The Impact of a Combined Intimate Partner Violence and HIV Prevention Intervention on Recent Abuse, Sexual Risk Behaviors and HIV Incidence in Rakai, Uganda

by
Jennifer Ann Wagman

A dissertation submitted to the Johns Hopkins University in conformity with the requirements for the degree of Doctor of Philosophy

Baltimore, MD
November 2013

© 2013 Jennifer Ann Wagman
All rights reserved
ABSTRACT

Background: Intimate partner violence (IPV) is a precursor to and consequence of HIV infection. Few interventions combining HIV and IPV prevention have been evaluated and none has significantly decreased both outcomes.

Design: A cluster-randomized trial was conducted in Rakai, Uganda. Intervention arm clusters (n=4) received an IPV prevention intervention (the Safe Homes and Respect for Everyone (SHARE) Project), enhanced HIV testing and treatment and routine HIV services. Control arm clusters (n=7) received standard of care HIV services alone.

Methods: Baseline and two follow-up visits were conducted via the Rakai Community Cohort Study between 2005 and 2009. Primary outcomes were past year emotional, physical and sexual IPV and HIV incidence. Analysis was by intention-to-treat. Modified Poisson regression was used to estimate prevalence risk ratios (PRR) to detect the impact of the intervention on IPV and secondary outcomes. Poisson regression was used to estimate incidence rate ratios (IRR) of HIV acquisition per 100 PY.

Results: Among women, SHARE was associated with reduced physical IPV (aPRR=0.80; 95% CI: 0.68-0.93), sexual IPV (aPRR= 0.82; 95% CI: 0.69-0.99), emotional IPV (aPRR= 0.90; 95% CI: 0.79-1.03), and rape (aPRR=0.80; 95% CI: 0.66-0.97). SHARE did not significantly reduce reported perpetration of any type of IPV by men. There was a marginal reduction in women’s reports of multiple sex partners in the past year (aPRR=0.98; 95% CI: 0.97-1.00). The intervention did not reduce the number
of sex/non-marital partners, alcohol use surrounding sex, condom use, or discussion about using condoms. Disclosure of HIV results was associated with reduced HIV acquisition, particularly among women but these estimates were not statistically significant. The intervention was associated with a reduction of HIV incidence in the total population (aIRR=0.64; 95% CI: 0.43-0.95, P=0.028).

**Conclusion**: SHARE reduced IPV among women and HIV incidence in the population. While we cannot conclusively explain the differential in HIV incidence found between the study arms, our analysis suggests SHARE’s greatest impact on HIV risk behaviors was the reduction of women’s experiences of forced sex and improvements rates of HIV results disclosure. The SHARE intervention model could inform programs in the prevention of IPV and HIV.

**Faculty Advisors**: Ronald H. Gray, MBBS, MSc and Heena Brahmbhatt, MPH, PhD
COMMITTEE OF THESIS READERS

Ronald H. Gray, MBBS, MSc
Professor and Thesis Advisor
Departments of Epidemiology and Population, Family and Reproductive Health
Johns Hopkins Bloomberg School of Public Health

Heena Brahmbhatt, MPH, PhD
Assistant Professor and Co-Advisor
Department of Population, Family and Reproductive Health
Johns Hopkins Bloomberg School of Public Health

David D. Celentano, MHS, ScD
Professor and Charles Armstrong Chair
Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health

Jacquelyn Campbell, PhD, RN, FAAN
Professor and Anna D. Wolf Chair
Department of Community-Public Health
Johns Hopkins University School of Nursing

Alternate Committee Members

Deanna L. Kerrigan, MPH, PhD
Associate Professor
Department of Health, Behavior and Society
Johns Hopkins Bloomberg School of Public Health

Michele R. Decker, MPH, ScD
Assistant Professor
Department of Population, Family and Reproductive Health
Johns Hopkins Bloomberg School of Public Health
ACKNOWLEDGMENTS

I express my most sincere gratitude to my mentors, friends and family for their guidance and support during the entire doctoral degree process. In particular, I thank Dr. Gray for his continued mentorship and guidance. The lessons I have learned from you, both academically and personally, are immeasurable. I am profoundly grateful to Dr. Brahmbhatt for her friendship and support and for serving as an ideal role model to me. You have helped me grow into an independent researcher and it is with pleasure that I look forward to collaborating with you for many years to come. Dr. Campbell, there are not words enough to express my admiration for you and your work and your intelligent and passionate contribution to the fields of violence prevention and women’s health. You have inspired me in more ways that you will ever know and I am honored to be your colleague and friend. I am also extremely thankful to Dr. Celentano for being the Chair of my committee and for providing irreplaceable insights into the design and importance of my work.

Dr. Marie Thoma, to you I express my utmost thanks for your statistical brilliance and for assuring me that I could complete this degree. Mostly, I thank you for your friendship. I would like to thank Ms. Fredinah Namatovu, Mr. Anthony Ndyanabo and Dr. Xiangrong Kong for offering significant input and guidance on specific chapters of this thesis. I also thank all of the researchers and staff members at the Rakai Health Sciences Program. Without you, this dissertation would not exist.
I am grateful for the kindness, patience, help with childcare, and many dinner invitations provided to me by my fantastic friends, Suzzanne Decker, Karin Tobin, Virginia Herring, Ann Christie. I love you all.

Finally, words are not sufficient to describe the gratitude I have for my parents, Robin Kingsley and William Wagman. You have both provided me with constant love and support over these past five years. You represent the lifecourse importance of family! On that note, my most heartfelt and deep expression of thanks goes to my son, Milo. You have been my light on the darkest days and have taught me the true meaning of patience, understanding, kindness and true love. To you I dedicate this dissertation.

**FUNDING SUPPORT**

This work was supported by an Interdisciplinary Violence Research Training Fellowship grant from the National Institute of Mental Health [T32 MH020014] awarded to Jacquelyn Campbell; a Ruth L. Kirschstein National Research Service Award from the National Institute of Mental Health [1F31MH095649-01A1]; scholarship funds from the Maryland Higher Education Commission; awards from the Department of Population, Family and Reproductive Health (Endowed Fellowship in Family Planning and Reproductive Health, Dr. Michael Koenig Memorial Fund); and an award from the Johns Hopkins Bloomberg School of Public Health (Endowed Student Support Fund for Injury Control Research).
# TABLE OF CONTENTS

ABSTRACT ........................................................................................................................ ii

COMMITTEE OF THESIS READERS ................................................................................ iv

ACKNOWLEDGMENTS ....................................................................................................... v

FUNDING SUPPORT ....................................................................................................... vi

TABLE OF CONTENTS ...................................................................................................... vii

LIST OF FIGURES ........................................................................................................... ix

LIST OF TABLES ............................................................................................................ x

CHAPTER 1. INTRODUCTION ........................................................................................ 1
  Background ....................................................................................................................... 2
  Conceptual model .......................................................................................................... 3
  Research aims ............................................................................................................... 7
  Study description ......................................................................................................... 8
  Organization of the thesis ............................................................................................ 13
  References .................................................................................................................... 14

CHAPTER 2. INTERVENTION DESCRIPTION .................................................................... 24

COMBINED INTIMATE PARTNER VIOLENCE AND HIV/AIDS PREVENTION IN RURAL AFRICA: DESIGN OF AN INTERVENTION STRATEGY, RAKAI, UGANDA
  Abstract ......................................................................................................................... 25
  Introduction ................................................................................................................... 26
  Pre-intervention IPV and HIV services in Rakai .......................................................... 30
  Intervention design ..................................................................................................... 31
  Monitoring and evaluation ........................................................................................... 39
  Lessons learned and recommendations ...................................................................... 40
  References .................................................................................................................... 45

CHAPTER 3. METHODS ................................................................................................... 63

METHODS FOR “IMPACT OF COMBINED INTIMATE PARTNER VIOLENCE AND HIV PREVENTION INTERVENTION ON RECENT EMOTIONAL, PHYSICAL AND SEXUAL ABUSE AND HIV INCIDENCE IN RAKAI, UGANDA: A CLUSTER RANDOMIZED TRIAL” (CHAPTER 4)
  Research team and data source .................................................................................. 64
  Study sample ................................................................................................................. 65
  Study procedures ......................................................................................................... 66
  Data analysis ................................................................................................................ 67
  Ethical considerations .................................................................................................. 72
LIST OF FIGURES

Figure 1.1. Conceptual Model:  Pathways from IPV to/from HIV Infection ....................22
Figure 1.2. Ecological Life Course Perspective of IPV and HIV in Rakai, Uganda ............23
Figure 2.1. A Public Health Approach to Preventing HIV and IPV in Rakai ...................56
Figure 2.2. Logic model for RHSP/SHARE intervention to reduce HIV and IPV ..........57
Figure 4.1. Allocation of Family Planning Trial and HIV/IPV Prevention Trial Communities in Rakai......................................................................................................111
Figure 4.2. Exposure in the control and intervention arms..............................................112
Figure 4.3. Timeline for research and intervention for each RCCS cluster in trial ........113
Figure 4.4. Trial population by study arm and sex of participants ..................................114
Figure 5.1. Conceptual Model:  Pathways from IPV to/from HIV Infection .................148
LIST OF TABLES

Table 2.1. Determinants of HIV and IPV in Rakai, Uganda .............................................56
Table 2.2. Intended outcomes and impact of RHSP/SHARE intervention to reduce HIV and IPV in Rakai ................................................................................................................57
Table 2.3. The activities, target population & intended outcome of each SHARE IPV prevention strategy .............................................................................................................58
Table 2.4. Activities that built VCT counselors’ capacity to recognize and understand IPV in Rakai.......................................................................................................................59
Table 2.5. HIV safe disclosure assessment tool and process .........................................60
Table 2.6. Risk reduction tool and process ........................................................................61
Table 2.7. Recommendations for future HIV/IPV prevention ...........................................62
Table 4.1. Survey questions used to measure IPV outcomes ..........................................115
Table 4.2. Social, demographic and relationship characteristics of the two study arms at baseline ............................................................................................................................116
Table 4.3. HIV prevalence and incidence of the two study arms at baseline .................118
Table 4.4. Reports of past year condom use and men's circumcision status at baseline and follow-up visits ................................................................................................................119
Table 4.5. IPV outcomes at follow-ups 1 and 2 in women according to trial arm ..........121
Table 4.6. IPV outcomes at follow-ups 1 and 2 in men according to trial arm ...............122
Table 4.7. Incidence of HIV by study arm.......................................................................123
Table 5.1. Survey questions used to measure risky sex practice outcomes .....................149
Table 5.2. Social and demographic characteristics of the two study arms at baseline ....150
Table 5.3. Sexual risk behavior characteristics of the two study arms at baseline ..........152
Table 5.4. Impact of intervention on risk behaviors among women ...............................154
Table 5.5. Impact of intervention on risk behaviors among men .................................156
Table 5.6. Incidence of HIV by self-disclosure of HIV results to primary partner .......158
Table 5.7. Incidence of HIV by primary partner’s disclosure of HIV results ...............159
LIST OF TABLES

Table 2.1. Characteristics and results of studies published 1990-2010 which assessed partner attributes in relation to STIs among adolescents ...................................................48

Table 4.1. Selected baseline characteristics among the sample of African-American females 15-21 years of age who completed at least one follow-up visit ..........................118

Table 4.2 Comparison of baseline characteristics among African-American females 15-21 years of age according to their report of sex in the prior 6 months with a male partner recently released from incarceration .................................................................119

Table 4.3. Unadjusted associations between having a sex partner who was recently released from incarceration and STIs, HIV/STI risk factors and IPV ........................................120

Table 4.4. Adjusted associations between having a sex partner who was recently released from incarceration and STIs, HIV/STI risk factors and IPV ...........................................122

Table 5.1. Selected sociodemographic and sexual risk characteristics among study participants ..............................................................................................................144

Table 5.2. The accuracy of respondents’ perceptions about sexual concurrency during the relationship ....................................................................................................145

Table 5.3. Unadjusted and adjusted associations between selected factors and inaccurate perceptions about sexual concurrency during the relationship .......................146
LIST OF FIGURES

Figure 1.1. Conceptual model: Adapted social-personal model ...............................................14

Figure 1.2. Aim 1 logic model for assessing STI risk associated with a sex partner recently released from incarceration among African-American adolescent females ........15

Figure 1.3. Aim 2 logic model for exploring factors related to inaccurate perceptions about partner’s concurrency status among pregnant adolescent couples.................................16

Figure 2.1. Study selection flow diagram. Associations between partner-level factors and STI risk among adolescents (1990-2010) .................................................................47
Chapter 1. Introduction
Background

Intimate partner violence (IPV)¹ and HIV disproportionately affect women (UNAIDS & WHO, 2009a; Garcia-Calleja, Gouws, & Ghys, 2006; Turmen 2003; Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002) and are associated with negative health, social and economic outcomes (UNAIDS & WHO, 2009a; Krug et al., 2002; Campbell 2002; Campbell & Soeken, 1999). Sub-Saharan Africa, the region most burdened by the global AIDS epidemic (UNAIDS & WHO, 2009a) has some of the world’s highest rates of IPV. The World Health Organization (WHO) reports between 18 and 59% of women in the region experienced some form of IPV in their lifetime (Garcia-Moreno, Jansen, Ellsberg, Heise, Watts, & WHO Multi-country Study Team, 2006). In 2008 sub-Saharan Africa accounted for 68% of all new adult HIV infections and 67% of all people living with HIV and most (60%) were women (UNAIDS & WHO, 2009a; Garcia-Calleja et al, 2006). HIV has devastated individuals and populations: life expectancy has declined in many sub-Saharan African countries and more than 14 million children are estimated to have lost one or both parents to HIV (UNAIDS & WHO, 2008). Likewise, IPV has adverse consequences, including physical injury and death, emotional and social problems, substance abuse, and reproductive and sexual morbidity (Krug et al., 2002; Campbell, 2002; Campbell & Soeken, 1999; Ellsberg, Jansen, Heise, Watts, & Garcia-Moreno, 1999).

¹Intimate partner violence (IPV) is defined by the CDC as a single episode or ongoing occurrence of violence or threats of violence between two people in a close relationship, including current and former spouses and dating partners. IPV includes four types of behavior: (1) Physical violence is when a person hurts or tries to hurt a partner by hitting, kicking, or other type of physical force; (2) Sexual violence is forcing a partner to take part in a sex act when the partner does not consent; (3) Threats of physical or sexual violence include the use of words, gestures, weapons, or other means to communicate the intent to cause harm; and (4) Emotional abuse is threatening a partner or his or her possessions or loved ones, or harming a partner’s sense of self-worth. Examples are stalking, name-calling, intimidation, or not letting a partner see friends and family. [Source: Centers for Disease Control and Prevention (CDC), Injury Prevention and Control: Violence Prevention. Understanding Intimate Partner Violence: Fact Sheet 2011. Last accessed on April 9, 2011 from: http://www.cdc.gov/violenceprevention/pdf/IPV_factsheet-a.pdf]
Violence and HIV do not, however, operate in isolation. Research suggests IPV is both a cause and consequence of HIV infection (Campbell, Baty, Ghandour, Stockman, Francisco, & Wagman, J, 2008; Maman, Campbell, Sweat, & Gielen, 2000).

**Conceptual Model**

Figure 1.1 provides a conceptual model to understand the interrelationship between IPV and HIV infection. Our framework borrows from and builds upon Jewkes and colleagues’ model illustrating the direct and indirect pathways through which IPV, gender and relationship power inequity might place women at risk of HIV (Page 42 of Jewkes, Dunkle, Nduna, & Shai, 2010).

Women who experience IPV are at increased risk for HIV infection and other sexually transmitted infections (STIs) (Campbell, 2002; Campbell & Soeken, 1999; Campbell et al., 2008; Maman et al., 2000; Garcia-Moreno & Watts, 2000; Fonck, Leye, Kidula, Ndinya-Achola, & Temmerman, 2005) and HIV-infected women are at heightened risk for abuse (Campbell et al., 2008; Maman, Mbwambo, Hogan, Kilonzo, Campbell, & Weiss, 2002). IPV is associated with increased HIV infection because male perpetrators of abuse are more likely to practice risky sex behaviors and to be HIV infected compared to non-abusive men (Dude, 2009; Decker et al., 2009; Dunkle et al., 2006). IPV potentially increases exposure to HIV through forced sex with an infected partner and by compromising a woman’s ability to negotiate safe sex (Campbell et al., 2008; Maman et al., 2000; Dunkle, Jewkes, Brown, Gray, McIntryre, & Harlow, 2004; Maman, Yamanis, Kouyoumdjian, Watt, & Mbwambo, 2009). Our model also reflects findings that HIV-infected women are at heightened risk for IPV when they request or undergo an HIV test.
and/or disclose their HIV positive results (Fonck et al., 2005; Maman et al., 2000; Maman et al., 2002). Finally, it demonstrates societal/structural factors (e.g. cultural norms and health, economic, education and social policies) and contextual determinants (e.g. patrilocality, unequal access to land, education and other resources between women and men) that may also increase risk for HIV and IPV (Krug & Dahlberg, 2002; Campbell, 1999; Koenig, Stephenson, Ahmed, Jejeebhoy, & Campbell, 2006a).

**IPV and HIV in Rakai, Uganda**

The study setting for this dissertation research was the Rakai District of southwest Uganda. National Ugandan estimates from 2006-07 suggested 48% of women experienced physical IPV (35% in past year) and 36% experienced sexual IPV (25% in the past year) (UBOS, 2007). HIV prevalence was estimated to be 6.4% and adult women were disproportionately affected (when compared to adult men) throughout the reproductive years (MOH, 2006). In Rakai, 24% of women experienced sexual and 30% physical IPV (Koenig et al., 2004a; Koenig et al., 2003) and 14% of adolescents 15-19 years reported forced first sex (Koenig et al., 2004b). When this trial began, HIV prevalence in Rakai was 16% in adult women, 12% in adult men (Wawer et al., 2005) and HIV incidence was 1.5/100 person-years (PY) among women vs. 1.4/100 PY among men (Zablotska et al., 2006).

To understand the risk and protective factors for HIV and IPV we used a life course perspective (Figure 1.2) to consider how timing and sequence of life-events, as well as contextual factors, potentially impacted the likelihood of both outcomes in Rakai,
Uganda. We then reviewed data collected between 2000 and 2004 to empirically establish risk and protective factors for HIV and IPV (at the individual, relationship, and societal levels) in the study setting.

**Combination IPV and HIV Prevention Efforts**

There is growing consensus that declines in HIV transmission cannot be achieved by one-dimensional approaches to prevention. Instead, evidence-based combination interventions that address the biomedical, behavioral and structural aspects of HIV-related vulnerability, such as programs focused on the linked epidemics of IPV and HIV, are needed, especially in sub-Saharan Africa (Piot, Bartos, Larson, Zewdie, & Mane, 2008; Pisani et al., 2003; UNAIDS, 2009b; Merson et al., 2008; Halperin, 2009).

Several combined approaches to prevent IPV and HIV have already been implemented in sub-Saharan Africa and four South Africa interventions were systematically evaluated. Three of the South African studies integrated violence prevention strategies into HIV prevention programs. The Intervention with Microfinance for AIDS and Gender Equity (IMAGE) study combined microfinance, gender/HIV training and community mobilization to reduce violence and STIs; a cluster randomized trial found IMAGE reduced self-reported IPV among clients but had no impact on sexual behaviors or HIV incidence (Pronyk et al., 2006). Furthermore, IMAGE was found to be an unsustainable option for violence and STI prevention in the study setting (Hargreaves et al., 2010). Stepping Stones, a participatory training program designed to prevent HIV and improve sexual health by challenging gender norms (Welbourn, 1995), was also evaluated through
a trial. The intervention reduced IPV and incidence of herpes simplex type 2 (HSV-2), but had no effect on HIV incidence or sexual risk behaviors in women (Jewkes et al., 2008). The third study assessed the impact of an integrated HIV and gender-based violence (GBV) intervention that was targeted at men and involved 5 violence and HIV risk-reduction sessions which promoted behavior change by challenging ideas about masculinity. A quasi-experimental evaluation showed no effect on HIV risk behaviors, but reductions in IPV and negative attitudes about women, and increased couple communication (Kalichman et al, 2009). A fourth intervention integrated HIV risk strategies into services for abused women. It reduced HIV misperceptions and trauma symptoms, increased HIV knowledge, risk reduction intentions, and condom use self-efficacy, but did not focus on reducing/preventing IPV or incident HIV (Sikkema et al., 2010).

Summary of Dissertation Research

The current dissertation research aimed to evaluate the impact of a combined behavioral intervention implemented in rural Uganda to reduce IPV, sexual risk behaviors and HIV incidence. The violence prevention intervention was locally named the Safe Homes and Respect for Everyone (SHARE) Project (Wagman et al., 2012). It was conducted between 2005 and 2009 and aimed to reduce experience of emotional, physical and sexual IPV. SHARE was carried out in collaboration with the Rakai Health Sciences Program (RHSP), an HIV and reproductive health research and service provision organization headquartered in Kalisizo, Rakai. SHARE’s violence prevention work was combined with RHSP’s HIV prevention activities in select regions of the district.
A cluster randomized trial (CRT) was conducted to assess the impact of SHARE intervention in approximately 50 communities (aggregated into 11 regions) throughout the Rakai District. Four of the 11 study regions were allocated for exposure to the intervention arm, and the remaining 7 were allocated to the control arm. Individuals in control regions were exposed to all regular RHSP research activities and routine HIV prevention services, as well as general health provision. Individuals in intervention regions were exposed to RHSP services plus the SHARE intervention and enhanced HIV prevention activities. Impact assessment was conducted through three questionnaire and serological surveys done pre-intervention and at 2 post-intervention follow-ups. All data were collected via the parent study, the Rakai Community Cohort Study (RCCS).

Research aims

**Aim 1:** To assess the impact of SHARE + RHSP community services on report of victimization from and perpetration of physical and/or sexual IPV in the past 12 months, compared to the impact of RHSP community services alone.

*Hypothesis 1(a):* SHARE intervention will reduce women’s reports of IPV victimization in intervention vs. control arms.

*Hypothesis 1(b):* SHARE intervention will reduce men’s reports of IPV perpetration in intervention vs. control arms.
**Aim 2:** To assess the impact of SHARE + RHSP community services on report of sexual risk behaviors among men and women compared to the impact of RHSP community services alone.

*Hypothesis 2(a):* SHARE intervention will reduce selected sexual risk behaviors in the intervention vs. control arms.

**Aim 3:** To assess the impact of SHARE + RHSP community services on HIV incidence compared to the impact of RHSP community services alone.

*Hypothesis 3(a):* Incidence of HIV will be lower in the intervention vs. control arms.

**Study description**

All 3 aims of this dissertation research involved a secondary analysis of data from the RCCS which conducts survey interviews every 12-18 months with all consenting people aged 15-49 in ~5,000 households in 47-50 communities throughout Rakai (Wawer et al., 1998). These 47-50 communities represent 7% of the 720 communities situated in Rakai District. The RCCS includes participants residing in trading centers and agrarian villages, representative of rural southwestern Uganda. Each RCCS participant receives a unique, life-long study identification number used to link data over time and between RHSP studies. RCCS written informed consent forms cover study participation, sample archiving for future assays including genetic testing, linkage of RCCS data to other RHSP databases, and permission to re-contact participants for other studies.
Aim 1: To assess the impact of SHARE + RHSP community services on report of victimization from and perpetration of physical and/or sexual IPV in the past 12 months, compared to the impact of RHSP community services alone.

The analysis for Aim 1 intended to evaluate the impact of a combination IPV and HIV prevention intervention on recent (past year) experience of physical and sexual IPV. The intervention’s effect on emotional IPV was also examined as a secondary outcome. Participants included both male and female RCCS participants. Men were asked about their experiences of perpetrating violence while women were asked about their experiences as victims of abuse.

