma, Violence, and Abuse*. 2019 Jan 22:1524838018823270.
3. Decker MR, **Wood SN**, Ndinda E, Yenokyan G, Sinclair J, Naksud N, Ross B, Omondi B, Ndirangu M. Sexual violence prevention for adolescent women in Malawi: A cluster-randomized controlled trial of empowerment self-defense training. *BMC Public Health*. 2018 Dec 4; 18 (1):1341.
4. Petrick JL, Falk RT, Hyland PL, Caron P, Pfeiffer RM, **Wood SN**, Dawsey SM, Abnet CC, Taylor PR, Guillemette C, Murray LJ, Anderson LA, Cook MB. Circulating levels of sex steroid hormones and esophageal adenocarcinoma in the FINBAR Study. *PLoS One*. 2018 Jan 17; 13 (1): e0190325.
5. Cook MB, Stanczyk FZ, **Wood SN**, Pfeiffer RM, Hafi M, Veneroso CC, Lynch B, Falk RT, Zhou CK, Niwa S, Emanuel E, Gao YT, Hemstreet GP, Zolfghari L, Carroll PR, Manyak MJ, Sesterhenn IA, Levine PH, Hsing AW. Relationships between circulating and intraprostatic

- sex steroid hormone concentrations. *Cancer Epidemiol Biomarkers Prev.* 2017 Aug 22. pii: cebp.0215.2017. doi: 10.1158/1055-9965.EPI-17-0215
6. Cook MB, **Wood S**, Hyland PL, Caron P, Drahos J, Falk RT, Pfeiffer RM, Dawsey SM, Abnet CC, Taylor PR, Guillemette C, Murray LJ, Anderson LA. Sex steroid hormones in relation to Barrett's esophagus: an analysis of the FINBAR study. *Andrology.* 2017 Mar;5(2):240-247.
 7. Cook MB, Drahos J, **Wood S**, Enewold L, Parsons R, Freedman ND, Taylor PR, Ricker W, Abnet CC. Pathogenesis and progression of oesophageal adenocarcinoma varies by prior diagnosis of Barrett's oesophagus *Br J Cancer.* 2016 Nov 22;115(11):1383-1390.
 8. Wentzensen N, Fetterman B, Castle PE, Schiffman M, **Wood SN**, et al. Response. *Journal of the National Cancer Institute.* 2015 Dec 27; 108(2): djv390.
 9. Wentzensen N, Fetterman B, Castle PE, Schiffman M, **Wood SN**, et al. p16/Ki-67 dual stain cytology for detection of cervical precancer in HPV-positive women. *Journal of the National Cancer Institute.* 2015 Sep 15; 107(12): djv257.
 10. Brinton LA, Key TJ, Kolonel LN, Michels KB, Sesso, HD, Ursin G, Van Den Eeden SK, **Wood SN**, et al. Sex Steroid Hormones in Relation to Male Breast Cancer Risk. *Journal of Clinical Oncology.* 2015 Jun 20; 33(18):2041-50.
 11. Cook MB, **Wood SN**, et al. An analysis of circulating sex steroid hormones in relation to Barrett's esophagus. *Clinical Gastroenterology and Hepatology.* 2015 Apr; 13(4):673-82.
 12. Wentzensen N, Fetterman B, Tokugawa D, Schiffman M, Castle P, **Wood SN**, et al. Interobserver reproducibility and accuracy of p16/Ki-67 dual stain cytology in cervical cancer screening. *Cancer Cytopathology.* 2014 Dec; 122(12):914-20.
 13. Brinton LA, Figueroa JD, Awuah B, Yarney J, Addai S, **Wood SN**, et al. Breast Cancer in Sub-Saharan Africa: Opportunities for Prevention. *Breast Cancer Research and Treatment.* 2014 Apr; 144(3):467-78.