SHARE aimed to reduce IPV and used methodologies from two proven successful violence prevention frameworks: Stepping Stones (Welbourn, 1995) and the Resource Guide for Mobilizing Communities to Prevent Domestic Violence (Michau & Naker, 2003). SHARE promoted a process of social change based on the Transtheoretical Model’s Stages of Change Theory (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997) which posits that although people realize they need to make changes in their life, they do it in stages instead of one major life change. There are five main stages of change: (1) pre-contemplation (an individual is unaware of the issue/problem and its consequences for her/his life), (2) contemplation (an individual begins to wonder if the issue/problem relates to her/his life), (3) preparation for action (an individual gets more information and develops an intention to act), (4) action (an individual begins to try new
and different ways of thinking and behaving) and (5) maintenance (an individual recognizes the benefits of the behavior change and maintains it).

We hypothesized that repeated exposure to the ideas included in SHARE would encourage men and women to begin a process of change that results in preventive behavior (e.g., changing their behavior so they are less likely to perpetrate violence in intimate relationships). At final follow up we expected fewer reports of recently perpetrated physical and sexual IPV in current intimate partnerships by men and women in intervention communities as compared to control communities.

Each of the violence measures (emotional, physical and sexual IPV) was analyzed as a dichotomous outcome and adjusted models controlled for covariates shown to be correlated with IPV in the literature, in previous Rakai studies, and the characteristics found to differ (at p<0.05) between the trial arms at baseline. These included age, education, marital status, IPV and number of non-marital sex partners in the year preceding the baseline interview. An intention-to-treat approach was followed.

Aim 2: To assess the impact of SHARE + RHSP community services on report of sexual risk behaviors among men and women compared to the impact of RHSP community services alone.

The analysis for Aim 2 aimed to examine the impact of the SHARE/RHSP intervention on 8 risk factors that potentially mediate the interrelationship between IPV and HIV infection, including past year (1) intimate partner rape (forced sex), (2) number of total
sex partners, (3) number of extra-marital sex partners, (4) alcohol use with last sex, (5) condom use, (6) discussion about condom use with primary partner, (7) main partner’s disclosure of his/her HIV status to respondent and (8) respondent’s disclosure of HIV status in past year. Participants included both male and female RCCS participants.

As discussed above (and illustrated in the conceptual model in Figure 1.1) women who experience forced sex are directly at risk for exposure to HIV and other STIs (Maman et al., 2000; Campbell et al., 2008). Evidence also suggests IPV may indirectly increase a woman’s vulnerability to HIV/STI infection in three main ways. Many women who experience IPV also report risky sexual behaviors (Bensley et al., 2003; Coid et al., 2001; Hotaling & Sugarman, 1986); male perpetrators are more likely to be HIV infected themselves and/or practice higher risk sex compared to non-abusive men (Decker et al., 2009; Dunkle et al., 2006); and in settings where IPV is normative, girls and women often lack choices about how and when they have sex and their ability to self-protect is limited (Maman et al., 2000).

As such, our intervention targeted the indirect pathways between IPV and HIV and aimed to (1) reduce sexual risk behaviors (number of non-marital sex partners, alcohol use with sex), (2) increase capacity for people to protect themselves from violence and HIV infection (by increasing condom use and rates of HIV results disclosure to sex partners) and (3) change attitudes about the acceptability of violence against women. We hypothesized that exposure to the SHARE intervention would be associated with declines in the 8 selected sexual risk behaviors in the intervention versus the control arm.
An intention-to-treat approach was followed. Each risk factor outcome was analyzed as binary data adjusted models controlled for covariates found to differ (at the p<0.05 significance levels) between the two trial arms at baseline. These included baseline age of the respondent, education level, marital status, number of non-marital sex partners in year preceding baseline interview and baseline report of the outcome being measured.

**Aim 3: To assess the impact of SHARE + RHSP community services on HIV incidence compared to the impact of RHSP community services alone.**

The analysis for Aim 3 aimed to examine the impact of the SHARE/RHSP intervention on new cases of HIV infection. We hypothesized that exposure to the SHARE intervention would be associated with declines in HIV incidence in the intervention versus the control arm.

Data from both male and female participants were included in the analysis of the HIV incidence outcome. Only baseline HIV negative were included. Person years (PY) of exposure were cumulated from baseline to the last negative HIV result if the person remained negative, or to the midpoint of the interval between the last negative tests and first positive tests for seroconverters. HIV incidence was estimated per 100 PY. An intention-to-treat approach was followed. Adjusted models controlled for age, education, marital status and number of non-marital sex partners. Additionally, we controlled for respondents’ self-reports of condom use at baseline and each follow-up as well as men’s self-reported circumcision status, and women’s report of their primary male partner’s circumcision status (at each follow up).
Organization of the thesis

The first chapter provides a brief introduction to the dissertation, specifies study objectives and hypotheses and presents the frameworks underpinning the analyses. Chapters Two, Four and Five consist of three stand-alone manuscripts. Chapter Two is not a data analysis piece but describes how the SHARE IPV prevention intervention was integrated between 2005 and 2009 into the RHSP’s existing HIV services. Details are provided on the stages of program development and implementation and the findings used to inform the intervention’s design are discussed. The chapter was written as a free-standing original article and was submitted on November 1, 2013 for publication in the Journal of Health Care for Women International. Chapter Three focuses on methods used in the dissertation and describes the data sources and study procedures and provides an in-depth discussion of the analytic methodology. Chapters Four and Five are data-based research papers and each includes a separate introduction, methods, results, and discussion section. Chapter Four describes the community-based CRT conducted to evaluate the impact of the combination IPV/HIV prevention intervention. It details the methods and findings on the intervention’s impact on recent emotional, physical and sexual IPV and HIV incidence. Chapter Five examines the direct and indirect pathways between IPV and HIV infection in the study setting and aims to explain the mechanisms that led to changes in reports of violence, as well as HIV incidence. Conclusions integrating the results of all three manuscripts are provided in the final chapter.
References


voluntary counseling and testing clinic in Dar es Salaam, Tanzania. American
Journal of Public Health, 92(8), 1331–1337.

Partner Violence and the Association With HIV Risk Behaviors Among Young
print]

Merson, M., Padian, N., Coates, T.J., Gupta, G.R., Bertozzi, S.M., Piot, P., Mane, P.,
Bartos, M., & Lancet HIV Prevention Series Authors. (2008). Combination HIV

Kampala, Uganda: Raising Voices.

Ministry of Health (MOH) [Uganda] and ORC Macro. (2006). Uganda HIV/AIDS Sero-
behavioral Survey 2004-2005. Calverton, Maryland, USA: Ministry of Health and
ORC Macro.


326:1384-7.


Figure 1.1. Conceptual Model: Pathways from IPV to/from HIV Infection (Jewkes et al., 2010).
Figure 1.2. Ecological Life Course Perspective of IPV and HIV in Rakai, Uganda
CHAPTER 2. DESCRIPTION OF THE INTERVENTION UNDER EVALUATION

COMBINED INTIMATE PARTNER VIOLENCE AND HIV/AIDS PREVENTION IN RURAL AFRICA: DESIGN OF AN INTERVENTION STRATEGY, RAKAI, UGANDA
Abstract

**Background:** Intimate partner violence (IPV) against women is both a cause and consequence of HIV infection. Thus, interventions that aim to reduce IPV also hold potential for reducing HIV transmission.

**Objectives:** This paper describes how a primary IPV prevention intervention, named the Safe Homes And Respect for Everyone (SHARE) Project, was integrated between 2005 and 2009 into the Rakai Health Sciences Program’s existing HIV services in rural Uganda.

**Design:** Project description

**Outline:** Details are provided on the stages of program development and implementation and we review the empirical findings on the associations between HIV and IPV that were used to inform the intervention’s design. The paper concludes by discussing lessons learned and thoughts on incorporating IPV prevention into ongoing HIV programs in the future.
Introduction

Research over the past 20 years has established that intimate partner violence (IPV) and HIV are independently associated with negative health, social and economic outcomes in women (Krug, et al., 2002; Campbell, 2002; Campbell & Soeken, 1999; Ellsberg et al., 2008).

In 2004 the President’s Emergency Plan for AIDS Relief (PEPFAR) announced that interventions to prevent gender-based violence (GBV) should be part of the global AIDS strategy (OGAC, 2004). In 2006 PEPFAR more specifically recognized the role of IPV in perpetuating women’s vulnerability to HIV (OGAC, 2006). In 2011 the U.S. Agency for International Development (USAID) developed a guide for integrating GBV prevention into all PEPFAR programs (Khan, 2011) and in 2012 UNAIDS added a GBV indicator to its core set of markers used to globally track progress in an HIV response (UNAIDS, 2011). The Centers for Disease Control and Prevention (CDC) and WHO’s Violence Prevention Alliance (VPA) recommend using a four step public health approach to prevent violence at the population level. Step 1 is to define the problem. Step 2 is to identify risk and protective factors. Step 3 is to develop and test prevention strategies, and Step 4 is to assure widespread adoption (CDC, 2009; WHO, 2012).

This paper describes a combination HIV/IPV prevention intervention conducted in Rakai Uganda, a setting characterized by a mature HIV epidemic (Wawer et al., 1997) and relatively high rates of IPV against women (Koenig et al., 2003). We modified the CDC/VPA model (Figure 2.1) to address violence and HIV by dividing Step 3 into two
parts. The first part (3A) was to develop and test an IPV prevention intervention named the Safe Homes And Respect for Everyone (SHARE) Project. The second part (3B) was to integrate the SHARE IPV prevention intervention with the existing HIV prevention activities conducted by the Rakai Health Sciences Program (RHSP), a community-based HIV/AIDS research and service provision organization in rural southwest Uganda. We conclude the paper by discussing lessons learned and suggestions for incorporating IPV prevention into ongoing HIV programs.

**HIV and IPV in Rakai, Uganda**

The first two steps in our approach to preventing HIV and IPV were to understand the magnitude and determinants of each outcome in Rakai. The RHSP has conducted a wide range of HIV/AIDS and reproductive health research and services since 1988 (Wawer et al., 1998; Zablotska, et al., 2009). Its core is the Rakai Community Cohort Study (RCCS) which follows a cohort of consenting 15-49 year old participants through annual surveys in 50 communities (aggregated into 11 regions). Between 2000 and 2004, data were collected via RCCS to measure the magnitude of and association between HIV and IPV in Rakai (Step 1) and to identify their risk and protective factors (Step 2). Main findings are reviewed below.

*Findings Used to Inform Program Design: Evidence on HIV and IPV from Rakai*

In 2002, HIV prevalence in Rakai was 16% in women and 12% in men and HIV incidence was 1.5/100 person-years (PY) (Zablotska et al., 2006). Approximately 30% and 24% of adult women reported lifetime experience of physical and sexual IPV,
respectively (Koenig et al., 2003; Koenig et al., 2004a) and 14% of women 15-19 years experienced forced first sex (Koenig et al., 2004b). Although female against male IPV did exist in Rakai (approximately 3% of men experienced past year physical IPV) women were disproportionately affected (Koenig et al., 2003) and our intervention therefore focused on prevention of IPV against women. Risk and protective factors for HIV and IPV are summarized in Table 2.1.

Individual level determinants of HIV and IPV

Younger age was found to increase risk for sexual IPV (Koenig, et al., 2004a) and HIV infection (Wawer et al., 1994). Higher levels of schooling protected women from IPV (Koenig, et al., 2003; Koenig, et al., 2004a) but were associated with increased HIV seroprevalence (Smith et al., 1999). Young women who reported forced first sex had higher HIV incidence (Koenig et al., 2006) and were less likely to report subsequent use of modern contraceptives and condoms compared to women whose sexual debut did not involve force (Koenig et al., 2004b).

Alcohol use before sex was common (Wawer et al., 2009) in Rakai and associated with increased risk for physical and sexual IPV and also for HIV infection (Zablotska et al., 2006). Having more than one recent sexual partners increased a woman’s risk for physical and sexual IPV (Koenig et al., 2003; Koenig et al., 2004a) as well as HIV infection (Serwadda et al., 1992). Younger age of sexual debut was associated with risk for both HIV and IPV (Koenig, et al., 2003; Koenig et al., 2004a) and high rates of HIV
infection in young women were associated with early onset of sexual activity (Kelly et al., 2003).

**Relationship level determinants of HIV and IPV**

In Rakai we found that women cohabitating with a partner but not formally married experienced significantly more physical IPV than those officially married or in casual (e.g., dating) relationships (Koenig et al., 2003). However, both married and cohabitating women experienced elevated rates of sexual IPV compared to those in casual relationships (Koenig et al., 2004a).

Rakai women who reported IPV (compared to those who did not) were more likely to perceive their male partner to have a high HIV risk profile (Koenig et al., 2003; Koenig et al., 2004a) and less likely to have discussed HIV results with him (Wagman et al., 2003). Partnering with older men was found to increase women’s vulnerability to HIV infection. Specifically, the attributable fraction of prevalent HIV infection among women 15 to 24 years associated with partners 10 or more years older was 9.7% (95% CI: 5.2-14.0) (Kelly et al., 2003). However, age differences between partners were not consistently associated with risk of physical (Koenig et al., 2003) or sexual (Koenig et al., 2004a) IPV.

Use of condoms and other forms of safe sex were associated with reduced risk of IPV (Zablotska, et al., 2009), possibly because women able to negotiate these protective behaviors were also more likely to be in non-violent relationships. Nonetheless, data
indicating that only 6.5% of men and 3% of women in Rakai consistently used condoms in the past year (Wawer et al., 2009) posed a significant challenge to HIV prevention and might also be a marker for increased vulnerability to IPV.

Society level determinants of and attitudes related to HIV and IPV

In 2005 there were no specific laws protecting women from IPV. In 2007 a domestic violence by-law was passed in the capital city of Kampala but had limited impact in Rakai. We examined people’s attitudes about gender and violence and found that beliefs condoning IPV were widespread and predictive of risk for physical abuse. Most adult men (70%) and women (90%) reportedly believed that IPV was justifiable under certain circumstances (Koenig, et al., 2003).

Pre-intervention IPV and HIV Services in Rakai

RHSP offered a range of HIV prevention and treatment services to men and women. These included HIV testing, results notification and counseling; HIV prevention education, provision of modern contraceptives and symptom-based STI treatment (through mobile and fixed clinics); and HIV treatment and care. Prior to the initiation of the HIV/IPV intervention in 2005, however, none of RHSP’s routine HIV prevention activities directly addressed the role of violence. The Program’s HIV testing, results notification, and counseling protocols did not include specific screens for violence or address it if it was reported by a client. Further, none of the HIV clinics provided IPV-related services and RHSP’s health workers were not trained to screen for violence or handle related cases, and there was no availability of IPV related services prior to
SHARE. While district level police and social welfare officers had been trained to handle cases of conflict, none had been trained to screen for IPV, handle or refer cases or help victims with safety planning.

**Intervention Design**

The Rakai district is located in southwest Uganda. Based on 2002 census data (UBOS, 2002) we estimate the population of Rakai was approximately 500,000 in 2005. The process of allocating regions for exposure to the HIV/IPV intervention or control arm built on a previous cluster randomized trial (CRT) of enhanced family planning interventions whereby 5 regions were randomly selected to receive standard family planning services (control) and 6 regions were assigned to receive enhanced family planning information, counseling, and contraceptive methods (intervention) (Lutalo, et al., 2010). For the current intervention, 4 of the 6 family planning intervention regions were assigned to the HIV/IPV intervention arm while the remaining 2 family planning intervention regions, as well as all 5 family planning control regions were assigned to the control arm. All residents over 15 years of age in the intervention communities were targeted for the combined HIV-IPV prevention intervention and control arm communities received the standard of care provided by RCCS/RHSP.

*Intended Outcomes and Impact*

The intended long-term impact of the combined HIV/IPV intervention was to prevent/mitigate physical and sexual IPV against women and reduce HIV incidence in the
population by addressing risk factors of each outcomes. Table 2.2 outlines the intended intermediate outcomes and long-term impact of the intervention.

**The Intervention**

*Violence Prevention*

Step 3A in our public health approach was to develop and test strategies for preventing IPV against women. The SHARE Project was integrated into RHSP between 2005 and 2009 and has been described previously (Wagman et al., 2012). The aims of SHARE were to reduce physical and sexual IPV by changing community-level attitudes about the acceptability of IPV; raising awareness about links between IPV and HIV infection; and encouraging men and women to reduce the number of non-marital sexual partners, reduce alcohol use with sex, and increase couple communication about HIV (including HIV results disclosure).

SHARE adapted methodologies from The Resource Guide for Mobilizing Communities to Prevent Domestic Violence (Michau & Naker, 2003) which is a proven successful framework for community-based IPV prevention (Michau & Naker, July 2003). SHARE based its approach on the Trantheoretical Model (TTM) of Behavior Change (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997) and applied the TTM’s “Stages of Change” at the population level. SHARE was organized in 5 consecutive phases that involved multiple IPV prevention strategies aimed at everyone in the population: advocacy, capacity building, community activism, learning materials, and special events (Table 2.3).
**Combined HIV and IPV Prevention**

Step 3B was to combine IPV reduction strategies with ongoing HIV prevention work by integrating violence prevention into existing HIV prevention, testing, and treatment procedures. Here we describe how RHSP’s HIV activities were modified to integrate procedures for raising awareness about IPV, engaging key groups in combination prevention, screening for IPV’s occurrence, handling and referring IPV cases, and offering risk reduction strategies for women in abusive relationships.

**Integrating IPV Reduction into RHSP’s HIV Prevention Activities**

SHARE worked with RHSP’s Health Education and Community Mobilization (HECM) team to raise the community’s awareness about how IPV increases women’s risk for HIV infection and how women with HIV/AIDS are more vulnerable to abuse. The HECM partnered with local leaders, community health mobilizers and RHSP’s Community Advisory Board to educate the community about health and HIV and mobilize residents to participate in RHSP’s research and health/HIV services. Building on this infrastructure SHARE partnered with HECM to incorporate messages about HIV and IPV during community meetings, local theatre, sporting events, and film shows and education materials.

**Building Capacity of VCT Counselors and Community Counseling Aides to Address IPV**

RHSP’s voluntary HIV counseling and testing services were offered to all RCCS participants who provided blood specimens at each survey visit. HIV results and post-
test counseling was provided by professional counselors at community offices situated throughout the 11 regions. When SHARE began there were 18 counseling offices (Matovu et al., 2002) serving all RCCS participants, thus each counselor served approximately 533–622 clients per year. To enhance the VCT program, we trained RHSP’s counselors in intervention regions to understand and recognize IPV and its links with HIV; we also trained and added 12 additional “community counseling aides” to lessen the work load. A network was established between the two sets of counselors (Table 2.4).

Engaging Key Groups in Combination HIV/IPV Prevention

Multiple prevention strategies were used in our intervention to involve people from all levels of society and engage the entire community. Additionally, targeted activities were conducted to encourage IPV/HIV prevention among three strategic groups: (1) adolescents, (2) boys and men, (3) girls and women (including HIV-infected females).

Targeted Work with Adolescents

Being an adolescent was associated with increased risk for both IPV (Koenig, et al., 2004a) and HIV infection (Wawer et al., 1994) in Rakai. To focus on young men and women (primarily those between the ages of 15 and 19 years) in our population, we used a training package from Stepping Stones a widely used HIV prevention program that employs participatory methods for improving communication skills and building gender-equitable intimate relationships (Welbourn, 1995). Peer groups were established in each intervention region. Additionally, a 10 session learning program was implemented in
schools and central locations (to reach out of school youth) on topics including sex and love, HIV and STIs, safer sex and condoms, gender equality and the importance of mutually consensual sex (Wagman et al., 2012). The intended outcomes of our targeted work with youth were to increase knowledge about sexual health, raise awareness about the risks and the consequences related to sexual risk taking and IPV and foster improved communication skills.

**Targeted Work with Men and Boys**

Recognizing that Uganda was culturally and socially patriarchal (Ellis, et al., 2006) and that men were the main perpetrators of IPV, we opted to actively engage men and boys in the prevention of HIV and violence against women. We partnered with male role models from the community and engaged traditional male counselors/activists in the implementation of the project. All male facilitators received training on (1) Understanding domestic violence and its link with HIV; (2) Human rights awareness; and (3) Advocating for women’s rights (Wagman et al., 2012).

Focused boys’ and men’s programs were designed to consider how traditional concepts of masculinity (and female subordination) impacted risk for (and prevention of) HIV and IPV. Focus was placed on raising awareness about the role of alcohol in increasing risk for both HIV infection and perpetration of abuse. Men were encouraged to consider the benefits of reducing alcohol intake and talking more openly and honestly with their female partners about sex, relationships and peaceful conflict resolution. The intended outcomes of our targeted work with men and boys were to increase knowledge about how
cultural mores about masculinity and female subordination impact attitudes and behaviors toward girls and women.

**Targeted Work with Girls and Women**

*Developing and Pilot-testing Counseling Tools to Address HIV and IPV with Female Clients*

RCCS participants who requested their HIV test results were notified of their serostatus and could request their results as individuals or couples; people who chose not to have couple counseling were encouraged to notify their partner(s) of their results (Matovu et al., 2002). During post-test counseling sessions, RHSP counselors helped clients assess and plan how to reduce their risks for HIV infection and/or transmission by using a checklist with priority issues, including abstinence, condom use, couple counseling, partner notification, HIV results interpretation, family planning, nutrition, proper and prompt medication and mother-to-child HIV transmission (Matovu et al., 2002). However, prior to the SHARE program, the check list did not include recommendations for assessing one’s risk of violence and for negotiating safe sex, including condom use.

We followed the World Health Organization’s recommendations and developed and pilot tested two tools for addressing IPV as a barrier to women’s access of HIV testing and counseling services and for providing women with counseling on safe disclosure of HIV status and risk reduction (Mama, et al., 2006). As such, these tools addressed women. The first was used to assess clients’ fear of violence, safety of HIV disclosure and to help
develop (safe) disclosure plans. The second tool helped counselors provide risk reduction counseling to women at heightened vulnerability for IPV.

All 18 RHSP’s VCT counselors participated in a two-day workshop during which they were introduced to these two tools. Following this workshop, 6 VCT counselors (1 in each of the 4 SHARE intervention regions and two counselors working at RHSP headquarters) received focused training on the use of each tool and each counselor was selected to participate in a subsequent two week pilot study to test these tools. SHARE team staff conducted site visits during this time to provide technical assistance to the counselors and address any questions or concerns that emerged (King et al., 2007). After the pilot period ended, interviews were conducted with each of the 6 counselors who participated in the assessment and a final feedback session was held with all 18 counselors to discuss experiences and plan the way forward.

Counseling tool to assess women’s safety when disclosing HIV test results

We implemented a disclosure assessment tool, previously pilot tested in a VCT clinic in Dar es Salaam, Tanzania (Maman, et al., 2006). The goal was to help counselors raise the issue of violence and assess a client’s safety following HIV positive disclosure. The tool guided counselors through the process of asking female clients 5 screening questions and, based on their responses and HIV-status, guiding them through a tailored plan for immediate disclosure, delayed disclosure, mediated disclosure, or non-disclosure (Table 2.5). Both male and female counselors administered this tool. All female clients were asked the 5 screening questions. The safe disclosure assessment procedure was
conducted with female clients who: (1) reported living with their partner for at least 6 months; (2) reported receiving their HIV results for the first time; (3) were HIV-infected; or (4) indicated that testing alone (regardless of the result of their test) could incite violence in their relationship who (King et al., 2007).

*Risk reduction tool for counseling women at risk for violence*

Guidelines from Family Health International (Fischer, et al., 2007) were adapted to train RHSP counselors to counsel women on negotiating safe sexual practices, using role play scenarios with clients to facilitate discussion about condom use and sexual coercion. Role plays were tailored for younger women in relationships, women in casual relationships, and women who were married or in consensual unions. If fear or history of violence had not been disclosed in previous sessions counselors were trained to assess level of comfort (and perceived ability) to negotiate condom use and risk for abuse recognizing that, regardless of history of violence, clients could be at risk because of their decision to test for HIV or get their HIV results. Counselors administered this tool to all female clients who reported that their male partner/husband recently (past year) perpetrated IPV and/or who reported that their male partner/husband refused VCT (King et al., 2007). Table 2.6 provides details of the tool and process.

*Addressing Women’s Risk for IPV in RHSP’s HIV Treatment and Care Services*

RHSP’s HIV treatment program used a decentralized approach via 17 “Suubi (hope)” mobile clinics provided free CD4 evaluation and basic HIV care and ART. As part of the current intervention, five of RHSP’s ART counselors were trained in the intervention
communities by a Kampala-based violence prevention organization called Empower Children and Communities Against Abuse (ECCA) to understand IPV, recognize signs and symptoms of abuse in clients, help women develop safe HIV disclosure plans, offer facilitated disclosure of HIV results, and practice risk reduction strategies for avoiding violence in intimate relationships. Further, Education activities were conducted for all PLHIV receiving pre-antiretroviral therapy (ART) care and ART from RHSP. Monthly discussions on IPV and HIV were held on clinic days.

To focus on HIV-infected women’s increased risk for IPV (Fonck et al., 2005; Maman et al., 2000; Maman et al., 2002) and more severe and frequent abuse (Sareen et al., 2009), support groups were formed for, attended by and facilitated by women living with HIV. The group sessions provided a supportive and nonjudgmental forum for discussing how to comply with ART regimens, how to safely introduce the topic of ART use (and adhere to regimes) to husbands/partners, how to care for HIV-infected infants and children, whether or not ART can be used during pregnancy and breastfeeding, and how to prevent mother to child transmission of HIV.

**Monitoring and Evaluation**

Monitoring of IPV prevention activities was done by SHARE staff, volunteers and partners to assess acceptability of the intervention and the communities’ readiness for behavior and attitude change (Wagman et al., 2012). The disclosure assessment and risk reduction tools were monitored by having the 6 counselors who participated in the pilot test fill out summary forms after completing every session when either of the tools was
used. These forms recorded time required to implement the tool, problems encountered, and lessons learned.

Data from an effectiveness trial conducted by RCCS are under analysis to assess the current HIV/IPV intervention’s impact on past year physical and sexual IPV, attitudes about the acceptability of IPV, select sexual risk behaviors, and HIV incidence. The logic model shown in Figure 2.2 was developed to represent how intervention strategies and activities theoretically lead to intended outcomes and impact. This framework highlighted important variables and outcomes for measurement and illustrates connections between the various program components and activities and their short-term and long-term objectives. Included in the logic model are the intervention’s activities (both IPV and HIV); output (the direct product of the program’s activities); outcomes (the short-term or intermediate results of the program) and impact (the long-term outcome of the program).

Lessons Learned and Recommendations

Data from the aforementioned evaluation trial will reveal how effective our intervention was at reducing IPV, HIV infection and select risk behaviors. In the meantime, many valuable field lessons warrant discussion and have helped to develop recommendations for future IPV and HIV prevention interventions (Table 2.7). As described elsewhere (Wagman et al., 2012), we realized many RHSP staff members were dealing with violence in their own lives. Because external services were not readily available in Rakai, we responded by incorporating an internal staff support system whereby
victims/perpetrators of IPV (and their spouse/partner when appropriate) were offered confidential counseling and risk reduction planning by a SHARE staff member or professional counselor/social worker.

We also initially met resistance from some community members who feared our activities were challenging cultural norms and/or castigating men. Some authorities (e.g., police officers, religious and local leaders, and local council members) we planned to work with had traditional attitudes and biases against women and, as a result, did not want to handle cases of IPV – alone or in relation to cases of other issues such as HIV prevention or care. This complicated efforts to gain acceptance by the community, collaborate with local leaders and encourage the involvement of men and boys. We addressed many of these issues by meeting in person with groups and individuals in the community to introduce SHARE, answer questions, discuss concerns and invite key individuals (e.g., the head of the education sector) and groups (e.g., the district police) to partner with us. As a result we gained the endorsement and approval of gatekeepers and promoted grassroots ownership of the initiative (Wagman et al., 2012).

Although we had male focused activities, many men and boys perceived violence prevention to be a “women’s project” that aimed to shame or stigmatize men. Further, there was skepticism about any true links between IPV and HIV infection. We addressed these barriers to male involvement and support in three main ways. First, our intervention team was gender balanced. SHARE staff included both men and women so as to lead by exemplifying that prevention of violence and HIV infection requires
everyone’s efforts. Second, we recruited local leaders and community-based boys and men as volunteers and positive role models. These individuals spearheaded efforts for weaving discussions about HIV and IPV into men’s routine conversations on everyday issues and concerns (e.g., sporting events, going out to bars/for meals, politics, etc). Local role models made the project’s efforts less threatening to men because of their familiarity to the community. They also served as effective examples for boy and men to emulate. Third, we did not rush boys or men through a process of attitudinal transformation, nor did we non-constructively challenge their traditional notions of masculinity. Instead, we allowed everyone to take their time and have comfortable space to ask questions and discuss fears and concerns about how preventing violence against women might impact men. We respected the need for everyone to be able to progress through the stages of change at their own pace.

Recruiting community counseling aides complemented the work of the Program’s professional VCT counselors. This success depended mainly on the quality training offered to the community counseling aides which provided them confidence to deal with most client issues encountered and skills to refer to RHSP’s VCT counselors when needed. This not only reduced the workload of the Program’s counselors but increased the sense of community ownership of the project.

VCT counselors who were interviewed about their experiences pilot testing the disclosure assessment and risk reduction tools reported that both were easy to implement and took between 5 and 10 minutes to complete. Many counselors had clients who disclosed fears
of violence and reported that the disclosure assessment questions enabled them to successfully probe their clients’ perceptions about partner’s potential reactions, past experiences of abuse, potential for future violence and other barriers to HIV disclosure. A shortcoming was that the piloting only lasted 2 weeks. Counselors agreed that the process of assessing a client’s safety for disclosure and developing a personalized safety plan necessitates more than one counseling session (King, et al., 2007).

Although clients indicated that risk reduction scenarios were well written and helpful, many expressed hesitation about how realistic it would be for them to actually use them with their partners. It might be useful for counselors to develop personalized role play content based on what each client thinks would be appropriate and comfortable in her relationship. Another challenge was a lack of interest/willingness to use male condoms among some participants (King, et al., 2007). Risk reduction scenarios could be adapted to promote other safe sex behaviors, such as use of the female condom.

Another limitation of the current intervention’s use of the safe disclosure and risk reduction tools is that they were only adapted for use with female clients in Rakai. While girls and women often greatly benefit from strengthened skills for negotiating violence-free relationships and safe sex, many factors put boys and men at risk for HIV and violence as well. Therefore, similar tools have the potential to reduce boy’s and men’s chances of HIV infection/transmission and becoming victims or perpetrators of IPV and we recommend they also be implemented and evaluated.
Finally, the main approaches used in this combined IPV and HIV prevention intervention were chosen because they had proven success in a sub-Saharan African setting and could feasibly be replicated in similar populations. Stepping Stones has been implemented in over 40 countries (Welbourn, 1995) and was found to be associated with a 33% reduction in herpes virus type 2 (HSV-2) and reduced violence perpetration in South Africa (Jewkes, et al., 2008). The Resource Guide for Mobilizing Communities to Prevent Domestic Violence was developed for use by any organization focusing on violence prevention. It is meant to be modified and adapted based on a group’s and community’s priorities, strengths, and capacity (Michau & Naker, 2003). In an evaluation in Kampala, Uganda the approach changed people’s attitudes about the acceptability of IPV and reduced levels of IPV in Kampala, Uganda (Michau & Naker, July 2003). Lastly, the safe disclosure and risk reduction protocols used in our setting were also successfully implemented in Tanzania (Maman, et al., 2006) and most recently incorporated into a regional guide developed to help VCT counselors discuss violence and HIV/AIDS (Raising Voices, 2008). These easy to use guides can help others researchers, health care providers and program managers discuss HIV with people experiencing violence, as well as offer assistance and support through HIV testing and treatment.
References


http://www.cdc.gov/ncipc/dvp/PublicHealthApproachTo_ViolencePrevention.htm


Dunkle, K. L., Jewkes, R. K., Nduna, M., Levin, J., Jama, N., Khuzwayo, N., Koss, M.,
young men in the rural Eastern Cape, South Africa. AIDS, 20, 2107–2114.

retrieved on December 31, 2011 from:
http://siteresources.worldbank.org/INTAFRREGTOPGENDER/Resources/gender_ec
on_growth_ug.pdf

Multi-country Study on Women's Health and Domestic Violence against Women
Study Team. Intimate partner violence and women's physical and mental health in the
WHO multi-country study on women's health and domestic violence: an

Counseling and Testing for Youth: A Manual for Providers. Family Health

risk of HIV in women experiencing physical partner violence in Nairobi, Kenya.
AIDS and Behavior, 9(3), 335–339.

prevalence surveys in sub-Saharan Africa: results and implications for HIV and AIDS
estimates. Sexually Transmitted Infections, 82 (Supp. 3):iii64–iii70.


Raising Voices. (2008) VCT Counselor Interview Guide. Last accessed on October 4, 2012 from

http://www.raisingvoices.org/files/sasa/03_support/training/su_tr_vctig.pdf


Figure 2.1. A Public Health Approach to Preventing HIV and IPV in Rakai
Figure 2.2. Logic model for RHSP/SHARE intervention to reduce HIV and IPV

<table>
<thead>
<tr>
<th>Activities</th>
<th>Output</th>
<th>Outcome</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advocacy</td>
<td>Leaders, officials, and policymakers informed about IPV and women’s rights and given opportunity to discuss and make decisions.</td>
<td>Public policies made to prevent IPV. More resources allocated to screening for, treating and preventing violence.</td>
<td>IPV rates reduced</td>
</tr>
<tr>
<td>Capacity building</td>
<td>Police, social welfare officers, health care providers, teachers, local and religious leaders, SHARE staff/volunteers completed Community Activism Course (CAC) on IPV prevention.</td>
<td>Leaders and key individuals/groups have knowledge about IPV, its causes and consequences, understand human rights and have skills to advocate for women’s rights.</td>
<td>IPV infection rates reduced</td>
</tr>
<tr>
<td>Community activism</td>
<td>Community volunteers (n=40) appointed and trained as SHARE ambassadors; IPV watch groups and community action groups formed; village meetings and forums held.</td>
<td>Community members change their own behavior (to prevent IPV) and attitudes (to reject IPV as acceptable and hold women to the same standards as men).</td>
<td></td>
</tr>
<tr>
<td>Learning materials</td>
<td>Booklets, brochures, posters, story cards, and other materials developed and disseminated.</td>
<td>Community members have knowledge about IPV and why it is a public health concern.</td>
<td></td>
</tr>
<tr>
<td>Special events</td>
<td>Local fairs, public marches, campaigns and poster exhibitions conducted. Violence prevention newsletters created and disseminated.</td>
<td>Ideas about IPV prevention and gender norms have been publicly discussed and explored.</td>
<td></td>
</tr>
<tr>
<td>Youth program</td>
<td>Twelve peer groups formed (for married, out-of-school youth). Ten sessions held on communication, sex, love, HIV, safe sex, gender equality, and non-violent conflict resolution.</td>
<td>Youth understand the importance of gender-equitable relationships and have effective skills for talking openly about sex and resolving conflicts without violence.</td>
<td></td>
</tr>
<tr>
<td>Men’s and boys’ program</td>
<td>Male leaders (n=46) trained using the CAC curriculum. Ten lesson work plan on violence and alcohol reduction for groups of men and boys.</td>
<td>Boys/men understand how masculinity and female subordination impact IPV. Boys/men adopt non-violent approaches to problem-solving and use alcohol responsibly.</td>
<td></td>
</tr>
<tr>
<td>Community counseling aides</td>
<td>12 community counseling aides (CCAs) appointed, completed CAC and trained to offer basic psychological support and make referrals.</td>
<td>CCAs provide support to people experiencing IPV or HIV and catalyze referral process (to SHARE or RHSP-HIV counselor) when necessary.</td>
<td></td>
</tr>
<tr>
<td>Counseling protocols modified to address IPV</td>
<td>Protocols modified so counselors: (1) Screen for IPV when disclosing results; (2) Handle or refer IPV cases; (3) Discuss how IPV might affect disclosure; (4) Counsel women on safe sex negotiation.</td>
<td>Fewer cases of violence experienced due to seeking HIV results, disclosing to a partner or suggesting condom use.</td>
<td></td>
</tr>
<tr>
<td>VCT &amp; ART counselors training</td>
<td>19 VCT and 5 ART counselors completed CAC, training on screen for and handling IPV, and conducted disclosure and risk assessments.</td>
<td>Counselors understand IPV and rights, screen for, handle and refer cases, discuss safe, mediated or non-disclosure as well as risk reduction.</td>
<td></td>
</tr>
<tr>
<td>Support groups for HIV+ women</td>
<td>14 HIV+ women trained to facilitate support group meetings. Support groups conducted on clinic days for HIV infected women experiencing violence.</td>
<td>HIV+ women experiencing IPV had forum to discuss related issues in a supportive and non-judgmental environment.</td>
<td></td>
</tr>
</tbody>
</table>
Table 2.1 Determinants of HIV and IPV in Rakai, Uganda

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Risk factors</th>
<th>Protective factors</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td>IPV</td>
<td>HIV</td>
<td>IPV</td>
</tr>
<tr>
<td>Younger age</td>
<td>X</td>
<td>X</td>
<td>Koenig, et al., 2004a; Wawer et al., 1994</td>
</tr>
<tr>
<td>Higher education</td>
<td>X</td>
<td></td>
<td>Koenig, et al., 2003; Koenig, et al., 2004a; Smith et al., 1999</td>
</tr>
<tr>
<td>Forced first sex</td>
<td>X</td>
<td></td>
<td>Smith et al., 1999; Koenig et al., 2004b</td>
</tr>
<tr>
<td>Multiple sexual partners</td>
<td>X</td>
<td>X</td>
<td>Koenig et al., 2003; Koenig et al., 2004a; Serwadda et al., 1992</td>
</tr>
<tr>
<td>Early onset of sexual activity</td>
<td>X</td>
<td>X</td>
<td>Koenig, et al., 2003; Koenig et al., 2004a; Kelly et al., 2003</td>
</tr>
<tr>
<td>Relationship type</td>
<td></td>
<td>X</td>
<td>Koenig et al., 2003; Koenig et al., 2004a</td>
</tr>
<tr>
<td>Perception that male partner is high HIV risk</td>
<td>X</td>
<td>X</td>
<td>Koenig et al., 2003; Koenig et al., 2004a</td>
</tr>
<tr>
<td>Low rates of HIV disclosure</td>
<td>X</td>
<td>X</td>
<td>Wagman et al., 2003</td>
</tr>
<tr>
<td>Practicing safe sex (e.g., consistent condom use)</td>
<td></td>
<td>X</td>
<td>Zablotska, et al., 2009</td>
</tr>
<tr>
<td>Age gap between partners</td>
<td>X</td>
<td></td>
<td>Kelly et al., 2003</td>
</tr>
<tr>
<td>Alcohol use before sex</td>
<td>X</td>
<td>X</td>
<td>Zablotska et al., 2006</td>
</tr>
<tr>
<td>Belief that wife beating was acceptable</td>
<td></td>
<td>X</td>
<td>Koenig, et al., 2003</td>
</tr>
</tbody>
</table>
Table 2.2 Intended Outcomes and Impact of RHSP/SHARE Intervention to Reduce HIV and IPV in Rakai

<table>
<thead>
<tr>
<th>Intermediate Outcomes</th>
<th>Long-term Impact</th>
</tr>
</thead>
</table>
| **Risky sex practices** | 1. Reduce physical IPV  
2. Reduce sexual IPV  
3. Reduce HIV Incidence |
| 1. Reduce the number of non-marital sexual partners  
2. Reduce alcohol use with sex |
| **Self-protection** | 1. Reduce physical IPV  
2. Reduce sexual IPV  
3. Reduce HIV Incidence |
| 3. Increase the rate of consistent condom use  
4. Increase the rate of HIV disclosure |
| **HIV prevention, testing and treatment** | 1. Reduce physical IPV  
2. Reduce sexual IPV  
3. Reduce HIV Incidence |
| 5. Raise awareness about the link between HIV and IPV  
6. Appoint and train SHARE community counselors  
7. Train HIV counselors to screen for, handle and refer IPV cases  
8. Integrate IPV screening and prevention into RHSP’s treatment |
| **Contextual variables** | 1. Reduce physical IPV  
2. Reduce sexual IPV  
3. Reduce HIV Incidence |
| 9. Change attitudes about the acceptability of IPV |
Table 2.3. The activities, target population & intended outcome of each SHARE IPV prevention strategy

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Activities</th>
<th>Target population</th>
<th>Intended outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advocacy</strong></td>
<td>Workplace dialogues, local group seminars, dialogues with opinion and local leaders.</td>
<td>Local and religious leaders, local organizations and government, teachers, health care workers.</td>
<td>Increased awareness of IPV as a public health problem and the right of everyone to live without violence.</td>
</tr>
<tr>
<td><strong>Capacity building</strong></td>
<td>Staff development workshops, training of resource persons and volunteers, seminars, community based workshops on IPV, human rights and women’s rights.</td>
<td>Police, probation and social welfare officers, health care providers, teachers, local and religious leaders, SHARE staff and volunteers, and RHSP counselors and staff.</td>
<td>A developed set of skills for recognizing and preventing IPV.</td>
</tr>
<tr>
<td><strong>Community activism</strong></td>
<td>Work with community volunteers and drama groups, booklet clubs, IPV prevention action groups, door-to-door awareness activities, films.</td>
<td>Women and men, youth and children within the community.</td>
<td>Active participation in preventing IPV in the community.</td>
</tr>
<tr>
<td><strong>Learning materials</strong></td>
<td>Development and adaptation of booklets, brochures, posters, story cards, and other educational materials.</td>
<td>General public, community members, local organizations, health care providers and social service officers.</td>
<td>Effective learning through the use of engaging, thought-provoking materials.</td>
</tr>
<tr>
<td><strong>Special events</strong></td>
<td>Local fairs, public marches and campaigns, poster exhibitions, seminars and collaboration meetings.</td>
<td>Community members, leaders, the general public and local institutions.</td>
<td>Shared ideas and values for the promotion of IPV reduction.</td>
</tr>
</tbody>
</table>
Table 2.4. Activities that built VCT counselors’ capacity to recognize and understand IPV in Rakai

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHSP’s resident VCT counselors:</td>
<td>To increase their knowledge of IPV and its causes and consequences, RHSP’s VCT counselors completed a Community Activism Course (CAC) based on the Resource Guide for Mobilizing Communities to Prevent Domestic Violence (Michau &amp; Naker, 2003). This training was conducted by SHARE staff members. The comprehensive CAC included three workshops conducted during three separate 2-day training sessions. The first workshop focused on understanding partner violence. The theme of the second workshop was human rights awareness. The final workshop provided guidelines on advocating for women’s rights. RHSP’s VCT counselors were also trained to screen for and handle cases of violence that were disclosed by clients. This training was conducted by professional psychosocial and post-rape/sexual assault counselors from the Kampala-based organization, Empower Children and Communities against Abuse (ECCA). ECCA provided systematic guidance on alleviating violence-related psychological trauma through one to one directional counseling, group support counseling, couple counseling and referral. Counselors residing in the 4 SHARE regions participated in ongoing SHARE meetings and events and were provided with consistent technical support from the SHARE team members.</td>
</tr>
<tr>
<td>Community Counseling Aides:</td>
<td>SHARE appointed and trained 12 community counseling aides (CCAs); three per region (1 male, 1 female, and 1 youth representative). CCAs were trained to offer basic support to community members experiencing violence. They received clients directly or upon referral from a SHARE community volunteer. Cases beyond the scope of a CCA’s ability were referred to the RHSP counselor or a local social welfare officer. Community counseling aides received a monthly stipend of 10,000 Ugandan shillings (~$6 USD). SHARE’s CCA’s were also trained using the framework of the Community Activism Course (Michau &amp; Naker, 2003)</td>
</tr>
<tr>
<td>Counseling network:</td>
<td>A counseling network was established between SHARE CCA’s, RHSP resident counselors and the district level social welfare officers, primarily in the 4 intervention regions but sometimes extending beyond. Regular meetings were held to bring representatives from these entities together so they could become familiar with one another, exchange information and trouble shoot IPV and HIV-related issues experienced during day to day work.</td>
</tr>
</tbody>
</table>
Disclosure Assessment: Counselors were trained to ask female clients the following questions:

1. Is your partner aware that you will be tested for HIV? (Yes/No)
2. If you told your partner you tested positive for HIV do you think he would react supportively? (Yes/No)
3. Are you afraid of how your partner will react if you share your HIV test results with him? (Yes/No)
4. Has your partner ever physically hurt you? (Yes/No)
5. Do you think that your partner may physically hurt you if you tell him that you have tested for HIV and your HIV test results are positive? (Yes/No)

HIV disclosure recommended: Counselors were trained to encourage women to disclose their HIV status if they answered: (1) “Yes” or “No” to question 1, and (2) “Yes” to question 2, and (3) “No” to questions 3-5.