Other Publications

1. Battle N, Kibira S, Makumbi F, Sarnak D, Tsui A, **Wood SN**, Zimmerman L. Final Report. PMA Plus: Utilizing panel studies to better understand contraceptive dynamics. March, 2020. Baltimore, USA and Kampala, Uganda.
2. Decker MR, **Wood SN**, et al. Final Report. Empowerment Transformation Training: Baseline Survey Results and Feasibility of Tablet-Based Data Collection in Urban Nairobi and Rural Kajiado. September, 2019. Baltimore, USA and Nairobi, Kenya.
3. Decker MR, **Wood SN**, Hameeduddin Z, Asira B, Kennedy R, Frankel A, Omondi B, Tallam C, Akumu I, Wanjiru, I, Glass N. Research & Policy Brief. Community partnered technology for partner violence prevention and response: myPlan adaptation and preliminary results. November, 2018. Baltimore, USA and Nairobi, Kenya.
4. Moreau C, Karp C, **Wood SN**, Desta S, Galadanci H, Kibira SPS, Makumbi F, Omoluabi E, Shiferaw S, Seme AD, Jiang S, Xue Q, Tsui AO. Technical Report. Women's and Girls' Empowerment in Sexual and Reproductive Health Index Construction. November, 2018. Johns Hopkins University, Bayero University Kano, Center for Addis Ababa University, Makerere University College of Health Sciences, Centre for Research Evaluation Resources and Development. Ethiopia, Uganda, Nigeria, and Baltimore, USA.
5. Frankel A, Kanja W, **Wood SN**, Hameeduddin Z, Decker MR. Research & Policy Brief. The Wangu Kanja Foundation Data Review. July, 2018. Johns Hopkins University, The Wangu Kanja Foundation, Action Aid. Baltimore, MD, USA & Nairobi, Kenya
6. Decker MR, **Wood SN**, Ndinda E, Yenokyan G, Sinclair J, Naksud N, Ross B, Omondi B, Ndirangu M. Research Brief: Sexual violence prevention for adolescent women in Malawi:

- A cluster-randomized controlled trial of empowerment self-defense training. Baltimore, Maryland, USA: Johns Hopkins University Bloomberg School of Public Health.
- Zimmerman, L., Shiferaw, S., Seme, A., Yihdego, M., Desta, S., Shankar, M., **Wood, S.**, Ahmed, S. (2018) Final Report: Performance Monitoring and Accountability 2020 – Maternal and Newborn Health in Southern Nations, Nationalities and Peoples’ region (SNNPR) – Ethiopia. Baltimore, Maryland, USA: Bill & Melinda Gates Institute for Population and Reproductive Health, Johns Hopkins University Bloomberg School of Public Health.

Manuscripts Accepted/In Press

- Wood SN***, Karp C*, Tsui AO, Kibira SPS, Desta S, Galadanci H, Makumbi F, Omoluabi E, Shiferaw S, Seme AD, Moreau C. A sexual and reproductive empowerment framework to explore volitional sex in sub-Saharan Africa (*accepted at Culture, Health and Sexuality*.)
- Decker MR, **Wood SN**, Hameeduddin Z, Kennedy SR, Perrin N, Tallam C, Akumu I, Wanjiru I, Asira B, Frankel A, Omondi B, Case J, Clough A, Otieno R, Mwititi M, Glass N. Using a safety decision-making and planning mobile app for intimate partner violence prevention and response: randomised controlled trial in Kenya (*accepted at BMJ Global Health*).