Alternative models of HIV disclosure: Counselors were trained to explore alternative options for disclosure if a woman answered: (1) “No” to question 2, and (2) “Yes” to any of the following questions, 3-5. Alternative options for disclosure included:

- Opting not to disclose
- Deferring disclosure to a time when the woman’s safety could be insured
- Developing a plan for mediated disclosure in which the woman either brings her partner to the clinic to disclose in the presence of a counselor or identifies a trusted family member or friend who can be present with the woman when she shares her HIV test results with her partner.
Table VI. Risk reduction tool and process (King et al., 2007).

| Counselors were trained to introduce the risk reduction activity to clients with this preamble: |
| Condom use can effectively prevent the transmission of HIV between sexual partners. However, sometimes partners do not want to use condoms. Also, sometimes partners become violent when their partners ask them to use a condom or refuse to have sex. Therefore, it is important to develop skills to discuss condom use and the right not to have sex if you are not comfortable. We can go through some role playing that is intended to help you think about how your partner might react to using a condom and how you might respond. |

**ROLE-PLAY SCENARIOS TO ADDRESS THE RISK OF VIOLENCE (FOR WOMEN IN RELATIONSHIPS)**

<table>
<thead>
<tr>
<th>If their partner says...</th>
<th>They can say...</th>
</tr>
</thead>
<tbody>
<tr>
<td>“If you don’t have sex with me without a condom, I will force you.”</td>
<td>“A respectable man cannot force his partner into sex. I respect you and you ought to respect me. Let’s talk about this calmly.”</td>
</tr>
<tr>
<td>“I have a right to have sex with you without a condom.”</td>
<td>“I will have sex with you but I would prefer to use a condom, until we get tested. We need to protect our health.”</td>
</tr>
<tr>
<td>“I paid a bride price for you. You have to have sex with me.”</td>
<td>“Yes, you did pay a bride price. Don’t you want to keep me healthy and alive so I can take care of our children?”</td>
</tr>
</tbody>
</table>

**ROLE-PLAY SCENARIOS TO TALK ABOUT CONDOMS**

(For younger couples and those in a relationship but not yet married)

<table>
<thead>
<tr>
<th>If their partner says...</th>
<th>They can say...</th>
</tr>
</thead>
<tbody>
<tr>
<td>“We have never used a condom before.”</td>
<td>“I don’t want to take any more risks for HIV and STIs.”</td>
</tr>
<tr>
<td>“Don’t you trust me?”</td>
<td>“I trust you are telling the truth but with some STI’s there are no symptoms. Let’s be safe and use condoms.”</td>
</tr>
<tr>
<td>“It seems you have another boyfriend.”</td>
<td>“I am very faithful to you but we need to protect ourselves from HIV”</td>
</tr>
</tbody>
</table>

(For married/permanent couples)

<table>
<thead>
<tr>
<th>If their partner says...</th>
<th>They can say...</th>
</tr>
</thead>
<tbody>
<tr>
<td>“But we want to have more children.”</td>
<td>“But we need children who are planned and healthy. We need to protect our health by wearing condoms.”</td>
</tr>
<tr>
<td>“I thought you said condoms were for casual partners?”</td>
<td>“I also thought so but we need to face the facts. I want us to stay happy and healthy.”</td>
</tr>
<tr>
<td>“You have HIV, not AIDS. We do not need to use a condom!”</td>
<td>“Even if you do not have AIDS, HIV can be passed from me to you. If you prevent HIV, you prevent AIDS.”</td>
</tr>
</tbody>
</table>
Table 2.7. Recommendations for future HIV and IPV prevention work

<table>
<thead>
<tr>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Awareness raising is needed to increase knowledge about the links between HIV and IPV.</td>
</tr>
<tr>
<td>2. On-site psychosocial support (or a strong referral system) should be integral to all violence reduction programs, whether they are standalone interventions or combined with other activities (such as HIV prevention work).</td>
</tr>
<tr>
<td>3. We suggest active partnership with groups and individuals in the community throughout the duration of your intervention. Introduce them to the project, solicit their suggestions and endorsement and take special care to ensure they are taken through their own process of behavior change.</td>
</tr>
<tr>
<td>4. If working to engage boys and men in the prevention of IPV, have both men and women lead the project, involve boys and men as volunteers and positive role models, and accommodate males who need longer (than females or other men) to progress through the stages of change.</td>
</tr>
<tr>
<td>5. If doing VCT work and funds and capacity allow, we recommend appointing community counseling aides to complement the work of the professional counselors.</td>
</tr>
<tr>
<td>6. Ideally the disclosure assessment and risk reduction tools should be implemented for 3-6 months or longer if funds and capacity allow. If role plays are used we suggest counselors develop personalized content based on what a client feels is appropriate in his/her relationship.</td>
</tr>
<tr>
<td>7. We urge programmers to measure the longer-term effectiveness and sustainability of the disclosure assessment and risk reduction tools through formal evaluation and feedback sessions.</td>
</tr>
<tr>
<td>8. Development, implementation and testing of male oriented violence prevention tools, both in and outside of the VCT setting, are warranted.</td>
</tr>
<tr>
<td>9. Impact assessment (through formal evaluation and feedback sessions) is needed to measure the longer-term effectiveness and sustainability of safe disclosure and risk reduction tools.</td>
</tr>
</tbody>
</table>
CHAPTER 3. METHODS
Methods for “Impact of Combined Intimate Partner Violence and HIV Prevention Intervention on Recent Emotional, Physical and Sexual Abuse and HIV Incidence in Rakai, Uganda: A Cluster Randomized Trial” (Chapter 4)

Research Team: Rakai Health Sciences Program

Data collection for this dissertation analysis was done by the research teams and investigators from RHSP which was established in 1988 with a focus on HIV/AIDS research, including evaluation of health education and condom promotion. Over time activities have increased in nature and volume and expanded to include laboratory and clinical research, randomized trials of new prevention strategies, health professional training, expanded community services including HIV voluntary testing and counseling, provision of HIV antiretroviral therapy (ART), general and HIV-related medical care, prevention of mother-to-child transmission of HIV (PMTCT), and family planning services. In 2002, the Rakai Program became an International Center for Excellence in Research (ICER), sponsored by the National Institute of Allergy and Infectious Diseases (NIAID). The core of the RHSP is the 18-year community-based longitudinal RCCS, within which the RHSP has implemented multiple interdisciplinary studies. Over 150 peer-reviewed papers have been generated from the RCCS and its nested studies.

Data Source: Rakai Community Cohort Study

This study is a secondary analysis of data collected through the RCCS which conducts survey interviews every 12-18 months with all consenting people aged 15-49 in ~5,000 households in 47-50 communities throughout Rakai (Wawer et al., 1998). These 47-50
communities represent 7% of the 720 communities situated in Rakai District. The RCCS includes participants residing in trading centers and agrarian villages, representative of rural southwestern Uganda. Each RCCS participant receives a unique, life-long study identification number used to link data over time and between RHSP studies. RCCS written informed consent forms cover study participation, sample archiving for future assays including genetic testing, linkage of RCCS data to other RHSP databases, and permission to re-contact participants for other studies.

The trial was funded by two studies, “Rakai Community Cohort Study” and “Assessing the impact of community-based intervention designed to reduce levels physical and sexual domestic violence in Rakai District, Uganda.” The “Rakai Community Cohort Study” received funding through NIAID and NICHD (RO1s and U01s) and the Gates Foundation. “Assessing the impact of community-based intervention designed to reduce levels physical and sexual domestic violence in Rakai District, Uganda” received funding from the World Health Organization.

**Study sample**

Data from 3 rounds of the RCCS were analyzed for this dissertation. Baseline data collection took place between February 2005 and June 2006. The first round of follow-up data were collected between August 2006 and April 2008. The second and final round of follow-up data were collected between June 2008 and November 2009.
A total of 11,452 eligible men and women aged 15–49 years were enrolled during the baseline round of data collection (Feb 2005–Jun 2006): 6,112 in the control arm and 5,339 in the intervention arm. Retention rates at the first follow up were 68% and 74% for women and 64% and 66% for men in the control and intervention arms, respectively. At the second follow up retention was 60% (control) and 57% (intervention) for women, and 56% (control) and 53% (intervention) for men. Cumulative retention rates over the two follow up visits were higher in the control arm (58%) than the intervention arm (55%) (p=0.001), and among women (59%) as compared to men (55%) (p=0.0001). All RCCS participants were compensated with 3,000 Ugandan Shillings (approximately $1.5 US) per visit. For hygiene purposes, participants in RCCS were also given a bar of soap after providing biological samples (blood, urine, and/or vaginal swabs).

**Study procedures**

One week prior to the RCCS survey all households are censused, enumerating residents by age, gender and relationship to the head of household and collecting information on births, deaths, migration, marital status, and socioeconomic status. Based on census data, lists of eligible RCCS participants are generated and participants are contacted. At each survey round, 12,000-16,000 participants consent to interview. Written informed consent is obtained at enrollment and each follow up visit. RCCS is an open cohort whereby newly age or geographically eligible individuals are enrolled at each follow-up round. It was designed to conduct a community randomized controlled trial (RTC) of STI control for HIV prevention within 56 communities (grouped into 10 clusters) (Wawer et al., 1998). The cohort has undergone slight changes but 45 communities have remained
consistently under surveillance for 16 years. The original 10 clusters were rearranged over time into 11 clusters.

The RCCS interviews for this study were conducted in the respondents’ homes or at a central location (referred to as a “hub”). Interviews were done in complete privacy in the language of Luganda by experienced same-sex interviewers using structured questionnaires. RCCS questionnaires collected data on socio-demographics, health and sexual behaviors including sexual network questions for up to four partnerships in the prior year. Biological specimen included blood, genital ulcer swabs, self-collected vaginal swabs (women). All participants were provided free pre-test counseling and encouraged to receive HIV test results and post-test counseling. Approximately 94% of RCCS eligible residents agree to participate annually. Annual outmigration (~20%) does occur but it is balanced by in-migration and aging-in of adolescents.

**Data analysis**

All data were analyzed using Stata/SE version 12 (StataCorp, 2011).

**Overview**

An intention to treat approach was used in which all eligible participants with complete data for each outcome of interest were included in the analysis by randomized trial arm. Social and demographic characteristics (age, religion, education level, marital status) and sexual risk behaviors (past year condom use, past year number of non-marital sex partners, and alcohol use at last sex) were measured at baseline to assess comparability
between the study arms. Men’s and women’s reports of experiencing/perpetrating IPV were measured at baseline and follow up. Men’s reports of their circumcision status and women’s reports of their primary male partner’s circumcision status were also measured at baseline and each time of follow-up. Differences in loss-to-follow up were also assessed. Two-tailed p values (0.05) were estimated for dichotomous and categorical variables using Pearson's chi-square and Fischer's exact tests for differences in proportions. T-tests and Wilcoxon rank tests were used for continuous variables.

Statistical model selection
All outcomes were analyzed separately for men and women and for the first and second follow-up visits. We tested for potential within-region correlation by fitting a random-intercept model at the region level and found no significant correlation within clusters for all IPV outcomes (rho=0, p=1.0). Given the low correlation within clusters and questions regarding the stability of estimation and difficulty of verifying the random effects assumptions given the small number of clusters (11 clusters), we chose generalized linear models for the main analysis. In addition, minimal differences in point estimates for the intervention effect were found using a random effects model compared to the generalized linear model.

Analysis of violence outcomes
Each of the primary violence outcomes (emotional, physical and sexual IPV) were analyzed as dichotomous using “modified” Poisson regression models estimate prevalence risk ratios (PRRs) by fitting a generalized linear model (glm) using a log link
with an assumed underlying Poisson distribution (Zou G, 2004). In our main models estimating the intervention’s effect on recent IPV we controlled for covariates shown to be correlated with the violence outcomes in the literature, in previous Rakai studies, and the characteristics found to differ (at p<0.05) between the trial arms at baseline. These included age, education, marital status, IPV and number of non-marital sex partners in the year preceding baseline interview.

**Measurement of violence outcomes**

Men were asked to report on perpetration of IPV while women were asked to report on their experiences of IPV victimization. An adaptation of the Conflict Tactics Scales (Straus, 1979) was used to measure past year emotional, physical and sexual IPV.

- **Emotional IPV** was measured by asking, “In the past 12 months, has your current partner verbally abused or shouted at you?” [YES/NO]

- **Physical IPV** was measured by asking, “In the past 12 months, has your current partner done any of the following to you”:
  - Pushed, pulled, slapped, or held you down? [YES/NO]
  - Punched you with fist or with something that could hurt you? [YES/NO]
  - Kicked you or dragged you? [YES/NO]
  - Tried to strangle you or burn you? [YES/NO]
  - Threatened you with a knife, gun or other type of weapon? [YES/NO]
  - Attacked you with knife, gun, or other weapon? [YES/NO]
• **Sexual IPV** was measured by asking, “In the past 12 months, has your current partner done any of the following to you”:
  
  o Used verbal threats to force you to have sex when you did not want to? [YES/NO]
  
  o Physically forced you to have sex when you did not want to? [YES/NO]
  
  o Forced you to perform other sexual acts when you did not want to? [YES/NO]

*Analysis of HIV incidence outcome*

For analysis of the HIV incidence outcome, only baseline HIV negative were included. Person years (PY) of exposure were cumulated from baseline to the last negative HIV result if the person remained negative, or to the midpoint of the interval between the last negative tests and first positive tests for seroconverters. HIV incidence was estimated per 100 PY. This analysis also followed an intention-to-treat approach, using a log link and Poisson distribution to estimate the incidence rate ratios (IRR) of HIV acquisition comparing intervention to control groups. The models estimating the effects of the intervention on HIV incidence were also adjusted for age, education, marital status and number of non-marital sex partners. Additionally, we controlled for respondents’ self-reports of condom use at baseline and each follow-up as well as men’s self-reported circumcision status, and women’s report of their primary male partner’s circumcision status (at each follow up).
**Measurement of HIV incidence outcome**

HIV incidence was determined from venous blood samples, using two enzyme immunoassay (EIA), with Western blot (WB) and/or polymerase chain (PCR) confirmation of discordant EIA results and for all seroconversions.

**Additional HIV incidence analysis on secular trends**

To assess comparability between study arms prior to the intervention we estimated HIV incidence during two preceding survey rounds (September 2003 – November 2004), before initiation of SHARE. This also allowed assessment of secular trends in HIV incidence data for both study arms before and after the intervention. Thus, we estimated incidence by study arm pre-baseline, at baseline, two trial follow up visits and after the trial’s final follow up (January 2010 – June 2011). The post-trial incidence allowed assessment of the sustainability of any effects.

**Analysis of covariates**

Select covariates were measured through questions included in the RCCS survey. **Non-marital partnerships** were assessed by asking respondents, “Do you currently have a relationship with someone to whom you are not officially married or in a consensual union?” For married participants, non-marital partners were estimated by subtracting the number of marital partners from the total number of partners. **Past year condom use** was measured through two questions. Participants were asked “During the past 12 months have you/partner used condoms?” Those who responded “yes” were asked about if they used condoms consistently, sometimes (inconsistently) or always. To measure **patterns of alcohol use during sex**, participants were asked, “Did you drink alcohol
before your last sex with this partner?” (Yes/No). **Circumcision status** of male participants and male partners of female participants was assessed by asking men “Are you circumcised?” and women “Is your partner circumcised?”

**Ethical considerations**

Several steps were taken by the RHSP to ensure the safety and confidentiality of all research participants. Because this was secondary data analysis, the main risk was breach of confidentiality if participant records, interviews or lab results are revealed to third parties. Informed consent documents are retained in locked filing cabinets and store rooms, accessible only to senior investigators or designated staff. All questionnaires and samples are identified by pre-printed study ID numbers, and names are removed. All questionnaires are stored in secure, locked facilities in the field station in Kalisizo and permanent stores in Entebbe. Only designated staff members have access to these records. All computerized data bases contain study ID numbers and the lists linking study numbers to names is kept separately in a password protected computer accessible only to senior data managers. Files of lab results are maintained in a separate safe computer file, with study ID numbers, and contain no personal identifiers.

The RCCS interviews for this study were conducted in the respondents’ homes or at a central location (referred to as a “hub”). Interviews were done in complete privacy in the language of Luganda by experienced same-sex interviewers using structured questionnaires. Recognizing that research on IPV raises important ethical and methodological challenges beyond those posed by general population health research,
RHSP investigators followed recommendations developed by the WHO regarding the safe and ethical conduct of domestic violence research (World Health Organization, 2001).

IRB approval for the original study data was provided under two studies “Rakai Community Cohort Study” and “Assessing the impact of community-based intervention designed to reduce levels physical and sexual domestic violence in Rakai District, Uganda.” The “Rakai Community Cohort Study” received IRB approval from WIRB (WIRB PRO#20031318) and the study “Assessing the impact of community-based intervention designed to reduce levels physical and sexual domestic violence in Rakai District, Uganda” received approval from the IRB of the World Health Organization (WHO.A55085). Both studies also received ethical approval from the Uganda Virus Research Institute’s Science Ethics Committee and the Ugandan National Council of Science and Technology. Ethical approval for the proposed secondary analysis was received by WIRB as a sub study to the ongoing Rakai Community Cohort study (WIRB PRO#20031318). All enrollment and data collection has ended.

Methods for “Trends in Risky Sex Practices and HIV Results Disclosure after Exposure to an Intimate Partner Violence and HIV Risk Reduction Intervention in Rakai, Uganda: A Cluster Randomized Trial" (Chapter 5)

The research team, data source, study sample, study procedures, and ethical considerations for the third manuscript (“Trends in Risky Sex Practices and HIV Results
Disclosure after Exposure to an Intimate Partner Violence and HIV Risk Reduction Intervention in Rakai, Uganda: A Cluster Randomized Trial": Chapter 5) are identical to those used for the second manuscript (“Impact of Combined Intimate Partner Violence and HIV Prevention Intervention on Recent Emotional, Physical and Sexual Abuse and HIV Incidence in Rakai, Uganda: A Cluster Randomized Trial”: Chapter 4). The data analysis, however, is unique and is described in full below.

**Data analysis**

All data were analyzed using Stata/SE version 12 (StataCorp, 2011).

**Overview**

The analysis was restricted to RCCS participants aged 15-49 who enrolled at the SHARE CRT baseline, were sexually active in the past year and provided follow up information. HIV incidence was determined in the initially HIV-uninfected population. An intention to treat approach was used in which all participants with complete data for each outcome of interest at each follow up visit were included. Social and demographic characteristics (age, religion, education level, marital status, and age at first sex) as well as all main risk behavior outcomes were measured at baseline to assess associations between potential confounders and outcomes of interest and to assess comparability between the two study arms. Differences in frequencies for dichotomous and categorical variables were tested using Pearson's chi-square and Fischer's exact tests for differences in proportions. T-tests and Wilcoxon rank tests were used for continuous variables.
Risk behavior outcomes

Eight risk behavior outcomes were measured in this analysis, including past year (1) intimate partner rape (forced sex), (2) total number of sex partners, (3) number of extra-marital sex partners, (4) alcohol use with last sex, (5) condom use, (6) discussion about condom use with primary partner, (7) main partner’s disclosure of his/her HIV status to respondent and (8) respondent’s disclosure of HIV status in past year. It is worth noting that intimate partner/spousal rape (forced sex), as measured in the current analysis, differed from the measurement of sexual IPV (for the paper “Impact of Combined Intimate Partner Violence and HIV Prevention Intervention on Recent Emotional, Physical and Sexual Abuse and HIV Incidence in Rakai, Uganda: A Cluster Randomized Trial”: Chapter 4). Intimate partner rape is also referred to as marital rape or spousal rape and it refers to forced sex in which the perpetrator is the victim's partner or spouse. In this analysis intimate partner rape was defined as unwanted penetrative sex involving the use of physical force whereas sexual IPV was more broadly defined as penetrative or non-penetrative sex or other sexual acts involved verbal threats or physical forced.

Statistical model selection

All outcomes were analyzed separately for men and women and for the first and second follow-up visits. We tested for potential within-cluster correlation by fitting a random-intercept model at the cluster level and found no significant correlation within clusters for all IPV outcomes (rho=0, p=1.0). Given the low correlation within clusters and questions regarding the stability of estimation and difficulty of verifying the random effects assumptions with the small number of clusters (11 clusters), we chose generalized linear
models for the main analysis. In addition, minimal differences in point estimates for the intervention effect found generalized linear model were compared using a random effects model.

Analysis of risk behavior outcomes

Each outcome was analyzed as dichotomous and “modified” Poisson regression models were used to estimate prevalence risk ratios (PRRs) by fitting a generalized linear model (glm) with a log link and an assumed underlying Poisson distribution (Zou G, 2004). In our adjusted models we controlled for covariates found to differ (at the p<0.05 significance levels) between the two trial arms at baseline. These included baseline age of the respondent, education level, marital status, number of non-marital sex partners in year preceding baseline interview and baseline report of the outcome being measured.

Measurement of risk behavior outcomes

The following survey questions were used to measure the eight risk behavior outcomes of interest in this study.

- **Intimate partner rape** (or spousal rape or forced sex) was measured by asking, “In the past 12 months have any of your sexual partners physically forced you to have sex when you did not want to?” [YES/NO] *Victimization was measured among women and perpetration measured among men.*

- **Multiple (more than 1) sexual partners** was measured by asking, “How many different sexual partners have you had in the last 12 months, including married or consensual partners, and anyone already mentioned?” [One/two or more]
• **Non-marital sexual partners** was measured by asking, “Do you currently have a relationship with someone to whom you are not officially married or in a consensual union?” [NO/YES]

• **Alcohol use with sex** was measured by asking, “Did you drink alcohol before your last sex with this partner?” [NO/YES]

• **Condom use** was measured by asking, “During the past 12 months have you/partner used condoms?” [NO/YES]

• **Discussion about condom use** was measured by asking, “Have you discussed condom use with this partner?” [NO/YES]

• **Partner's disclosure of HIV status** was measured by asking, “In the last 12 months has this partner informed you of his/her HIV sero-status?” [No or never got tested/results / Yes or received couple counseling]

• **Self-disclosure of HIV status** was measured by asking, “In the last 12 months have you informed this partner of your HIV serostatus?” [No or never got tested/results / Yes or received couple counseling]

*Sub-analysis on risk behavior outcomes and HIV incidence*

A sub-analysis was conducted on risk factors that potentially mediated the relationship between IPV and HIV infection and that differed between study arms in association with exposure to SHARE. To assess whether significant changes in risk factors could have reduced HIV incidence we examined differences in HIV incidence rates by risk factor and trial arm separately for men, women and the total population. To estimate HIV incidence we used data from participants who were HIV negative at baseline. PY of
exposure were cumulated from baseline to the last negative HIV result if the person remained negative, or to the midpoint of the interval between the last negative tests and first positive tests for seroconverters. HIV incidence was estimated per 100 PY. This analysis followed an intention-to-treat approach, using a log link and Poisson distribution to estimate the incidence rate ratios (IRR) of HIV acquisition comparing intervention to control arms. The models estimating the effects of the intervention on HIV incidence were adjusted for baseline age, education, marital status, number of non-marital sex partners, respondents’ self-reports of condom use at baseline and each follow-up as well as men’s self-reported circumcision status, and women’s report of their primary male partner’s circumcision status (at each follow up).
References

StataCorp. (2011). Stata Statistical Software: Release 12. College Station, TX: StataCorp LP.


CHAPTER 4.

IMPACT OF COMBINED INTIMATE PARTNER VIOLENCE AND HIV PREVENTION INTERVENTION ON RECENT EMOTIONAL, PHYSICAL AND SEXUAL ABUSE AND HIV INCIDENCE IN RAKAI, UGANDA: A CLUSTER RANDOMIZED TRIAL
Abstract

Background: Intimate partner violence (IPV) is a precursor to and consequence of HIV infection. Few interventions combining HIV and IPV prevention have been evaluated and none has significantly decreased both outcomes.

Design: A cluster-randomized trial was conducted in Rakai, Uganda between 2005 and 2009. Intervention arm clusters (n=4) received an IPV prevention intervention (the Safe Homes and Respect for Everyone (SHARE) Project), enhanced HIV testing and treatment and routine HIV services. Control arm clusters (n=7) received standard of care HIV services alone.

Methods: Baseline and two follow-up visits were conducted via the Rakai Community Cohort Study between 2004 and 2009. Primary outcomes were past year emotional, physical and sexual IPV and HIV incidence. Analysis was by intention-to-treat. Modified Poisson regression was used to estimate prevalence risk ratios (PRR) to detect the impact of the intervention on IPV. Poisson regression was used to estimate incidence rate ratios (IRR) of HIV acquisition per 100 PY.

Results: The SHARE intervention was associated with reduced physical IPV (aPRR=0.80; 95% CI: 0.68-0.93), sexual IPV (aPRR= 0.82; 95% CI: 0.69-0.99) and in women’s reports of emotional IPV (aPRR= 0.90; 95% CI: 0.79-1.03). SHARE did not significantly reduce reported perpetration of IPV by men. The intervention was associated with a reduction of HIV incidence in the total population (aIRR=0.64; 95% CI:...
0.43-0.95, P=0.028). HIV incidence was significantly lower among men in the SHARE arm (aIRR=0.63, 95% CI: 0.39-0.99, P=0.049) and marginally significant among women (aIRR=0.69; 95% CI: 0.45-1.06, P=0.088).

**Conclusion:** The SHARE intervention reduced IPV among women and HIV incidence in the population. The SHARE intervention model could inform programs in the prevention of both IPV and HIV.
Introduction

A growing body of research suggests women who experience intimate partner violence (IPV) are at increased risk for HIV acquisition and other sexually transmitted infections (STIs) (Campbell, 2002; Campbell & Soeken, 1999; Campbell, et al., 2008; Garcia-Moreno & Watts, 2000; Fonck, et al., 2005) and HIV-infected women are at heightened risk for IPV (Campbell, et al., 2008; Maman, et al., 2002). In response to these findings, programs combining efforts to reduce HIV and IPV have been promoted (OGAC, 2006; Silverman, 2010).

Several IPV/HIV prevention intervention studies have been conducted in sub-Saharan Africa, the region most burdened by the global AIDS epidemic (UNAIDS/WHO, 2009) and with some of the world’s highest rates of IPV (Garcia-Moreno et al., 2006). Varying intervention approaches have been used (WHO, 2010) but few joint IPV/HIV interventions have been evaluated and among those that have, none has successfully reduced both outcomes.

Two cluster-randomized trials (CRTs) were conducted in South Africa to evaluate HIV prevention interventions targeting gender norms and gender based violence (GBV) Incident HIV infection was a primary outcome in both trials. The Stepping Stones intervention was associated with a 33% reduction in herpes virus type 2 (HSV-2) incidence and reduced violence perpetration and select risky behaviors among men. No impact was found, however among desired behavior change among women and the study did not affect HIV incidence (Jewkes, et al., 2008). The Intervention with Microfinance
for AIDS and Gender Equity (IMAGE) reduced IPV by 55% but did not affect the rate of unprotected sex with non-spousal partners, nor did it reduce HIV incidence (Pronyk et al., 2006). While these findings suggest that integrated gender equality/HIV training interventions offer potential synergies, they highlight the need for further testing of innovative programs so as to assess strategies for reducing both HIV incidence and IPV.

Uganda is a traditional patriarchal society. Land ownership and inheritance is mainly patrilineal and customary laws privilege men in decision-making and allocation of roles (Ellis, et al., 2006). This paper describes a community-based CRT conducted between 2005 and 2009 to evaluate the impact of an IPV prevention intervention that was integrated into an ongoing HIV research and service provision organization in Rakai, Uganda. The goal of the combined approach was to reduce both IPV and HIV incidence and the trial aimed to measure the intervention’s impact on these two outcomes. A cluster design was chosen for the intervention and its evaluation so that all individuals and their intimate sexual partners would be exposed to the intervention.

**Methods**

*Study population and setting*

Rakai District, located in southwest Uganda, has high HIV prevalence and incidence with a mature generalized HIV epidemic (Konde-Lule, et al., 1997; Sewankambo, et al., 2000, Wawer et al., 1997) and relatively high rates of IPV (Koenig et al., 2003).
The HIV/IPV intervention trial was conducted by Rakai Health Sciences Program (RHSP), an established HIV research and service provision program (Wawer et al., 1998; Zablotska, et al., 2009). The trial was nested in the Rakai Community Cohort Study (RCCS), an open, community-based, longitudinal cohort which has implemented multiple interdisciplinary studies since 1994 (ref). RCCS conducts interviews and serological surveys with all consenting individuals aged 15-49 years residing in approximately 50 communities located on secondary roads which have been aggregated into 11 study clusters for a prior community-randomized trial of STI control for HIV prevention (Wawer et al., 1998).

In 2005, RHSP initiated a primary IPV prevention intervention named the Safe Homes And Respect for Everyone (SHARE) Project in 4 randomly selected RCCS clusters which constituted the intervention arm of the trial (Wagman, et al., 2012). Additionally, RHSP’s HIV prevention, testing, and treatment activities were enhanced in these 4 clusters to integrate procedures for raising awareness about IPV, screening for its occurrence, handling and referring cases, and offering risk reduction strategies for women in abusive relationships. The other 7 RCCS clusters were not exposed to SHARE or the enhanced HIV activities, but continued to receive RHSP’s standard of care services including health education, voluntary HIV counseling and testing (VCT), and HIV care and treatment, including antiretroviral therapy (ART). These clusters constituted the control arm.
Study design and intervention description

The trial used a community-based approach and built on a previous CRT conducted between 1999 and 2002 to assess the impact of enhanced family planning (FP) outreach via social marketing in Rakai (Lutalo, et al., 2012). The FP trial randomized 5 clusters to receive standard FP services (control) and 6 clusters (intervention). For the current IPV/HIV intervention trial, 4 of the 6 FP intervention clusters were assigned to the intervention arm. The remaining 2 FP intervention clusters, as well as all 5 FP control areas were assigned to the control arm of the current CRT, making a total of 7 control clusters (Figure 4.1). The decision to allocate only 4 communities to intervention was based on budgetary constraints which precluded a larger number of intervention areas.

IPV prevention (the SHARE Project) and enhanced HIV services from RHSP

Details of the SHARE Project have been described previously (Wagman, et al., 2012). Briefly, SHARE followed a recommended public health approach (CDC, 2009), was based on the Transtheoretical Model (TTM) of Behavior Change (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997) and adapted proven successful violence prevention methodologies from Stepping Stones (Welbourn, 1995) and Raising Voices’ Resource Guide for Mobilizing Communities to Prevent Domestic Violence (Michau & Naker, 2003). SHARE aimed primarily to reduce physical and sexual IPV. The intervention also focused on the importance of mitigating emotional abuse (CDC, 2009). SHARE encouraged people to change their attitudes about the acceptability of all forms of IPV, adopt non-violence methods of conflict resolution, increase couple communication, increase disclosure of HIV results, reduce their number of non-marital
sexual partners, reduce alcohol use with sex, increase the consistent use of condoms, and
improve communication about reproductive health choices. SHARE used multiple
strategies, including advocacy, capacity building, community activism, learning
materials, a program for men and boys, a youth program and special events (Wagman, et
and implemented its strategies over the course of 5 consecutive phases that
complemented the TTM’s 5 “Stages of Change” and used Stepping Stones’ training
package for adolescents (Welbourn, 1995) which implemented participatory learning to
improve communication skills and build more gender-equitable intimate relationships
(Wagman, et al., 2012).

In the four intervention clusters, SHARE partnered with RHSP’s Health Education and
Community Mobilization (HECM) team to incorporate IPV reduction messages in their
ongoing HIV education approach in intervention clusters. These enhanced messages
were delivered through community meetings, local theatre, sporting events, film shows
and written/visual education materials. Additionally, information sessions focusing on
the links between IPV and HIV and the context in which violence occurred within the
lives of people living with HIV (PLHIV) were provided to patients receiving pre-ART
care and ART.

Violence prevention was also integrated into existing VCT and ART screening and
treatment procedures. RHSP’s VCT and ART counselors in intervention clusters were
trained to understand IPV and its links with HIV. SHARE also trained 12 community
counseling aides (CCA) trained in basic psychosocial, violence prevention and HIV counseling. There were 3 CCAs in each of the 4 SHARE clusters. Two counseling tools to address HIV and violence were pilot-tested. The first tool was used to assess clients’ fears of IPV and safety for HIV disclosure and to help them develop safe disclosure plans. The second tool helped counselors provide risk reduction counseling to HIV-infected women with histories of IPV and/or a partner/husband who refused VCT. RHSP’s ART counselors working in SHARE intervention clusters were trained to understand and recognize IPV, help clients develop safe HIV disclosure plans, facilitate disclosure of HIV results, and help HIV-infected women practice IPV risk reduction strategies.

**RHSP’s routine HIV services**

RHSP’s routine services included provision of free male condoms, syndromic STI treatment, general medical care, prevention of mother-to-child HIV transmission services, HIV prevention and general health education. RHSP also offered HIV testing, HIV results and post-test counseling through a system of community-based counselors (Matovu et al., 2002). PLHIV who accepted VCT were referred to program clinics for free CD4 evaluation and HIV care, including “the Basic Care Package” (cotrimoxazole prophylaxis for opportunistic diseases, bed nets for malaria prevention, clean water containers and hypochlorite for prevention of diarrhea) and supportive education on living with HIV and prevention of transmission. Persons receiving HIV care were initiated on standard first line ART when they reached WHO stage IV disease and/or a
CD4 count of $\leq 250$ cells/mm$^3$. Persons on ART were monitored via CD4 cell counts and HIV viral loads.

Figure 4.2 illustrates what individuals in the intervention and control clusters of the trial were exposed to during the course of the intervention.

**Endpoints and covariates**

Eligibility criteria for inclusion in the current trial analyses were (1) enrollment into RCCS at baseline (2005-06), (2) report of sexual activity or being in a partnership in the year prior to the baseline interview, (3) provision of follow-up information on variables of interest. For HIV incidence, only participants with initial HIV-negative serostatus at their baseline visit were included in the analyses.

The primary endpoints of this study were past year emotional, physical and sexual IPV and HIV incidence reported at two follow up surveys. Men were asked to report on perpetration of IPV while women were asked to report on their experiences of IPV victimization. An adaptation of the Conflict Tactics Scales (Straus, 1979) was used to measure emotional, physical and sexual IPV. HIV incidence was determined from venous blood samples, using two enzyme immunoassay (EIA), with Western blot (WB) and/or polymerase chain (PCR) confirmation of discordant EIA results and for all seroconversions. The survey questions used to measure IPV are shown in Table 4.1.
To assess comparability between study arms prior to the intervention we estimated HIV incidence during two preceding survey rounds (September 2003 – November 2004), before initiation of SHARE. This also allowed assessment of secular trends in HIV incidence data for both study arms before and after the intervention. Thus, we estimated incidence by study arm pre-baseline, at baseline, two trial follow up visits and after the trial’s final follow up (January 2010 – June 2011). The post-trial incidence allowed assessment of the sustainability of any effects.

All covariates were measured through questions included in the RCCS survey. Non-marital partnerships were assessed by asking respondents, “Do you currently have a relationship with someone to whom you are not officially married or in a consensual union?” For married participants, non-marital partners were estimated by subtracting the number of marital partners from the total number of partners. Past year condom use was measured through two questions. Participants were asked “During the past 12 months have you/partner used condoms?” Those who responded “yes” were asked about if they used condoms consistently, sometimes (inconsistently) or always. To measure patterns of alcohol use during sex, participants were asked, “Did you drink alcohol before your last sex with this partner?” (Yes/No). Circumcision status of male participants and male partners of female participants was assessed by asking men “Are you circumcised?” and women “Is your partner circumcised?”
**Study schedule**

Baseline interviews and biological samples were collected via RCCS between February 2005 and June 2006. Two follow up rounds of data collection occurred between August 2006 and April 2008, and June 2008 and November 2009. Thus, the entire intervention trial lasted 4 years and 7 months.

The timing of the research activities and the intervention’s implementation was designed so (1) baseline data were collected before the intervention started in each region; and (2) each intervention region had approximately the same length of exposure to the IPV prevention and enhanced HIV activities. The timing of the intervention was staggered using the schedule of RCCS surveys. The timing of the survey data collection points and the intervention’s implementation is illustrated in Figure 4.3.

**Data analysis**

An intention to treat approach was used in which all eligible participants with complete data for each outcome of interest were included in the analysis by randomized trial arm. Social and demographic characteristics (age, religion, education level, marital status) and sexual risk behaviors (past year condom use, past year number of non-marital sex partners, and alcohol use at last sex) were measured at baseline to assess comparability between the study arms. Men’s and women’s reports of experiencing/perpetrating IPV were measured at baseline and follow up. Men’s reports of their circumcision status and women’s reports of their primary male partner’s circumcision status were also measured at baseline and each time of follow-up. Differences in loss-to-follow up were also
assessed. Two-tailed p values (0.05) were estimated for dichotomous and categorical
variables using Pearson's chi-square and Fischer's exact tests for differences in
proportions. T-tests and Wilcoxon rank tests were used for continuous variables.

All outcomes were analyzed separately for men and women and for the first and second
follow-up visits. We tested for potential within-region correlation by fitting a random-
intercept model at the region level and found no significant correlation within clusters for
all IPV outcomes (\(\rho=0, p=1.0\)). Given the low correlation within clusters and questions
regarding the stability of estimation and difficulty of verifying the random effects
assumptions given the small number of clusters (11 clusters), we chose generalized linear
models for the main analysis. In addition, minimal differences in point estimates for the
intervention effect were found using a random effects model compared to the generalized
linear model. All data were analyzed using Stata/SE version 12 (StataCorp, 2011).

Each of the primary violence outcomes (emotional, physical and sexual IPV) were
analyzed as dichotomous using “modified” Poisson regression models estimate
prevalence risk ratios (PRRs) by fitting a generalized linear model (glm) using a log link
with an assumed underlying Poisson distribution (Zou G, 2004). In our main models
estimating the intervention’s effect on recent IPV we controlled for covariates shown to
be correlated with the violence outcomes in the literature, in previous Rakai studies, and
the characteristics found to differ (at \(p<0.05\)) between the trial arms at baseline. These
included age, education, marital status, IPV and number of non-marital sex partners in the
year preceding baseline interview.
For analysis of the HIV incidence outcome, only baseline HIV negative were included. Person years (PY) of exposure were cumulated from baseline to the last negative HIV result if the person remained negative, or to the midpoint of the interval between the last negative tests and first positive tests for seroconverters. HIV incidence was estimated per 100 PY. This analysis also followed an intention-to-treat approach, using a log link and Poisson distribution to estimate the incidence rate ratios (IRR) of HIV acquisition comparing intervention to control groups. The models estimating the effects of the intervention on HIV incidence were also adjusted for age, education, marital status and number of non-marital sex partners. Additionally, we controlled for respondents’ self-reports of condom use at baseline and each follow-up as well as men’s self-reported circumcision status, and women’s report of their primary male partner’s circumcision status (at each follow up).

Regulatory approvals, ethics and ensuring the safety of participants

The study was approved by the Western Institutional Review Board, the World Health Organization’s Ethics Review Committee, the Uganda Virus Research Institute’s Scientific and Ethics Committee and the Ugandan National Council of Science and Technology. All interviewers were trained using the World Health Organization’s guidelines on conducting safe and ethical research on domestic violence (WHO, 2001).

Participants who disclosed IPV to a SHARE staff member or an RCCS interviewer were referred to a SHARE CCA to provide basic psychosocial support. Abuse victims needing
professional mental health and/or HIV-related counseling were referred to one of RHSP’s VCT or ARV counselors. With respect to social welfare, legal and law enforcement services, SHARE partnered with the District Police Office and the District Government Office of Community Services which employed social welfare officers throughout Rakai. Victims of abuse who requested welfare, law or criminal justice services were directly referred to a partnering officer from one of these jurisdictions in the 4 intervention clusters.

Results

A total of 11,452 eligible men and women aged 15–49 years were enrolled at baseline: 6,112 in the control arm and 5,339 in the intervention arm. The numbers of participants enrolled and followed up are shown in the trial Consort diagram Figure 4.4. Retention rates at the first follow up were 68% and 74% for women and 64% and 66% for men in the control and intervention arms, respectively. At the second follow up retention was 60% (control) and 57% (intervention) for women, and 56% (control) and 53% (intervention) for men. Cumulative retention rates over the two follow up visits were higher in the control arm (58%) than the intervention arm (55%) ($p=0.001$), and among women (59%) as compared to men (55%) ($p=0.0001$).

Social, demographic and relationship characteristics of the two study arms at baseline are shown in Table 4.2. The two arms were similar for both sexes on religion, past year emotional IPV, past year condom use, and alcohol use with last sex; and among men for past year physical IPV perpetration. There were marginally significant differences
between arms in women’s reports of the number of non-marital sex partners and men’s reports of marital status. Significant differences were found between the arms for baseline for age and education.

At baseline, approximately 25% of women in both arms reported past year emotional IPV whereas 30% and 29% of men in the control and intervention groups, respectively, reported its perpetration during the same period. Past year physical IPV was reported by 18% and 17% of women in the control and intervention arms, respectively (p=0.05). Reports of perpetration by men were lower than reported by women in both the control (12%) and intervention (11%) arms. Past year experiences of sexual IPV at baseline in the control and intervention arms were reported by approximately 16% and 13% of women (p=0.01) and 6% and 4% of men (p=0.02), in the intervention and control arms, respectively.

Table 4.3 shows HIV prevalence and incidence in the two study arms at baseline. HIV prevalence was significantly higher in the control than intervention arm for women (14.1% vs 12.1%, p = 0.00) and men (11.3% vs 9.2%, p=0.03). HIV incidence in the follow up interval prior to baseline was comparable in the entire populations (1.5 per 100 py). Baseline incidence rates were higher among women in the intervention arm, compared to the control (1.26/100 py vs. 0.93/100 py) and higher among men in the control arm, compared to the intervention (1.21/100 py VS 0.77/100 py).
Table 4.4 displays men and women’s reports of past year condom use and the circumcision status of themselves (for men) or their primary partner (for women) at baseline and each of the two follow-ups. The two arms were similar for both sexes on each of the outcomes. However, the prevalence of female reported circumcision for their partners was higher than male self-reports of circumcision, probably because of polygamous marriages in which multiple women reported on the status of a single shared husband.

Tables 4.5 and 4.6 show the IPV outcomes for women and men by trial arm. The proportion of women who experienced physical as well as sexual IPV was significantly lower in the SHARE intervention arm at the second follow-up, after adjusting for potential confounders, including baseline differentials (aPRR Physical IPV= 0.80; 95% CI: 0.68-0.93 and aPRR Sexual IPV= 0.82; 95% CI: 0.69-0.99). The intervention was associated with borderline significant reductions in women’s experiences of emotional IPV (aPRR Emotional IPV= 0.90; 95% CI: 0.79-1.03).

There was no significant difference between the two arms in men’s reports of perpetration of physical IPV at either follow up (table 4.6). The proportion of men who perpetrated sexual IPV was lower in the SHARE arm compared to the control arm at the final follow up, but this difference was not statistically significant.

Unadjusted and adjusted IRRs of HIV incidence between the two study arms are shown in Table 4.7. Factors controlled for in the adjusted analyses were baseline age, education
level and marital status. The models adjusted for past year condom use, and number of past year non-marital sex partners as reported at baseline and follow-up. The adjusted models also controlled for circumcision status of male participants and the primary male partner of female participants as reported at baseline and both follow-ups. As shown in Table 4.7, HIV incidence for both sexes combined was significantly lower in the SHARE intervention arm, versus the control arm, after adjusting for confounders (aIRR=0.64, 95%CI: 0.43 - 0.95, p=0.028). This implies a 36% reduction in HIV incidence over the approximately four and half year period of the program. The intervention was associated with a significant lower HIV incidence among men (aIRR=0.63; 95% CI: 0.39 – 0.99; p=0.049) and a marginally significant lower incidence in women (aIRR=0.69; 95% CI: 0.45 – 1.06; p=0.088). It is noteworthy that the IRR for women declined from an unadjusted estimate of 0.87 to 0.69 after adjustment, suggesting substantial confounding.

To assess which covariates might account for this, we conducted a stepwise analysis (Table 4.8) which suggested that male partner’s circumcision status was the most likely potential confounder.

Table 4.9 shows HIV incidence rates in the control and intervention arms during five consecutive rounds of the RCCS between 2004 and 2011. The first data collection point (2003-2004) occurred before the current trial’s baseline and initiation of SHARE. At this stage, HIV incidence was non-significantly higher in the control arm (1.3/100 py) versus the intervention arm 1.05/100 py). At baseline, when SHARE was introduced and the “raising awareness” phase began, HIV incidence rates were equal between the two arms (1.05/100 py). The trial’s two follow up points of data collection (2006 - 2006) took
place during the scale up and full implementation phases of the intervention (Wagman, et al., 2012). A reduction in incidence was seen in the intervention arm but not in the control at both follow-up 1 (IRR=0.60; 95% CI: 0.42, 0.84) and follow-up 2 (IRR=0.66; 95% CI: 0.49, 0.90). During the post-SHARE intervention phase (2010-2011) incidence was comparable between study arms, suggesting that the trend of lower HIV incidence in the intervention arm was not sustained post-intervention.

Discussion

The SHARE trial assessed the impact of a community-based IPV prevention intervention that was nested within an existing cohort and HIV service provision project in rural Uganda. Individuals in both arms of the trial were exposed to RHSP’s routine HIV prevention and treatment services. People in the intervention arm were also exposed to comprehensive violence screening and prevention, and HIV risk reduction programs with enhanced safety of HIV disclosure.

The SHARE intervention had a significant impact on women’s experiences of physical and sexual IPV, but did not affect male reported perpetration of these two outcomes. The intervention was also associated with a decrease in HIV incidence which was not sustained during the post-trial phase.

Over the period of the intervention trial, levels of physical and sexual IPV victimization were significantly reduced by 20% and 18%, respectively, among women in the intervention arm relative to the control group. The SHARE intervention was also
associated with a marginally significant 10% decrease of emotional violence among women. However, men’s reports of all forms of IPV did not differ between study arms.

The discrepancy in men’s and women’s disclosure of violence was not unexpected. Compared to men, women reported far more physical and sexual IPV but less emotional abuse. Other studies consistently suggest that men under-report perpetration of abuse (Hamby, 2009). This underreporting could possibly be due to social desirability bias and stigma associated with disclosing abuse or men and women reporting on their experiences of violence differently (Hamby, 2009). Some men might have felt it was acceptable to report verbal/emotional abuse and moderate forms of physical violence against their female partners since cultural norms commonly condone the use of disciplinary violence in marriage (Ellis, et al., 2006). It is also possible that the questions we used to measure violence did not accurately capture the individual’s perception of abuse. For instance, violence against women is commonly justified in the Rakai setting (Koenig, et al., 2003), marital rape is not a widely accepted concept since choices about when to have sex are considered to be a man’s prerogative, particularly in wedlock (Wagman, 2009). Therefore, it is possible that men felt it was acceptable to underreport perpetration of sexual violence. For these reasons, we considered women’s accounts of physical and sexual IPV (rather than male reports of perpetration) as the main outcomes of the intervention.

This study suggests that the intervention was associated with a 36% reduction in HIV incidence in the population. This effect was more pronounced and statistically significant
in males (37%) than in females (31%) and the latter was marginally significant after adjustment.

While we cannot directly infer causality from the current analysis, although it is plausible that reductions in women’s experiences of IPV contributed to concomitant declines in female HIV incidence. A recent study from Rakai found significant associations between emotional, sexual and physical IPV and subsequent incident HIV infection among women (Kouyoumdjian, et al., 2013). Thus, by reducing women’s exposure to violence in the current trial study, it is possible that their risk of HIV infection was reduced. Additionally, while there were no differentials in number of sex/non-marital partners, alcohol use surrounding sex, use of condoms between study arms, disclosure of HIV results increased among all participants and was associated with reduced HIV acquisition in all groups and particularly among women (dissertation manuscript 3, “Trends in Risky Sex Practices and HIV Results Disclosure after Exposure to an Intimate Partner Violence and HIV Risk Reduction Intervention in Rakai, Uganda: A Cluster Randomized Trial”; Chapter 5). These findings might collectively account for an effect on female HIV incidence.

Limitations

This study had several limitations. The randomization of the 11 study clusters to the two arms of the trial built on a prior CRT which was initiated before the SHARE intervention began. However, due to financial constraints we could only introduce the intervention into 4 clusters, leading to imbalance in numbers and lack of comparability at baseline.
However, adjusting for the covariates found to differ at baseline, as well as determinants of the main outcomes, is likely to have controlled for confounding from baseline differences.

Participants in the intervention arm might have been more motivated to report less IPV than those in the control arm due to a social desirability bias. However, a meta-analysis suggested that there is low to moderate correlation between self-reports of IPV and validated scores of social desirability (Sugarman & Hotaling, 1997). In our study we considered women’s reports of their experiences of abuse as the main outcome and therefore feel this bias is likely minimal.