Manuscripts Under Review

- Moreau C, Karp C, **Wood SN**, Galadanci H, Kibira SPS, Makumbi F, Omoluabi E, Shiferaw S, Seme AD, Tsui AO. Reconceptualizing empowerment for women’s and girls’ sexual and reproductive health (SRH): A cross-cultural index for measurement, monitoring, and progress toward improved SRH (*under review at International Perspectives on Sexual and Reproductive Health*).
- Decker MR, **Wood SN**, Kennedy SR, Hameeduddin Z, Asira B, Tallam C, Akumu I, Omondi M, Otieno R, Mwititi M, Case J, Clough A, Glass N. Adapting the myPlan safety app to respond to intimate partner violence for women in low and middle income country settings: app tailoring and randomized control trial protocol (*under review at BMC Public Health*).
- Karp C*, **Wood SN***, Tsui AO, Kibira SPS, Desta S, Galadanci H, Makumbi F, Omoluabi E, Shiferaw S, Seme AD, Moreau C. “I am the master key that opens and locks”: Presentation and application of a conceptual framework for women’s and girls’ empowerment in reproductive health (*under review at Social Science and Medicine*).
- Yirgu R, **Wood SN**, Karp C, Tsui AO, Moreau C. “You better use the safer one...leave this one”: The role of health providers in women’s pursuit of their preferred family planning methods: Findings from a qualitative study in Ethiopia (*under review at BMC Women’s Health*).
- Wood SN**, Karp C, Zimmerman L. Effects of modern contraception on women’s sexual experiences in low- and middle-income countries: A systematic scoping review (*under review at Sexual and Reproductive Health Matters*).
- Kibira SPS, Karp K, **Wood SN**, Desta S, Galadanci H, Makumbi FE, Omouabli E, Shiferaw S, Seme A, Tsui AO, Moreau C. Covert use of family planning among women in sub-Saharan Africa: Reasons, challenges and consequences (*under review at BMC Public Health*).

*indicates equal contribution

TEACHING AND MENTORSHIP

Teaching Assistantships

Health Survey Research Methods (JHSPH)	Oct 2016-Dec 2017
Gender Based Violence (JHSPH)	Jan 2018-Mar 2018
Sexually Transmitted Infections in Public Health Practice (JHSPH)	Mar 2016- May 2019
Honors Thesis Seminar (JHU undergraduate)	Oct 2018-May 2020

Mentorship

- Stephanie Allen (Baylor University Honors Program thesis) Aug 2007- May 2008
- Simar Singh (Baylor University Honors Program thesis) Aug 2007- May 2008
- S. Rachel Kennedy (JHSPH MPH Capstone/ Field Research) Jun 2017- Dec 2018
- Erica Mills (JHSPH MPH Capstone) Jan 2018- May 2018
- Ariel Frankel (MSPH Thesis and Global Health Field Research) Jun 2018- May 2019
- Vaiddehi Bansal (Research Assistantship) Jun 2018-Dec 2018
- Liyana Ido (Research Assistantship and MSPH Thesis) Jul 2018-Dec 2018
- Robel Yirgu (Visiting Scholar) Jan-Mar 2019
- Claire Silberg (Global Health Field Research) May 2019-Nov 2019
- Karina Rahaman (JHSPH MSPH Thesis) Nov 2019-present

CAPACITY BUILDING

Trainings Conducted

- Reproductive Health (Nyakatch, Kenya) Jul 2015
- Quantitative Data Collection and Data Quality (Lilongwe, Malawi) May 2016
- Maternal and Neonatal Health Study Procedures (Addis Ababa, Ethiopia) Jul 2016
- Qualitative Data Collection and Methods (Nairobi, Kenya) May 2017
- Qualitative Data Collection and Methods (Kampala, Uganda) Jul 2017
- Qualitative Data Collection, Methods, and Analysis (Addis Ababa Ethiopia) Aug 2017
- Cognitive Interview Methods (Nairobi, Kenya) Dec 2017
- Randomized Control Trial Methods and Ethics (Nairobi, Kenya) Jan 2018
- Data Collection and Empowerment Study Procedures (Kampala, Uganda) Feb 2018
- Randomized Control Trial Data Monitoring (Nairobi, Kenya) May 2018
- Applied Ethics for Gender-Based Violence Research (Nairobi, Kenya) May 2019
- Family Planning, Maternal, and Newborn Health (Addis Ababa, Ethiopia) Aug 2019

PROFESSIONAL DEVELOPMENT

Professional Memberships

- Population Association of America

Peer Reviewer

- PLoS ONE
 - BMC Women's Health
-