There also could have been contamination between arms (e.g., by police officers or community services officers whose jurisdictions covered both areas). We believe significant contamination is unlikely since the RCCS clusters are geographically separated, and any contamination would bias results towards the null.

We did not collect data on frequency of IPV or assess the severity of violence. Thus, repeated abuse cannot be distinguished from isolated events and severe and moderate forms of violence differentiated from minor abuse. Lack of severity scales and measures of context variables is a drawback of the Conflict Tactics Scales (Straus, 1979) to measure violence. We recommend that future research examine the nature, severity and frequency of violence in intimate partnerships.
We cannot conclusively attribute the reductions in HIV incidence to the SHARE intervention, although data from the two trial follow-up visits suggest a reduction in the intervention arm incidence that was not seen in the control. During this time free ART became available (June 2004) for participants with a CD4 cell count of 250 cells/μl or less or WHO stage IV disease. This was associated with reduced HIV-1 transmission in HIV-discordant couples due to reductions in HIV-1 viral load (Reynolds, S.J., et al., 2011). Additionally, the SHARE RCT coincided with the last year’s follow up of a male circumcision trial (terminated in December, 2006) and the provision of circumcision services thereafter. The trial showed that male circumcision reduced HIV incidence in men (Gray, et al., 2007), and subsequent post-trial follow up showed sustained circumcision effectiveness (Gray et al, AIDS 2012). These developments may explain the secular declines in incidence, but are unlikely to account for differential incidence between SHARE CRT arms.

Strengths

The design of the SHARE intervention was based on the Center for Disease Control and Prevention’s recommended public health approach to prevention (CDC, 2009), and the TTM (a dominant intervention model in health promotion), it used IPV prevention strategies derived from successful violence prevention programs, and was integrated into a well-established HIV research and service provision program in rural Africa.

The RCCS cohort enabled us to enroll and follow a well-characterized populations of both HIV-infected and uninfected individuals to assess the trajectory of changes in
violence, sexual risk behaviors and HIV incidence over time. Further, we were able to compare both women’s and men’s reports of victimization and perpetration of IPV.

In summary, the SHARE intervention trial suggests that the intervention reduced physical and sexual IPV among women and HIV incidence in the population. We believe our intervention model could inform other programs for prevention of IPV and HIV.
References


http://www.cdc.gov/violenceprevention/overview/publichealthapproach.html


StataCorp. (2011). Stata Statistical Software: Release 12. College Station, TX: StataCorp LP.


World Health Organization (WHO) Department of Gender, Women and Health. (2001)
Putting women first: Ethical and safety recommendations for research on domestic violence against women. Reference no. WHO reference number:
WHO/FCH/GWH/01.1. Last access on May 27, 2013 from:


Figure 4.1. Allocation of Family Planning Trial and HIV/IPV Prevention Trial Communities in Rakai
Figure 4.2 Exposure in the control and intervention arms

Allocation of 11 RCCS regions

CONTROL ARM (7 REGIONS)
- Routine RHSP HIV services
  - Health education
  - HIV/STI Prevention Services
  - HIV testing and results notification
  - Pre-ART care (Basic Care Package)
  - Treatment (ART)

INTERVENTION ARM (4 REGIONS)
- Routine RHSP HIV services
  - Health education
  - HIV/STI Prevention Services
  - HIV testing and results notification
  - Pre-ART care (Basic Care Package)
  - Treatment (ART)

- Enhanced RHSP HIV services
  - IPV/HIV prevention education
  - VCT counselors trained on IPV
  - ART counselors trained on IPV
  - Community counselors appointed
  - Safe disclosure tool pilot-tested
  - Risk reduction tool pilot-tested

- SHARE IPV prevention
  - Advocacy
  - Men and boys’ program
  - Capacity building
  - Community activism
  - Learning materials
  - Special events
  - Youth program
Figure 4.3. Timeline for research and intervention for each RCCS cluster in trial
Figure 4.4. Trial population by study arm and sex of participants
Table 4.1. Survey questions used to measure IPV outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Survey question(s) used to measure outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional (verbal) IPV</td>
<td>In the past 12 months, has your current partner verbally abused or shouted at you?</td>
</tr>
<tr>
<td></td>
<td>• No</td>
</tr>
<tr>
<td></td>
<td>• Yes</td>
</tr>
<tr>
<td>Physical IPV</td>
<td><em>In the past 12 months, has your current partner done any of the following to you:</em></td>
</tr>
<tr>
<td></td>
<td>• Pushed, pulled, slapped, or held you down?</td>
</tr>
<tr>
<td></td>
<td>• Punched you with fist or with something that could hurt you?</td>
</tr>
<tr>
<td></td>
<td>• Kicked you or dragged you?</td>
</tr>
<tr>
<td></td>
<td>• Tried to strangle you or burn you?</td>
</tr>
<tr>
<td></td>
<td>• Threatened you with a knife, gun or other type of weapon?</td>
</tr>
<tr>
<td></td>
<td>• Attacked you with knife, gun, or other weapon?</td>
</tr>
<tr>
<td>Sexual IPV</td>
<td><em>In the past 12 months, has your current partner done any of the following to you:</em></td>
</tr>
<tr>
<td></td>
<td>• Used verbal threats to force you to have sex when you did not want to?</td>
</tr>
<tr>
<td></td>
<td>• Physically forced you to have sex when you did not want to?</td>
</tr>
<tr>
<td></td>
<td>• Forced you to perform other sexual acts when you did not want to?</td>
</tr>
</tbody>
</table>
### Table 4.2. Social, demographic and relationship characteristics of the two study arms at baseline

<table>
<thead>
<tr>
<th></th>
<th>Women (n=6,702)</th>
<th>Men (n=4,746)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control n=3,544</td>
<td>Intervention n=3,158</td>
</tr>
<tr>
<td></td>
<td>(52.88%)</td>
<td>(47.12%)</td>
</tr>
<tr>
<td></td>
<td>Control n=2,567</td>
<td>Intervention n=2,179</td>
</tr>
<tr>
<td></td>
<td>(54.09%)</td>
<td>(45.91%)</td>
</tr>
<tr>
<td><strong>n %</strong></td>
<td><strong>n %</strong></td>
<td><strong>p-value</strong></td>
</tr>
<tr>
<td><strong>p-value</strong></td>
<td><strong>N %</strong></td>
<td><strong>n %</strong></td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19 years</td>
<td>374 10.6</td>
<td>369 11.7</td>
</tr>
<tr>
<td>20-24 years</td>
<td>887 25.0</td>
<td>766 24.3</td>
</tr>
<tr>
<td>25-29 years</td>
<td>956 27.0</td>
<td>755 23.9</td>
</tr>
<tr>
<td>30-34 years</td>
<td>629 17.8</td>
<td>538 17.0</td>
</tr>
<tr>
<td>35 years and older</td>
<td>698 19.7</td>
<td>730 23.1</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian (Catholic, Protestant or Pentecostal)</td>
<td>2,948 83.4</td>
<td>2,621 83.6</td>
</tr>
<tr>
<td>Muslim</td>
<td>566 16.0</td>
<td>481 15.3</td>
</tr>
<tr>
<td>Other or no religion</td>
<td>22 0.6</td>
<td>34 1.1</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>523 14.8</td>
<td>526 16.7</td>
</tr>
<tr>
<td>Primary</td>
<td>1,981 55.9</td>
<td>1,769 56.0</td>
</tr>
<tr>
<td>Secondary or higher</td>
<td>1,040 29.4</td>
<td>863 27.3</td>
</tr>
</tbody>
</table>
## Marital status

<table>
<thead>
<tr>
<th></th>
<th>Never married</th>
<th>Currently married/ consensual union</th>
<th>Previously married (divorced/separated/widowed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>476 13.4 456 14.4</td>
<td>2,991 84.4 2,635 83.4</td>
<td>77 2.2 67 2.1</td>
</tr>
<tr>
<td></td>
<td>575 22.3 528 24.2</td>
<td>1,949 75.9 1,596 73.2</td>
<td>46 1.8 55 2.5</td>
</tr>
</tbody>
</table>

## Past year emotional IPV

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>2,663 75.2 2,385 75.6</td>
<td>1,762 69.6 1,549 71.2</td>
</tr>
</tbody>
</table>

## Past year physical IPV

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>2,891 81.6 2,635 83.4</td>
<td>2,251 87.7 1,937 88.9</td>
</tr>
</tbody>
</table>

## Past year sexual IPV

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>2,961 83.6 2,701 86.7</td>
<td>2,385 94.2 2,059 95.7</td>
</tr>
</tbody>
</table>

## Number non-marital sex partners in past year

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>1</th>
<th>≥2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>2,516 82.0 2,268 83.9</td>
<td>483 15.7 392 14.5</td>
<td>69 2.3 42 1.6</td>
</tr>
</tbody>
</table>

## Condom use in past year

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Sometimes/inconsistent</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>2,457 69.3 2,243 71.0</td>
<td>771 21.8 641 20.3</td>
<td>316 8.9 274 8.7</td>
</tr>
</tbody>
</table>

## Alcohol use with sex (past year)

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>2,656 75.0 2,333 74.0</td>
<td>887 25.0 821 26.0</td>
</tr>
</tbody>
</table>

### Notes

- The numbers and percentages may not sum due to rounding.
- The data points represent counts and proportions, with the latter being rounded to two decimal places.
Table 4.3. HIV prevalence and incidence of the two study arms at baseline

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th></th>
<th>Intervention</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=3,182)</td>
<td>(n=2,833)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV prevalence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>2,727 (85.7)</td>
<td>448 (14.1)</td>
<td>7 (0.2)</td>
<td>2,471 (87.2)</td>
<td>343 (12.1)</td>
<td>19 (0.7)</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>1,969 (88.1)</td>
<td>253 (11.3)</td>
<td>12 (0.5)</td>
<td>1,805 (89.9)</td>
<td>184 (9.2)</td>
<td>18 (0.9)</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>4,696 (86.7)</td>
<td>701 (12.9)</td>
<td>19 (0.35)</td>
<td>4,276 (86.7)</td>
<td>527 (10.9)</td>
<td>37 (0.8)</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>HIV incidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidence cases/py</td>
<td>31/3654.3</td>
<td>0.93</td>
<td>0.66-1.30</td>
<td>37/2946.2</td>
<td>1.26</td>
<td>0.91-1.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidence/100 py</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>33/2721.2</td>
<td>1.21</td>
<td>0.86-1.71</td>
<td>17/2206.9</td>
<td>0.77</td>
<td>0.48-1.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>67/6375.6</td>
<td>1.05</td>
<td>0.83-1.34</td>
<td>54/5153.1</td>
<td>1.05</td>
<td>0.80-1.37</td>
<td>0.91</td>
<td></td>
</tr>
</tbody>
</table>

* $n=$number of participants who contributed to the person-year calculation.
Table 4.4. Reports of past year condom use and men's circumcision status at baseline and follow-up visits

<table>
<thead>
<tr>
<th>WOMEN</th>
<th>Baseline</th>
<th>Follow-up 1</th>
<th>Follow-up 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td></td>
<td>3,544</td>
<td>3,158</td>
<td>2,426</td>
</tr>
<tr>
<td>N</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Past year condom use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>2,457</td>
<td>69.3</td>
<td>2,243</td>
</tr>
<tr>
<td>Sometimes/inconsistent</td>
<td>771</td>
<td>21.8</td>
<td>641</td>
</tr>
<tr>
<td>Always</td>
<td>316</td>
<td>8.9</td>
<td>274</td>
</tr>
<tr>
<td>Primary male partner’s circumcision status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2,337</td>
<td>66.24</td>
<td>2,116</td>
</tr>
<tr>
<td>Yes</td>
<td>1191</td>
<td>33.76</td>
<td>1017</td>
</tr>
<tr>
<td>Past year condom use</td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>None</td>
<td>1,271</td>
<td>49.51</td>
<td>1,094</td>
</tr>
<tr>
<td>Sometimes/inconsistent</td>
<td>898</td>
<td>34.98</td>
<td>707</td>
</tr>
<tr>
<td>Always</td>
<td>398</td>
<td>15.50</td>
<td>378</td>
</tr>
<tr>
<td>Circumcision status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1485</td>
<td>79.58</td>
<td>1333</td>
</tr>
<tr>
<td>Yes</td>
<td>381</td>
<td>20.42</td>
<td>376</td>
</tr>
<tr>
<td>Experience of past year emotional (verbal) abuse</td>
<td>Control No.</td>
<td>Control %</td>
<td>Intervention No.</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-------------</td>
<td>-----------</td>
<td>------------------</td>
</tr>
<tr>
<td>Baseline</td>
<td>878/3541</td>
<td>24.8</td>
<td>772/3157</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>498/2338</td>
<td>21.3</td>
<td>495/2257</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>409/2039</td>
<td>20.1</td>
<td>311/1737</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience of past year physical abuse</th>
<th>Control No.</th>
<th>Control %</th>
<th>Intervention No.</th>
<th>Intervention %</th>
<th>PRR</th>
<th>(95% CI)</th>
<th>aPRR*</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>653/3544</td>
<td>18.4</td>
<td>523/3158</td>
<td>16.6</td>
<td>0.90</td>
<td>(0.81-1.00)</td>
<td>0.90</td>
<td>(0.81-1.00)</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>397/2426</td>
<td>16.4</td>
<td>353/2342</td>
<td>15.1</td>
<td>0.92</td>
<td>(0.81-1.05)</td>
<td>0.96</td>
<td>(0.85-1.10)</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>346/2127</td>
<td>16.3</td>
<td>217/1812</td>
<td>12.0</td>
<td>0.74</td>
<td>(0.63-0.86)</td>
<td>0.80</td>
<td>(0.68-0.93)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience of past year sexual abuse</th>
<th>Control No.</th>
<th>Control %</th>
<th>Intervention No.</th>
<th>Intervention %</th>
<th>PRR</th>
<th>(95% CI)</th>
<th>aPRR*</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>580/3541</td>
<td>16.4</td>
<td>415/3116</td>
<td>13.3</td>
<td>0.81</td>
<td>(0.72-0.91)</td>
<td>0.82</td>
<td>(0.73-0.92)</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>292/2337</td>
<td>12.5</td>
<td>296/2257</td>
<td>13.1</td>
<td>1.05</td>
<td>(0.90-1.22)</td>
<td>1.15</td>
<td>(0.99-1.34)</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>261/2038</td>
<td>12.8</td>
<td>167/1737</td>
<td>9.6</td>
<td>0.75</td>
<td>(0.62-0.90)</td>
<td>0.82</td>
<td>(0.69-0.99)</td>
</tr>
</tbody>
</table>

*Effects of intervention adjusted for baseline age, baseline education, baseline marital status, baseline experience of IPV victimization (according to type measured), and number of non-marital sex partners.
Table 4.6. IPV outcomes at follow-ups 1 and 2 in men according to trial arm

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th>PRR</th>
<th>(95% CI)</th>
<th>aPRR</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>(95% CI)</td>
<td>(95% CI)</td>
</tr>
<tr>
<td>Perpetration of past year emotional (verbal) abuse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>771/2533</td>
<td>30.4</td>
<td>626/2175</td>
<td>28.8</td>
<td>0.95</td>
<td>0.87-1.03</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>520/1586</td>
<td>32.8</td>
<td>401/1367</td>
<td>29.3</td>
<td>0.92</td>
<td>0.80-0.99</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>315/1407</td>
<td>22.4</td>
<td>251/1104</td>
<td>22.7</td>
<td>1.02</td>
<td>0.88-1.18</td>
</tr>
<tr>
<td>Perpetration of past year physical abuse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>316/2567</td>
<td>12.3</td>
<td>242/2179</td>
<td>11.1</td>
<td>0.90</td>
<td>0.77-1.06</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>185/1641</td>
<td>11.3</td>
<td>132/1433</td>
<td>9.2</td>
<td>0.82</td>
<td>0.66-1.01</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>124/1437</td>
<td>8.6</td>
<td>99/1150</td>
<td>8.6</td>
<td>1.00</td>
<td>0.77-1.28</td>
</tr>
<tr>
<td>Perpetration of past year sexual abuse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>147/2532</td>
<td>5.8</td>
<td>92/2151</td>
<td>4.3</td>
<td>0.74</td>
<td>0.57-0.95</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>73/1586</td>
<td>4.6</td>
<td>56/1367</td>
<td>4.1</td>
<td>0.89</td>
<td>0.63-1.25</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>53/1407</td>
<td>3.8</td>
<td>30/1104</td>
<td>2.7</td>
<td>0.72</td>
<td>0.46-1.12</td>
</tr>
</tbody>
</table>

*Effects of intervention adjusted for baseline age, baseline education, baseline marital status, baseline experience of IPV perpetration (according to type measured), and number of non-marital sex partners.
Table 4.7. Incidence of HIV by study arm

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th>IRR (95% CI)</th>
<th>P value</th>
<th>aIRR$^b$ (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incidence cases/py</td>
<td>Incidence/100 py</td>
<td>No.$^a$</td>
<td>Incidence cases/py</td>
<td>Incidence/100 py</td>
<td>No.$^a$</td>
</tr>
<tr>
<td>Overall</td>
<td>119/10390.3</td>
<td>3,473</td>
<td>1.15</td>
<td>83/9509.5</td>
<td>3,251</td>
<td>0.87</td>
</tr>
<tr>
<td>Women</td>
<td>71/6153.8</td>
<td>2,038</td>
<td>1.15</td>
<td>56/5648.8</td>
<td>1,925</td>
<td>0.99</td>
</tr>
<tr>
<td>Men</td>
<td>48/4236.5</td>
<td>1,435</td>
<td>1.13</td>
<td>27/3860.6</td>
<td>1,326</td>
<td>0.70</td>
</tr>
</tbody>
</table>

$^a$No. = number of participants who contributed to the person-year calculation.

$^b$Adjusted for baseline age, baseline education, baseline marital status, baseline condom use, baseline number of non-marital sex partners and circumcision status of men or primary male partner of female respondents.
CHAPTER 5.

TRENDS IN RISKY SEX PRACTICES AND HIV RESULTS DISCLOSURE AFTER EXPOSURE TO AN INTIMATE PARTNER VIOLENCE AND HIV RISK REDUCTION INTERVENTION IN RAKAI, UGANDA: A CLUSTER RANDOMIZED TRIAL
Abstract

**Background:** A trial conducted in rural Uganda found a combination intimate partner violence (IPV) and HIV prevention intervention was associated with a decrease in HIV incidence and women’s experiences of emotional, physical and sexual IPV. This paper examines the behaviors which may explain the mechanisms leading to the declines in both IPV and HIV.

**Design:** A cluster-randomized trial was conducted in Rakai, Uganda between 2005 and 2009. Exposure in the intervention arm was an IPV and HIV prevention intervention (the Safe Homes and Respect for Everyone (SHARE) Project) that involved risk reduction strategies. Control clusters were exposed to standard services alone.

**Methods:** Characteristics were compared at baseline and impact was assessed at two follow-up visits. Outcomes included past year intimate partner rape/forced sex, number of total and extra-marital sex partners, alcohol use surrounding sex, condom use, discussion about condom use, partner’s disclosure of HIV status and respondent’s disclosure of HIV status. Analysis was intention-to-treat using modified Poisson multivariable regression to estimate adjusted prevalence risk ratios (aPRR) of outcomes in intervention versus control clusters. To assess the relationship between behaviors significantly changed with exposure to SHARE, Poisson regression was used to estimate adjusted incidence rate ratios (IRR) of HIV acquisition.
**Results:** The intervention was associated with significant reductions in women’s reports of victimization from rape at final follow up (aPRR=0.80; 95% CI: 0.66-0.97), but not with men’s reports of rape perpetration. There was a marginal reduction in women’s reports of multiple sex partners in the past year (aPRR=0.98; 95% CI: 0.97-1.00). The intervention was not associated with significant reductions in number of sex/non-marital partners, alcohol use surrounding sex, condom use, or discussion about using condoms. Disclosure of HIV results, both by the respondent and the respondent’s primary partner, was associated with reduced HIV acquisition in all groups and particularly among women but these estimates were not statistically significant.

**Conclusion:** While we cannot conclusively explain the differential in HIV incidence found between the study arms, our analysis suggests that SHARE’s greatest impact on HIV risk behaviors was the reduction of women’s experiences of forced sex and improvements in men’s and women’s rates of HIV results disclosure.
Introduction

A trial conducted in Rakai, Uganda found a combination intimate partner violence (IPV) and HIV prevention intervention (the Safe Homes And Respect for Everyone or SHARE Project) was associated with a decrease in HIV incidence and women’s experiences of emotional, physical and sexual IPV, but did not affect male reported perpetration of IPV (dissertation manuscript number 2, “Impact of Combined Intimate Partner Violence and HIV Prevention Intervention on Recent Emotional, Physical and Sexual Abuse and HIV Incidence in Rakai, Uganda: A Cluster Randomized Trial”: Chapter 4). The goal of this paper is to examine the impact of the SHARE intervention on risk behaviors that may mediate the interrelationship between IPV and HIV infection, and may explain the mechanisms that led to the declines of HIV incidence.

The relationship between IPV and HIV infection is multifaceted. Women who experience sexual violence (e.g. forced sex or rape) are directly at risk for exposure to HIV and other sexually transmitted infections (STIs) through contact with an infected partner (Maman et al., 2000; Campbell et al., 2008). Evidence also suggests that IPV may indirectly increase a woman’s vulnerability to infection with HIV/STIs in at least three main ways. First, many women who experience IPV throughout their lifetimes also report risky sexual behaviors (Bensley et al., 2003; Coid et al., 2001; Hotaling & Sugarman, 1986). Second, male perpetrators of IPV are more likely to be HIV infected themselves and/or practice higher risk sex compared to non-abusive men (Decker et al., 2009; Dunkle et al., 2006). Third, in settings where violence against women (VAW) is
normative, girls and women often lack choices about how and when they have sex and their ability to self-protect is limited (Maman et al., 2000).

The main objectives of the SHARE Project, conducted by Rakai Health Sciences Program (RHSP), were to reduce rates of IPV and HIV infection, two public health problems independently associated with negative health, social and economic outcomes (Krug, et al., 2002; Campbell, 2002; Campbell & Soeken, 1999; Ellsberg et al., 2008). Because correlations have been found between IPV and HIV infection (Fonck et al., 2005; Dude, 2009; Maman et al, 2002; Maman et al, 2009; Decker et al., 2009; Dunkle et al., 2004; Dunkle et al., 2006) and evidence suggests the two might be causally linked (Jewkes et al., 2010), our intervention targeted the indirect pathways between IPV and HIV and aimed to (1) reduce sexual risk behaviors (number of non-marital sex partners, alcohol use with sex), (2) increase capacity for people to protect themselves from violence and HIV infection (by increasing condom use and HIV results disclosure to sex partners) and (3) change attitudes about the acceptability of violence against women (VAW).

This paper summarizes the design and methods used in the trial. The key objectives of these analyses are to assess the impact of the intervention on risky sex practices and self-protection among men and women.
Methods

Study setting and population

This study was conducted in Uganda’s Rakai District which has a mature generalized HIV epidemic (Wawer et al., 1997) and relatively high rates of IPV (Koenig et al., 2003). The SHARE intervention trial was a community-based cluster randomized trial (CRT) conducted to evaluate the impact of the SHARE violence prevention intervention that was integrated into RHSP’s ongoing HIV research and service provision activities. The CRT was nested within the Rakai Community Cohort Study (RCCS) (Wawer et al., 1998) which is conducted in 11 clusters of 50 communities in Rakai district.

The SHARE intervention was implemented between 2005 and 2009 in 4 of the 11 RCCS clusters. Enhanced HIV prevention, testing, and treatment activities were also offered in these 4 clusters during this time period. The other 7 RCCS clusters were not exposed to SHARE or the enhanced HIV activities, but received RHSP’s routine services of health education, voluntary HIV counseling and testing (VCT), and HIV care and treatment, including antiretroviral therapy (ART).

Risk reduction intervention

Described previously are details of SHARE’s IPV prevention activities (Wagman, et al., 2012) and the way in which the intervention was nested into the existing RCCS (dissertation manuscript 1, “Combined Intimate Partner Violence and HIV/AIDS Prevention Intervention in Rural Africa: Design of an Intervention Strategy, Rakai Uganda”: Chapter 2). SHARE used multiple strategies (including advocacy, capacity
building, community activism, learning materials, a men and boys’ program, a youth program and special events) to reduce IPV in the intervention communities (Wagman, et al., 2012). To improve the way violence was addressed by HIV service providers, SHARE trained clinicians, counselors and social welfare officers to screen for IPV’s occurrence, handle and refer IPV cases, assess and help with safe HIV disclosure procedures, and offer risk reduction strategies for HIV-infected women in abusive relationships (dissertation manuscript 1, “Combined Intimate Partner Violence and HIV/AIDS Prevention Intervention in Rural Africa: Design of an Intervention Strategy, Rakai Uganda”: Chapter 2).

The risk reduction component of the SHARE intervention was informed by empirical findings on the determinants of IPV and HIV in Rakai. Previous studies found six main risk factors for both outcomes: 1) younger age, 2) multiple sex partners, 3) early onset of sexual activity, 4) low rates of HIV results disclosure to sex partners 5) no/inconsistent condom use, and 6) alcohol use before sex (dissertation manuscript 1, “Combined Intimate Partner Violence and HIV/AIDS Prevention Intervention in Rural Africa: Design of an Intervention Strategy, Rakai Uganda”: Chapter 2).

To develop strategies to target the overlapping risk factors we created a conceptual model (Figure 5.1) of the interrelationship between IPV and HIV infection (as identified in Rakai and in the literature). Our framework borrows from and builds upon the model by Jewkes et al (2010, pg 42) illustrating the direct and indirect pathways through which IPV, gender and relationship power inequity might place women at risk of HIV. Our
model also reflects findings that HIV-infected women are at heightened risk for IPV when they request or undergo an HIV test and/or disclose their HIV positive results (Fonck et al., 2005; Maman et al., 2000; Maman et al., 2002). Finally, it includes societal/structural factors that may also increase risk for HIV and IPV (e.g. cultural norms and health, economic, education and social policies) and contextual determinants (e.g. patrilocality, unequal access to land, education and other resources between women and men) (Dahlberg & Krug, 2002; Campbell, J.C., 1999; Koenig, et al., 2006).

SHARE developed specific strategies and activities to reduce sexual risk behaviors, increase capacity for people to protect themselves from violence and HIV, and change attitudes about the acceptability of violence against women.

**Study schedule**

Baseline interviews and biological samples were collected via RCCS between February 2005 and June 2006. Two follow up rounds of data collection occurred between August 2006 and April 2008, and June 2008 and November 2009. Thus, the entire intervention trial lasted 4 years and 7 months. The timing of the research activities and the intervention’s implementation was staggered across the 11 clusters and designed so (1) baseline data were collected before the intervention started in each cluster; and (2) each intervention cluster had approximately the same length of exposure to the intervention.
Data analysis

The analysis was restricted to RCCS participants aged 15-49 who enrolled at the SHARE CRT baseline, were sexually active in the past year and provided follow up information. HIV incidence was determined in the initially HIV-uninfected population. An intention to treat approach was used in which all participants with complete data for each outcome of interest at each follow up visit were included. Social and demographic characteristics (age, religion, education level, marital status, and age at first sex) as well as all main risk behavior outcomes were measured at baseline to assess associations between potential confounders and outcomes of interest and to assess comparability between the two study arms. Differences in frequencies for dichotomous and categorical variables were tested using Pearson's chi-square and Fischer's exact tests for differences in proportions. T-tests and Wilcoxon rank tests were used for continuous variables.

Eight risk behavior outcomes were measured in this analysis, including past year (1) intimate partner rape (forced sex), (2) total number of sex partners, (3) number of extra-marital sex partners, (4) alcohol use with last sex, (5) condom use, (6) discussion about condom use with primary partner, (7) main partner’s disclosure of his/her HIV status to respondent and (8) respondent’s disclosure of HIV status in past year. These risk behaviors are defined in Table 5.1. It is worth noting that intimate partner/spousal rape (forced sex), as measured in the current analysis, differed from the measurement of sexual IPV (in the main analysis in manuscript 2 described in Chapter 4 of this thesis). Intimate partner rape is also referred to as marital rape or spousal rape and it refers to forced or non-consensual sex in which the perpetrator is the victim's partner or spouse. In
this analysis intimate partner rape was defined as unwanted penetrative sex involving the use of physical force whereas sexual IPV was more broadly defined as penetrative or non-penetrative sex or other sexual acts involved verbal threats or physical forced.

All outcomes were analyzed separately for men and women and for the first and second follow-up visits. We tested for potential within-cluster correlation by fitting a random-intercept model at the cluster level and found no significant correlation within clusters for all IPV outcomes (rho=0, p=1.0). Given the low correlation within clusters and questions regarding the stability of estimation and difficulty of verifying the random effects assumptions with the small number of clusters (11 clusters), we chose generalized linear models for the main analysis. In addition, minimal differences in point estimates for the intervention effect found generalized linear model were compared using a random effects model.

Each outcome was analyzed as dichotomous and “modified” Poisson regression models were used to estimate prevalence risk ratios (PRRs) by fitting a generalized linear model (glm) with a log link and an assumed underlying Poisson distribution (Zou G, 2004). In our adjusted models we controlled for covariates found to differ (at the p<0.05 significance levels) between the two trial arms at baseline. These included baseline age of the respondent, education level, marital status, number of non-marital sex partners in year preceding baseline interview and baseline report of the outcome being measured.
A sub-analysis was conducted on risk factors that potentially mediated the relationship between IPV and HIV infection and that differed between study arms in association with exposure to SHARE. To assess whether significant changes in risk factors could have reduced HIV incidence we examined differences in HIV incidence rates by risk factor and trial arm separately for men, women and the total population. To estimate HIV incidence we used data from participants who were HIV negative at baseline. Person years (PY) of exposure were cumulated from baseline to the last negative HIV result if the person remained negative, or to the midpoint of the interval between the last negative tests and first positive tests for seroconverters. HIV incidence was estimated per 100 PY. This analysis followed an intention-to-treat approach, using a log link and Poisson distribution to estimate the incidence rate ratios (IRR) of HIV acquisition comparing intervention to control arms. The models estimating the effects of the intervention on HIV incidence were adjusted for baseline age, education, marital status, number of non-marital sex partners, respondents’ self-reports of condom use at baseline and each follow-up as well as men’s self-reported circumcision status, and women’s report of their primary male partner’s circumcision status (at each follow up). All data were analyzed using Stata/SE version 12 (StataCorp, 2011).

**Regulatory approvals, ethics and ensuring the safety of participants**

The study was approved by the Western Institutional Review Board, the World Health Organization’s Ethics Review Committee, the Uganda Virus Research Institute’s Science Ethics Committee and the Ugandan National Council of Science and Technology. All
interviewers received training on how to follow the World Health Organization’s guidelines on conducting safe and ethical research on domestic violence (WHO, 2001).

Participants who disclosed IPV to a SHARE staff member or an RCCS interviewer were referred to a CCA trained by SHARE to provide basic psychosocial support (there were 3 CCAs per cluster). Abuse victims who required professional psychosocial and/or HIV-related counseling were referred to one of RHSP’s VCT or ARV counselors. With respect to social welfare, legal and law enforcement services, SHARE partnered with the District Police Office and the District Government Office of Community Services which employed social welfare officers throughout Rakai. Victims of abuse who requested related (welfare, law, criminal justice) services were directly referred to a partnering officer from one of these jurisdictions in the 4 intervention clusters.

Results
A total of 11,452 eligible men and women aged 15–49 years were enrolled at baseline: 6,112 in the control arm and 5,339 in the intervention arm. Retention rates at the first follow up were 68% and 74% for women and 64% and 66% for men in the control and intervention arms, respectively. At the second follow up retention was 60% control and 57% intervention) for women, and 56% control and 53% intervention for men.
Cumulative retention rates over the two follow up visits were modestly higher in the control arm (58%) than the intervention arm (55%) (p=0.001), and among women (59%) compared to men (55%) (p=0.0001).
Baseline social and demographic characteristics are shown in Table 5.2. The two arms were similar for both sexes on religion and early sexual debut. However, there were significant differences in age, education level and marginally significant differences in male marital status.

Table 5.3 displays sexual and risk behaviors at baseline. There was comparability among men and women on alcohol use at last sex and past year condom use. Among women there were no differences between the two arms on reports of more than one sexual partner and borderline differences in non-marital partners in the past year. However, reported rape was more common in the control (14.1%) than intervention arm (11.5%, p=0.00). Discussion of condoms was significantly more frequent in the intervention arm, whereas disclosure of HIV status was significantly more frequent in the control arm.

Among men, reported perpetration of rape was more common in the control (4%) than intervention arm (2.7%, p=0.02), and control arm men reported significantly more sexual partners and more non-marital partners than intervention arm men. Control arm men also reported more frequent disclosure of HIV status.

Tables 5.4 and 5.5 show the risk behavior outcomes for women and men. All adjusted models controlled for baseline differences in age, education level, marital status and number of past year non-marital sex partners. Additionally, each adjusted model controlled for the baseline report of the outcome of interest.
Significant differences between the trial arms were observed in women’s experiences of three risk behavior outcomes at the second follow-up: (1) Past year intimate partner rape or forced sex (aPRR=0.80; 95% CI: 0.66-0.97). From baseline to final follow-up the proportion of women who reported past year intimate partner rape decreased in both the intervention (11.5% to 8.4%) and control (14.1% to 11.4%) groups, and this change was significantly larger among those exposed to SHARE (aPRR=0.80; 95% CI: 0.66-0.97). (2) Primary partner’s disclosure of HIV status to the respondent in the past year (aPRR=1.18; 95% CI: 1.06-1.32) and (3) the respondent’s own disclosure of her HIV status to her primary partner in the past year (aPRR=1.15; 95% CI: 1.06-1.24).

Marginally significant differences were detected in women’s reports of more than one sex partner in the past year (aPRR=0.98; 95% CI: 0.97-1.00). There were no significant differences between arms in female reported number of sex partners or non-marital partners, alcohol use surrounding sex, condom use, or discussion about using condoms in past year.

Relative to the control arm, men in the intervention group had increased reports of their primary partner’s disclosure of HIV status (to the respondent) in the past year at the second follow-up (aPRR=1.24; 95% CI: 1.11-1.39), and the respondent’s own disclosure of his HIV status to his primary partner in the past year at the first (aPRR=1.10; 95% CI: 1.00-1.21) and second follow-up (aPRR=1.17; 95% CI: 1.05-1.24). Men’s reports of past year perpetration of intimate partner rape or forced sex was not significantly reduced (aPRR=0.83; 95% CI: 0.50-1.37), and the intervention was not associated with
reductions in past year number of sex partners, non-marital partners, alcohol use surrounding sex, condom use, or discussion about using condoms.

In summary, exposure to the SHARE intervention was associated with: (1) a significant reduction in past year marital rape/forced sex among women, (2) a significant increase in men and women’s disclosure of their HIV status to their primary sex partner, and (3) a significant increase in the rate at which male and female respondents’ said their primary partners had disclosed their HIV results to them.

The incidence of HIV among women who were raped in the intervention group (0.90 per 100 PY, 2/ 221.44 PY) was smaller than those raped in the control group (1.74 per 100 PY, 5/ 287.647 PY). However, the small number of seroconverters among rape victims in models could not be fitted. Therefore, we assessed whether rape mediates the relationship between IPV and HIV infection by including it as a covariate in the main model. The inclusion of the rape covariate, however, did not change the IRR’s for HIV incidence. The unadjusted IRR of HIV incidence among women in the intervention versus control arms was 0.86 (95% CI: 0.61-1.22; p=0.397). After adjusting for rape at baseline and follow-up we saw a marginally significant decrease in HIV incidence among women in the intervention arm (aIRR= 0.67; 95% CI: 0.43-1.04; p= 0.072), but not in the fully adjusted model (IRR= 0.71; 95% CI: 0.44-1.13; p= 0.146).

Tables 5.6 and 5.7 display unadjusted and adjusted IRRs of HIV incidence between respondents who did and did not disclose their HIV status and whose partners did and did
not disclose their HIV status, by trial arm. Results are shown separately for men, women and the overall population. Factors controlled for in the adjusted analyses were baseline age, education level, marital status, past year condom use, number of non-marital sex partners in the year preceding the baseline survey and circumcision status of male participants and the primary male partner of female participants as reported at baseline and both follow-ups.

Disclosure of HIV results, both by the respondent and the respondent’s primary partner, was associated with reduced HIV acquisition in all groups and particularly among women. However, numbers were small none of our estimates achieved statistical significance.

**Discussion**

Previous findings suggest the SHARE intervention reduced emotional, physical and sexual IPV among women and HIV incidence in the population. The aim of the current study was to examine SHARE’s impact on the direct and indirect pathways between IPV and HIV infection. The goal of this analysis was to understand how select risk behaviors potentially mediated the relationship between violence and HIV infection and to identify which mechanisms led to the declines of HIV incidence.

The study found the SHARE intervention to be associated with significant reductions in women’s reports of victimization from rape by an intimate partner. Intimate partner rape (or forced sex) represents a potential direct pathway in the interrelationship between IPV
and HIV infection. Penetrative rape can lead to inflammatory responses that recruit target cells to the vaginal/cervical site of injury and/or disrupt the integrity of the mucosal epithelial barrier, both of which increase physiological susceptibility to HIV (Campbell, et al, 2013). Inflammation due to forced sex may also increase CD4+ cells in the cervical epithelium (Campbell, et al, 2013; Prakash, et al., 2003). The frequency of reported rape decreased more in the intervention than control arm over time suggesting that the decrease in forced sex may have contributed to the reduction in HIV incidence, and there is strong biologic plausibility for such an effect. However, the small number of women reporting rape, and small number of incident cases among rape victims suggests that the reductions in rape perpetration made only a modest contribution to the effect of SHARE on overall incidence.

Men’s reports of perpetration of partner rape was lower than reports of rape victimization by women. This is consistent with findings in dissertation manuscript 2 on sexual IPV and reports throughout the literature (Hamby, 2009). Therefore, as in dissertation manuscript 2, we considered women’s reports as the main outcome.

Exposure to the SHARE intervention was associated with significantly increased rates of disclosure of HIV serostatus to sexual partners of both genders (Tables 5.4 and 5.5). Disclosure was also associated with reductions in HIV incidence (Tables 5.6 and 5.7) However, none of these estimates were statistically significant because of the small numbers of seroconverters in the subgroups. Nevertheless, the reduction in IRRs was substantial among women. This is plausible since SHARE emphasized counseling on
safe disclosure of HIV status and risk reduction. SHARE trained counselors to screen female clients’ safety following HIV positive disclosure.

The intervention was not associated with significant reductions in factors found to be determinants of IPV and HIV infection in past Rakai research (dissertation manuscript number 1) most notably past year condom use and number of sexual partners. These two risky sexual behaviors are difficult to change and national surveys suggest that condom use has been decreasing in rural populations of Uganda, particularly among women (De Coninck Z, & Marrone G., 2012). The findings are consistent with another study from Rakai that found no evidence that condom use and number of sex partners mediated the association between IPV and HIV (Kouyoumdjian, et al., 2013). We also found no effect of exposure to SHARE and reduced rates of alcohol use with sex or increased couple-level discussion about using condoms. Thus, the differential in HIV incidence between study arms in our main analysis (dissertation manuscript number 2) cannot be explained by these behaviors.

In addition to the potential contribution of decreased forced sex and increased HIV disclosure to reduced HIV acquisition in our study, it is possible that incidence prior to SHARE was already lower in the intervention arm. However, incidence during the interval prior to baseline was the same in each study arm (1.05/100 py, dissertation manuscript number 2).
Limitations

Due to limited power we were unable to estimate the magnitude with which the changes in forced sex and HIV disclosure impacted the reduction in HIV incidence. Another limitation is that we were unable to measure injuries as a result of rape or frequency of its occurrence. However, research on IPV (not just partner rape) in Rakai found increased risk of HIV infection among women exposed to more frequent abuse (Kouyoumdjian, et al., 2013). Including these measures might have increased our understanding of the nature of the rapes that occurred and how they might relate to risk of HIV acquisition.

Strengths

Strengths of this study are the prospective nature and size of the parent RCCS study which enabled us to enroll and follow HIV-infected and uninfected individuals to measure changes in intimate partner rape, and several of the risk behaviors possibly mediating the relationship between IPV and HIV infection. We were also able to include data on relevant confounders. Additionally, because our study was population-based and RCCS is an open cohort with substantial new annual enrolment, it is likely that our findings can be generalized to other rural populations in Uganda and potentially beyond.

In summary, while we cannot conclusively explain the differential in HIV incidence found between the study arms, it is likely that the impact of SHARE on HIV incidence was at least in part mediated by reductions in women’s experiences of forced sex and improved rates of HIV results disclosure.
References


StataCorp. (2011). Stata Statistical Software: Release 12. College Station, TX: StataCorp LP.


Wawer, M.J., Serwadda, D., Gray, R.H., Sewankambo, N.K., Li, C., Nalugoda, F.,
Lutalo, T., & Konde-Lule, J.K.. (1997) Trends in HIV-1 prevalence may not reflect
trends in incidence in mature epidemics: data from the Rakai population-based

World Health Organization (WHO) Department of Gender, Women and Health. (2001)
Putting women first: Ethical and safety recommendations for research on domestic
violence against women. Reference no. WHO reference number:
WHO/FCH/GWH/01.1. Last access on May 27, 2013 from:

Zou G. A modified Poisson regression approach to prospective studies with binary data.
Figure 5.1. Conceptual Model: Pathways from IPV to/from HIV Infection (Jewkes et al., 2010).
Table 5.1. Survey questions used to measure risky sex practice outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Survey question(s) used to measure outcome</th>
</tr>
</thead>
</table>
| Intimate partner rape (forced sex)           | In the past 12 months have any of your sexual partners physically forced you to have sex when you did not want to?*  
• NO/YES  
*Victimization was measured among women and perpetration measured among men.                                                                                     |
| Multiple (more than 1) sexual partners       | How many different sexual partners have you had in the last 12 months, including married or consensual partners, and anyone already mentioned?  
• One  
• Two or more                                                                                                                                                                                  |
| Non-marital sexual partners                  | Do you currently have a relationship with someone to whom you are not officially married or in a consensual union?  
• NO/YES                                                                                                                                                                                      |
| Alcohol use with sex                         | Did you drink alcohol before your last sex with this partner?  
• NO/YES                                                                                                                                                                                      |
| Condom use                                   | During the past 12 months have you/partner used condoms?  
• NO/YES                                                                                                                                                                                      |
| Discussion about condom use                  | Have you discussed condom use with this partner?  
• NO/YES                                                                                                                                                                                      |
| Partner’s disclosure of HIV status           | In the last 12 months has this partner informed you of his/her HIV sero-status?  
• No or never got tested/results  
• Yes or received couple counseling                                                                                                                                                             |
| Self-disclosure of HIV status                | In the last 12 months have you informed this partner of your HIV serostatus?  
• No or never got tested/results  
• Yes or received couple counseling                                                                                                                                                             |
Table 5.2 Social and demographic characteristics of the two study arms at baseline

<table>
<thead>
<tr>
<th></th>
<th>Women (n=6,702)</th>
<th>Men (n= 4,746)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Intervention</td>
</tr>
<tr>
<td></td>
<td>n=3,544</td>
<td>n=3,158</td>
</tr>
<tr>
<td></td>
<td>(52.88%)</td>
<td>(47.12%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19 years</td>
<td>374</td>
<td>10.6</td>
</tr>
<tr>
<td>20-24 years</td>
<td>887</td>
<td>25.0</td>
</tr>
<tr>
<td>25-29 years</td>
<td>956</td>
<td>27.0</td>
</tr>
<tr>
<td>30-34 years</td>
<td>629</td>
<td>17.8</td>
</tr>
<tr>
<td>35 years and older</td>
<td>698</td>
<td>19.7</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian (Catholic, Protestant or Pentecostal)</td>
<td>2,948</td>
<td>83.4</td>
</tr>
<tr>
<td>Muslim</td>
<td>566</td>
<td>16.0</td>
</tr>
<tr>
<td>Other or no religion</td>
<td>22</td>
<td>0.6</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>523</td>
<td>14.8</td>
</tr>
<tr>
<td>Primary</td>
<td>1,981</td>
<td>55.9</td>
</tr>
<tr>
<td>Secondary or higher</td>
<td>1,040</td>
<td>29.4</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Never married</td>
<td>476</td>
<td>13.4</td>
</tr>
<tr>
<td>Currently married/ consensual union</td>
<td>2,991</td>
<td>84.4</td>
</tr>
<tr>
<td>Previously married</td>
<td>77</td>
<td>2.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Early sexual debut (≤ 14 years old)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>2,659</td>
<td>75.2</td>
<td>2,361</td>
<td>75.3</td>
<td>0.93</td>
<td>2,150</td>
<td>83.8</td>
<td>1,832</td>
</tr>
<tr>
<td>Yes</td>
<td>877</td>
<td>24.8</td>
<td>775</td>
<td>24.7</td>
<td>0.58</td>
<td>416</td>
<td>16.2</td>
<td>339</td>
</tr>
</tbody>
</table>
Table 5.3. Sexual risk behavior characteristics of the two study arms at baseline

<table>
<thead>
<tr>
<th></th>
<th>Women (n=6,702)</th>
<th>Men (n=4,746)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control (n=3,544)</td>
<td>Intervention (n=3,158)</td>
</tr>
<tr>
<td></td>
<td>(52.88%)</td>
<td>(47.12%)</td>
</tr>
<tr>
<td>n %</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td><strong>Rape/forced sex in the past year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3,041 85.9</td>
<td>2,759 88.5</td>
</tr>
<tr>
<td>Yes</td>
<td>500 14.1</td>
<td>357 11.5</td>
</tr>
<tr>
<td><strong>&gt;1 sexual partners in past year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3,329 94.0</td>
<td>3,001 95.0</td>
</tr>
<tr>
<td>Yes</td>
<td>214 6.0</td>
<td>157 5.0</td>
</tr>
<tr>
<td><strong>Non-marital sex partners in past year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2,516 82.0</td>
<td>2,268 83.9</td>
</tr>
<tr>
<td>Yes</td>
<td>552 18.0</td>
<td>434 16.1</td>
</tr>
<tr>
<td><strong>Alcohol use with sex (past year)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2,656 75.0</td>
<td>2,333 74.0</td>
</tr>
<tr>
<td>Yes</td>
<td>887 25.0</td>
<td>821 26.0</td>
</tr>
<tr>
<td><strong>Condom use in past year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None or inconsistent</td>
<td>3,228 91.1</td>
<td>2,884 91.3</td>
</tr>
<tr>
<td>Yes, always</td>
<td>316 8.9</td>
<td>274 8.7</td>
</tr>
<tr>
<td><strong>Discussion about condom use with primary partner in past year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1,457 58.9</td>
<td>1,415 55.2</td>
</tr>
<tr>
<td>Yes</td>
<td>2,087 41.1</td>
<td>1,743 44.8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>81.1</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Partner's disclosure of HIV status in past year</strong></td>
<td>Yes</td>
<td>669</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-disclosure of HIV status to partner in past year</strong></td>
<td>No</td>
<td>2,588</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>949</td>
</tr>
</tbody>
</table>
Table 5.4. Impact of intervention on risk behaviors among women

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>PRR</td>
<td>(95% CI)</td>
<td>aPRR*</td>
</tr>
<tr>
<td><strong>Past year rape/forced sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>500/3541</td>
<td>14.1</td>
<td>357/3116</td>
<td>11.5</td>
<td>0.81</td>
<td>(0.71-0.92)</td>
<td>1.18</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>261/2337</td>
<td>11.2</td>
<td>262/2257</td>
<td>11.6</td>
<td>1.04</td>
<td>(0.88-1.22)</td>
<td>1.12</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>232/2038</td>
<td>11.4</td>
<td>145/1737</td>
<td>8.4</td>
<td>0.73</td>
<td>(0.60-0.89)</td>
<td>0.80</td>
</tr>
<tr>
<td><strong>&gt;1 sexual partners in past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>214/3543</td>
<td>6.0</td>
<td>157/3158</td>
<td>5.0</td>
<td>0.82</td>
<td>(0.67-1.00)</td>
<td>1.48</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>214/2426</td>
<td>8.8</td>
<td>201/2341</td>
<td>8.6</td>
<td>1.00</td>
<td>(0.98-1.01)</td>
<td>1.00</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>207/2127</td>
<td>9.7</td>
<td>157/1812</td>
<td>8.7</td>
<td>0.99</td>
<td>(0.97-1.01)</td>
<td>0.98</td>
</tr>
<tr>
<td><strong>Non-marital sex partners in past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>552/3068</td>
<td>18.0</td>
<td>434/2702</td>
<td>16.1</td>
<td>0.89</td>
<td>(0.80-1.00)</td>
<td>1.34</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>377/2224</td>
<td>17.0</td>
<td>367/2127</td>
<td>17.3</td>
<td>1.02</td>
<td>(0.89-1.16)</td>
<td>1.01</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>396/2006</td>
<td>19.7</td>
<td>306/1693</td>
<td>18.1</td>
<td>0.92</td>
<td>(0.80-1.05)</td>
<td>0.89</td>
</tr>
<tr>
<td><strong>Alcohol use with sex (past year)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>887/3543</td>
<td>25.0</td>
<td>821/3154</td>
<td>26.0</td>
<td>1.04</td>
<td>(0.96-1.13)</td>
<td>0.99</td>
</tr>
<tr>
<td>Follow-up 1</td>
<td>647/2426</td>
<td>26.7</td>
<td>620/2342</td>
<td>26.5</td>
<td>0.99</td>
<td>(0.90-1.09)</td>
<td>0.99</td>
</tr>
<tr>
<td>Follow-up 2</td>
<td>435/2127</td>
<td>20.5</td>
<td>361/1812</td>
<td>19.9</td>
<td>0.97</td>
<td>(0.86-1.10)</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>Baseline</td>
<td>Follow-up 1</td>
<td>Follow-up 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------</td>
<td>------------</td>
<td>------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Condom use in past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>316/3544</td>
<td>201/2362</td>
<td>192/1170</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.9</td>
<td>8.5</td>
<td>16.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>274/3158</td>
<td>216/2282</td>
<td>157/931</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.7</td>
<td>9.5</td>
<td>16.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.97</td>
<td>1.11</td>
<td>1.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.83-1.14)</td>
<td>(0.93-1.34)</td>
<td>(0.85-1.25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.42</td>
<td>1.12</td>
<td>1.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.09-1.84)</td>
<td>(0.95-1.33)</td>
<td>(0.84-1.21)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Discussion about condom use with primary partner in past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2087/3544</td>
<td>1889/2426</td>
<td>1390/2127</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>58.9</td>
<td>77.9</td>
<td>65.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1743/3158</td>
<td>1811/2342</td>
<td>1131/1812</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>55.2</td>
<td>77.3</td>
<td>62.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.03</td>
<td>0.99</td>
<td>0.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.01-1.04)</td>
<td>(0.96-1.02)</td>
<td>(0.91-1.00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.95</td>
<td>1.00</td>
<td>0.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.93-0.97)</td>
<td>(0.97-1.03)</td>
<td>(0.92-1.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Partner's disclosure of HIV status in past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>669/3543</td>
<td>497/2340</td>
<td>455/2037</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.9</td>
<td>21.2</td>
<td>22.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>481/3156</td>
<td>492/2257</td>
<td>457/1740</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.2</td>
<td>21.8</td>
<td>26.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.81</td>
<td>1.03</td>
<td>1.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.73-0.81)</td>
<td>(0.92-1.15)</td>
<td>(1.05-1.32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.77</td>
<td>1.03</td>
<td>1.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.67-0.89)</td>
<td>(0.92-1.15)</td>
<td>(1.06-1.32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-disclosure of HIV status to partner in past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>949/3537</td>
<td>874/2339</td>
<td>752/2036</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26.8</td>
<td>37.4</td>
<td>36.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>764/3152</td>
<td>880/2257</td>
<td>731/1740</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24.2</td>
<td>39.0</td>
<td>42.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.90</td>
<td>1.04</td>
<td>1.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.83-0.98)</td>
<td>(0.97-1.12)</td>
<td>(1.05-1.23)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.61</td>
<td>1.05</td>
<td>1.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.55-0.68)</td>
<td>(0.97-1.12)</td>
<td>(1.06-1.24)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Effects of intervention adjusted for baseline age, education, marital status and number of non-marital sex partners. Each outcome was also adjusted for its baseline measure.*
Table 5.5. Impact of intervention on risk behaviors among men

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th>PRR (95% CI)</th>
<th>aPRR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Past year rape/forced sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>101/2532</td>
<td>58/2152</td>
<td>0.68</td>
<td>(0.49-0.93)</td>
</tr>
<tr>
<td></td>
<td>47/1586</td>
<td>38/1367</td>
<td>0.94</td>
<td>(0.61-1.43)</td>
</tr>
<tr>
<td></td>
<td>39/1407</td>
<td>24/1104</td>
<td>0.78</td>
<td>(0.47-1.30)</td>
</tr>
<tr>
<td><strong>&gt;1 sexual partners in past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>1208/2567</td>
<td>914/2179</td>
<td>0.89</td>
<td>(0.84-0.95)</td>
</tr>
<tr>
<td></td>
<td>829/1612</td>
<td>668/1406</td>
<td>0.92</td>
<td>(0.90-0.99)</td>
</tr>
<tr>
<td></td>
<td>676/1437</td>
<td>538/1150</td>
<td>0.99</td>
<td>(0.91-1.08)</td>
</tr>
<tr>
<td><strong>Non-marital sex partners in past year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>1189/2567</td>
<td>899/2179</td>
<td>0.89</td>
<td>(0.83-0.95)</td>
</tr>
<tr>
<td></td>
<td>804/1641</td>
<td>642/1433</td>
<td>0.91</td>
<td>(0.85-0.99)</td>
</tr>
<tr>
<td></td>
<td>645/1437</td>
<td>495/1150</td>
<td>0.96</td>
<td>(0.88-1.05)</td>
</tr>
<tr>
<td><strong>Alcohol use with sex (past year)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>943/2446</td>
<td>876/2168</td>
<td>1.05</td>
<td>(0.98-1.13)</td>
</tr>
<tr>
<td></td>
<td>787/1612</td>
<td>697/1406</td>
<td>1.02</td>
<td>(0.94-1.09)</td>
</tr>
<tr>
<td></td>
<td>670/1437</td>
<td>525/1150</td>
<td>0.98</td>
<td>(0.90-1.06)</td>
</tr>
</tbody>
</table>
### Condom use in past year

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Follow-up 1</th>
<th>Follow-up 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>398/2567</td>
<td>217/1613</td>
<td>188/806</td>
</tr>
<tr>
<td></td>
<td>15.5</td>
<td>13.5</td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td>378/2179</td>
<td>216/1408</td>
<td>153/601</td>
</tr>
<tr>
<td></td>
<td>17.4</td>
<td>15.3</td>
<td>25.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.14</td>
<td>1.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.98-1.36)</td>
<td>(0.91-1.31)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.06</td>
<td>1.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.76-1.03)</td>
<td>(0.87-1.24)</td>
</tr>
</tbody>
</table>

### Discussion about condom use with primary partner in past year

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Follow-up 1</th>
<th>Follow-up 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1470/2567</td>
<td>600/1612</td>
<td>547/1437</td>
</tr>
<tr>
<td></td>
<td>57.3</td>
<td>37.2</td>
<td>38.1</td>
</tr>
<tr>
<td></td>
<td>1191/2179</td>
<td>550/1406</td>
<td>476/1150</td>
</tr>
<tr>
<td></td>
<td>54.7</td>
<td>39.1</td>
<td>41.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.01</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.98-1.04)</td>
<td>(0.99-1.05)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.00</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.98-1.02)</td>
<td>(0.98-1.04)</td>
</tr>
</tbody>
</table>

### Partner's disclosure of HIV status in past year

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Follow-up 1</th>
<th>Follow-up 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>544/2533</td>
<td>425/1607</td>
<td>401/1409</td>
</tr>
<tr>
<td></td>
<td>21.5</td>
<td>26.5</td>
<td>28.5</td>
</tr>
<tr>
<td></td>
<td>365/2173</td>
<td>372/1374</td>
<td>385/1107</td>
</tr>
<tr>
<td></td>
<td>16.8</td>
<td>27.1</td>
<td>34.8</td>
</tr>
<tr>
<td></td>
<td>0.78</td>
<td>1.02</td>
<td>1.22</td>
</tr>
<tr>
<td></td>
<td>(0.69-0.88)</td>
<td>(0.91-1.15)</td>
<td>(1.09-1.37)</td>
</tr>
<tr>
<td></td>
<td>1.09</td>
<td>1.09</td>
<td>1.24</td>
</tr>
<tr>
<td></td>
<td>(0.85-1.41)</td>
<td>(0.97-1.22)</td>
<td>(1.11-1.39)</td>
</tr>
</tbody>
</table>

### Self-disclosure of HIV status to partner in past year

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Follow-up 1</th>
<th>Follow-up 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>647/2533</td>
<td>549/1607</td>
<td>444/1409</td>
</tr>
<tr>
<td></td>
<td>25.5</td>
<td>34.2</td>
<td>31.5</td>
</tr>
<tr>
<td></td>
<td>411/2174</td>
<td>494/1374</td>
<td>404/1107</td>
</tr>
<tr>
<td></td>
<td>18.9</td>
<td>36.0</td>
<td>36.5</td>
</tr>
<tr>
<td></td>
<td>0.74</td>
<td>1.05</td>
<td>1.16</td>
</tr>
<tr>
<td></td>
<td>(0.66-0.83)</td>
<td>(0.95-1.16)</td>
<td>(1.04-1.29)</td>
</tr>
<tr>
<td></td>
<td>0.91</td>
<td>1.10</td>
<td>1.17</td>
</tr>
<tr>
<td></td>
<td>(0.74-1.10)</td>
<td>(1.00-1.21)</td>
<td>(1.05-1.31)</td>
</tr>
</tbody>
</table>

*Effects of intervention adjusted for baseline age, education, marital status and number of non-marital sex partners. Each outcome was also adjusted for its baseline measure.
Table 5.6. Incidence of HIV by self-disclosure of HIV results to primary partner

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th>IRR</th>
<th>(95% CI)</th>
<th>P value</th>
<th>aIRRb</th>
<th>(95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incidence cases/py</td>
<td>Incidence/100 py</td>
<td>Incidence cases/py</td>
<td>Incidence/100 py</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVERALL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-disclosed</td>
<td>14/1622.99</td>
<td>615</td>
<td>0.86</td>
<td>4/1407.97</td>
<td>511</td>
<td>0.28</td>
<td>0.33</td>
<td>(0.11-1.00)</td>
</tr>
<tr>
<td>Did not self-disclose</td>
<td>70/5332.53</td>
<td>1,914</td>
<td>1.31</td>
<td>55/4929.80</td>
<td>1,852</td>
<td>1.12</td>
<td>0.85</td>
<td>(0.60-1.21)</td>
</tr>
<tr>
<td>WOMEN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-disclosed</td>
<td>8/998.96</td>
<td>376</td>
<td>0.80</td>
<td>1/900.64</td>
<td>327</td>
<td>0.11</td>
<td>0.14</td>
<td>(0.02-1.11)</td>
</tr>
<tr>
<td>Did not self-disclose</td>
<td>40/3060.64</td>
<td>1,100</td>
<td>1.31</td>
<td>37/2800.56</td>
<td>1,064</td>
<td>1.32</td>
<td>1.01</td>
<td>(0.65-1.58)</td>
</tr>
<tr>
<td>MEN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-disclosed</td>
<td>6/624.02</td>
<td>239</td>
<td>0.96</td>
<td>3/507.32</td>
<td>184</td>
<td>0.59</td>
<td>0.62</td>
<td>(.154-2.46)</td>
</tr>
<tr>
<td>Did not self-disclose</td>
<td>30/2271.89</td>
<td>814</td>
<td>1.32</td>
<td>18/2129.24</td>
<td>788</td>
<td>0.85</td>
<td>0.64</td>
<td>(0.36-1.15)</td>
</tr>
</tbody>
</table>

a No. = number of participants who contributed to the person-year calculation.

b Effects of intervention adjusted for baseline age, education, marital status, number of non-marital sex partners, condom use, male circumcision status (of male respondents and primary male partner of female respondents) and results disclosure at follow up.
Table 5.7. Incidence of HIV by primary partner's disclosure of HIV results

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th>IRR</th>
<th>(95% CI)</th>
<th>P value</th>
<th>aIRR&lt;sup&gt;b&lt;/sup&gt;</th>
<th>(95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OVERALL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner disclosed</td>
<td>7/1031.43</td>
<td>390</td>
<td>0.68</td>
<td>3/893.52</td>
<td>320</td>
<td>0.34</td>
<td>0.49</td>
<td>(0.13-1.92)</td>
</tr>
<tr>
<td>Partner did not</td>
<td>87/6688.95</td>
<td>2366</td>
<td>1.30</td>
<td>62/6293.95</td>
<td>2315</td>
<td>0.99</td>
<td>0.76</td>
<td>(0.55-1.05)</td>
</tr>
<tr>
<td>disclose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WOMEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner disclosed</td>
<td>4/509.16</td>
<td>193</td>
<td>0.79</td>
<td>2/438.09</td>
<td>159</td>
<td>0.46</td>
<td>0.58</td>
<td>(0.11-3.19)</td>
</tr>
<tr>
<td>Partner did not</td>
<td>52/4156.44</td>
<td>1449</td>
<td>1.25</td>
<td>42/3930.27</td>
<td>1427</td>
<td>1.07</td>
<td>0.85</td>
<td>(0.57-1.28)</td>
</tr>
<tr>
<td>disclose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner disclosed</td>
<td>4/522.27</td>
<td>368</td>
<td>0.77</td>
<td>1/455.43</td>
<td>358</td>
<td>0.22</td>
<td>0.38</td>
<td>(0.04-3.69)</td>
</tr>
<tr>
<td>Partner did not</td>
<td>35/2532.52</td>
<td>917</td>
<td>1.38</td>
<td>20/2363.68</td>
<td>888</td>
<td>0.85</td>
<td>0.61</td>
<td>(0.36-1.06)</td>
</tr>
<tr>
<td>disclose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>No.=number of participants who contributed to the person-year calculation.

<sup>b</sup>Effects of intervention adjusted for baseline age, education, marital status, number of non-marital sex partners, condom use, male circumcision status (of male respondents and primary male partner of female respondents) and results disclosure at follow up.

<sup>c</sup>In this adjusted model we only controlled for baseline age, education and marital status because of the small cell sizes the fully adjusted model could not be fitted.
Summary of results

The overall objective of this thesis was to describe a combination HIV and IPV prevention program that was implemented in Rakai Uganda and to evaluate its impact on recent experiences of IPV, select sexual risk behaviors and HIV incidence.

Chapter Two describes how the SHARE IPV prevention intervention was integrated between 2005 and 2009 into the RHSP’s existing HIV services. It briefly summarizes violence prevention activities and provides details on how the they were interwoven into ongoing HIV prevention work being conducted by RHSP. Some of the main field lessons learned are discussed and recommendations are provided for conducting future IPV and HIV prevention work in sub-Saharan Africa and similar settings.

Chapter Four describes the community-based CRT conducted to evaluate the impact of the combination IPV/HIV prevention intervention. It details the methods and findings on the intervention’s impact on recent IPV and HIV incidence. Findings suggest that exposure to the SHARE intervention was associated with reduced physical, sexual and emotional among women but did not impact men’s reports of perpetrating the same outcomes against women. The intervention was associated with a reduction of HIV incidence in the total population but these findings cannot conclusively be attributed to the intervention.

Chapter Five examines the direct and indirect pathways between IPV and HIV infection so as to explain the mechanisms that led to changes in reports of violence, as well as HIV
incidence. Findings from this analysis suggest the intervention was associated with significant reductions in women’s reports of victimization from rape at final follow up but not with men’s reports of rape perpetration. There was a marginal reduction in women’s reports of multiple sex partners in the past year but the intervention was not associated with significant reductions in number of sex/non-marital partners (among men), alcohol use surrounding sex, condom use, or discussion about using condoms. Exposure to SHARE was associated with increased rates of HIV results disclosure among both men and women and disclosure of results, both by the respondent and the respondent’s primary partner, was associated with reduced HIV acquisition in all groups and particularly among women but these estimates were not statistically significant.

**Implications**

The SHARE intervention reduced IPV among women and HIV incidence in the population. While we cannot conclusively explain the differential in HIV incidence found between the study arms, our analysis suggests that SHARE’s greatest impact on HIV risk behaviors was the reduction of women’s experiences of forced sex and improvements in men’s and women’s rates of HIV results disclosure. The SHARE intervention model could inform programs in the prevention of both IPV and HIV.
Jennifer Wagman  
CURRICULUM VITAE

EDUCATION

1999 MHS, Department of International Health, JHBSPH, Baltimore, Maryland
1992 BA, Department of Animal Behavior, Bucknell University, Lewisburg, Pennsylvania

HONORS AND AWARDS

2011-2013 Ruth L. Kirschstein National Research Service Award, JHBSPH; National Institute of Mental Health [1F31MH095649-01A1]
2012 Endowed Student Support Fund for Injury Control Research, JHBSPH
2010/11/12 Endowed Fellowship in Family Planning and Reproductive Health, Department of Population, Family and Reproductive Health (PFRH), JHBSPH, Baltimore, Maryland
2011 Dr. Michael Koenig Memorial Fund, PFRH, JHBSPH, Baltimore, Maryland
2008-2010 Pre-Doctoral Interdisciplinary Violence Research Training Fellowship Award, Johns Hopkins School of Nursing; National Institute of Mental Health [T32 MH020014] PI: Jacquelyn Campbell
1999 Delta Omega Scientific Poster Award Recipient, JHU, School of Public Health, Baltimore, MD

PUBLIC HEALTH EXPERIENCE

Research Employment Experience

2010-2013 **Technical Advisor - HIV and Violence Research**, Research to Prevention (R2P) Project, Center for Communication Programs, Johns Hopkins Bloomberg School of Public Health. *Supervisor: Deanna Kerrigan, PhD, Associate Professor and R2P Project Director*

2006–2008 **Senior Research Program Coordinator**, Johns Hopkins Bloomberg School of Public Health (JHSPH), Department of Population, Family and Reproductive Health (PFRH) **AND Investigator**, Rakai Health Sciences Program (RHSP) (Baltimore, Maryland). *Supervisor: Ronald Gray, MD, Professor, Departments of Epidemiology and PFRH*
2006–2008  **Violence Research Collaborator** to the Johns Hopkins University, School of Nursing (Baltimore).  *Supervisor: Nancy Glass, PhD, MPH, RN, FAAN, Associate Professor.*

2000–2006  **Staff Associate,** Columbia University, Mailman School of Public Health, Heilbrunn Department of Population and Family Health.  (Uganda)  *Supervisors: Maria J. Wawer, MD, MHSc, Professor, Ronald Gray, MD, Professor and David Serwadda, MD, MHSc, Professor and Dean, Makerere University School of Public Health.*

1998–2000  **Field Research Coordinator,** Kongwa Malaria Treatment Project (Tanzania)  **Qualitative Data Analyst**, JHSPH, Department of International Health.  *Supervisor: Peter J. Winch, MD, MPH, Professor, Director, Social and Behavioral Interventions Program*

**Research Consultancies**

Jan-Mar 2011  **Evaluation Consultant for the Gender-Based Violence (GBV) Prevention Network,** Raising Voices (Uganda).  *Supervisor: Lori Michau, Co-Director, Raising Voices*

Jul-Aug 2009  **Violence and HIV Research Consultant,** London School of Hygiene & Tropical Medicine and Raising Voices (Uganda).  *Supervisor: Charlotte Watts MSc PhD, Professor, Director - Gender, Violence and Health Centre, Head – HIV Tools Research Group*

**Teaching Experience**

2010/11/12  Teaching Assistant and guest lecturer, *HIV Infection in Women, Children and Adolescents*, JHSPH, PRFH (Instructors: Heena Brahmbhatt and Maria Wawer)

2010  Teaching Assistant, *Understanding and Preventing Violence*, JHSPH, Department of Health Policy and Management (Instructor: Daniel Webster)

2005  Guest lecturer, *The Role of Social and Behavioral Science in Public Health*, Makerere University, Institute of Public Health (Kampala, Uganda)

1999  Teaching Assistant, *Qualitative Research Methods*, JHSPH, Department of International Health, (Instructor: Joel Gittelsohn)

PROFESSIONAL ACTIVITIES

Society Membership
American Public Health Association
Society for Advancement of Violence and Injury Research
International AIDS Society
Gender-Based Violence Prevention Network, Kampala, Uganda

Peer Review Activities
HIV/AIDS - Research and Palliative Care
International Journal of Gynecology and Obstetrics
International Journal of Women’s Health
International Perspectives on Sexual and Reproductive Health
PLoS One
Sexual Violence Research Initiative (conference abstract reviewer)
Women’s Health Issues

Other Partnerships and Activities
Expert witness for Chicago-based Jenner & Block Law Firm in first asylum case where an immigration judge in the Seventh Circuit recognized “women sold into arranged marriages” as a social group for purposes of granting asylum in the United States (2006)

Violence Prevention Partner, National domestic violence prevention initiative coordinated by the Center for Domestic Violence Prevention in Kampala, Uganda: a strengthening capacity initiative to increase the number and quality of community-based violence prevention initiatives in Uganda. (2006-present)

RESEARCH AND PROGRAM GRANTS

2011-2013 Principal Investigator, Ruth L. Kirschstein National Research Service Awards (NRSA) for Individual Predoctoral Fellows: Assessing the impact of an intervention to prevent violence and HIV in Uganda; Johns Hopkins Bloomberg School of Public Health; National Institute of Mental Health (NIMH) [1F31MH095649-01A1]

2007–2009 Principal Investigator, Assessing the Impact of a Community-Based Intervention Designed to Reduce Levels of Physical and Sexual Domestic Violence in Rakai District, Uganda. World Health Organization, Department of Reproductive Health and Research


2003–2004  Project Coordinator, Building on lessons learned about domestic violence in Rakai, Uganda: Strengthening capacity to handle cases of domestic violence and to promote the reproductive rights of women and girls. Democracy and Human Rights Fund, US Embassy Kampala, Uganda

2002–2003  Co-investigator and Research Coordinator, How research participants, community members and opinion leaders perceive the benefits and risks of biomedical research in Rakai District, Uganda. NIH, Department of Clinical Bioethics.

PUBLICATIONS


**PRESENTATIONS**


