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Exploring differential impacts of interventions to reduce and prevent intimate partner violence (IPV) on sub-groups of women and men: A case study using impact evaluations from Rwanda and South Africa

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ABSTRACT

Currently, most efforts to evaluate programmes designed to reduce intimate partner violence (IPV) assume that they affect all people similarly. Understanding whether interventions are more or less effective for different subgroups of individuals, however, can yield important insights for programming. In this study, we conducted subgroup analyses to assess whether treatment effects vary by baseline reporting of IPV experience among women or perpetration among men. Results indicated that for both men and women, the *Indashyikirwa* intervention in Rwanda was more successful at reducing or stopping ongoing IPV than it was at preventing its onset. The *SS-CF* intervention in South Africa, by contrast, was more successful at preventing men from starting to perpetrate IPV than it was in reducing the intensity of men's perpetration or stopping it entirely. These results indicate that the prevention field needs to better understand the extent to which IPV interventions may have differential impacts on primary versus secondary prevention. It also emphasizes the importance of distinguishing between intervention strategies that prevent the onset of IPV versus those that reduce or stop ongoing IPV.

Introduction

Intimate partner violence (IPV) affects one-third of women globally (Devries et al., 2013; Garcia-Moreno, Jansen, Ellsberg, Heise, & Watts, 2006) and the negative health consequences of IPV are well-documented (Campbell, 2002; Coker, Smith, Bethea, King, & McKeown, 2000; Follingstad, Rogers, & Duvall, 2012). Over the last decade, multiple interventions have been developed, adapted, and evaluated to address IPV as a public health concern: two separate reviews identified 95 completed randomized control trials (RCT) and quasi-experimental evaluations of interventions aimed at preventing IPV and other types of violence against women and girls (VAWG) (Dickens, Augier, Sabet, Picon, & Rankin, 2019; Kerr-Wilson et al., 2020). As more longitudinal data on the effectiveness of interventions becomes available, researchers can move from asking questions regarding the "average" success of an intervention, to unpacking its effect on different sub-populations, thereby guiding the targeting of the intervention.

Scholars of clinical trials have long highlighted the need for subgroup analysis to determine whether drugs or interventions work differently across groups with different characteristics at baseline (Cook, Gebski, & Keech, 2004; Espinoza, Manca, Claxton, & Sculpher, 2014; Hirji & Fagerland, 2009; Sun et al., 2012). Differences in outcomes by subgroup, (e.g., race, SES, weight, sex) can inform directions on dosage or use and/or guide future research and development. Similar observations can be made about randomized trials used to evaluate complex social interventions such as violence prevention. Understanding whether interventions are more or less effective for different subgroups of individuals can yield important insights for programming. Such information can be used to strengthen programs and tailor them to specific populations (Kane et al., 2016). It is possible, for example, that an intervention could be more effective at stopping moderately violent behavior than at curbing more severe forms of abuse. In this case, a model intervention could seek to recruit individuals without a history of severe IPV.

One particularly important subgroup to explore is whether programs are equally effective at preventing the onset of violence among women not experiencing IPV at baseline (primary prevention) as they are at reducing or stopping violence that is already ongoing (secondary

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prevention). To our knowledge, *SASA!* (a community mobilization programme to reduce IPV in Uganda) is the only IPV prevention programme that has been evaluated this way among women and has been shown to be effective at reducing pre-existing IPV, but not at preventing the onset of abuse (Abramsky et al., 2016). Conversely, sexual assault prevention interventions have been found to be less successful among women with a history of victimization (Anderson & Whiston, 2005; Breitenbecher & Gidycz, 1998; Gidycz, Layman, et al., 2001; Gidycz, Lynn, et al., 2001; Hanson & Gidycz, 1993; Rothman & Silverman, 2007).

Two additional studies have explored the differential impacts of IPV prevention programming on different categories of men. A study using latent class analysis found that the Sonke CHANGE intervention in South Africa may have been more effective at reducing IPV perpetration among men who were less violent and reported lower non-partner sexual violence perpetration as compared to anti-social and hypermasculine men who reported high levels of violence at baseline (Christofides et al., 2020). Another study used group-based trajectory analyses to identify trajectories of violence perpetration among men enrolled in the intervention arms of three separate IPV prevention trials in Africa—the Sonke CHANGE trial in a peri-urban area of Johannesburg; the Stepping Stones/Creating Futures trial among young men in Durban; and the Indashykirwa trial among cohabiting couples in Rwanda. This analysis identified three violence trajectories among men: a low-flat trajectory (60%–67% of men), a high-start with large reduction trajectory (19%–24%) and high-start with slight increase trajectory (10%–21%), suggesting these interventions may have had the greatest impact on those who were more violent at baseline (Gibbs, Dunkle, et al., 2020). We did not find any study that examined the differential impact of an IPV intervention on primary versus secondary prevention for men (The SASA evaluation interviewed only women).

Among participants who report ongoing IPV at baseline, an important additional question is whether interventions are able to eliminate violence (bring it to zero), or merely reduce its frequency and severity. Both VAWG evidence reviews mentioned previously found that the majority of studies used a binary outcome measure (1 = any IPV in the past 12 months, 0 = no IPV in the past 12 months) to assess trial impact, despite the fact that most studies used multi-item scales to measure IPV that include information on frequency and severity of IPV (Dickens et al., 2019; Kerr-Wilson et al., 2020). Binary measures of average impact are appropriate for evaluations of interventions that seek to completely stop violence from occurring by the end of the intervention. However, they are less well suited to interventions that expect some participants to report a reduction in the severity of violence and others to report cessation of violence.

In this paper, we use data from impact evaluations conducted as part of the What Works to Prevent VAWG research consortium (hereafter the What Works consortium), to examine both of these critical issues. What Works was a 6-year program, funded by the UK Department of International Development that evaluated, using comparable outcome measures and instruments, a range of interventions designed to reduce violence against women and children in low-and middle-income countries (LMICs). We use secondary data from two separate interventions in this consortium—*Stepping-Stones/Creating Futures (SS-CF)* in South Africa, and *Indashyikirwa* in Rwanda, to answer the following research questions: Are the interventions tested equally effective at preventing the onset of violence as they are for stopping or reducing the intensity of violence pre-existing in a relationship? And, among participants who reported ongoing IPV at baseline, are interventions more likely to reduce or stop the intensity of ongoing violence?

Method

Description of studies

The *Stepping Stones and Creating Futures (SS-CF)* trial was conducted in South Africa, where 13% and 8% of women aged 18 years or older experienced physical and sexual violence respectively from a partner in the past 12 months, according to a population-based study in one province (Machisa, Jewkes, Colleen, & Kubi, 2011). *SS-CF* is a behavioral and structural intervention aimed at reducing IPV through transforming gender attitudes and relationships and strengthening livelihoods. The intervention comprises 21 sessions, each approximately 3-hours long, delivered twice weekly by trained peer facilitators. The evaluation used a two-arm controlled trial, randomized at the group level, with a wait-list control. Male and female groups were conducted separately and members were typically not in romantic relationships with each other. Data were collected at baseline before the intervention and 24 months post intervention, using tablets programmed for the study, with built-in skip and logic patterns. To be included, participants had to be between 18 and 30 years, resident in the informal settlement, and not working or in education. A total of 676 women and 674 men were recruited and endline retention was 74.9% (n = 505) for men and 80.6% (n = 545) for women. More details on the study rationale, setting, methods and intervention are available elsewhere (Gibbs, Washington, et al., 2020). Results from the main trial analysis found that men in the *SS-CF* intervention reported significantly less perpetration of severe physical and/or sexual IPV (aOR:0.70, 95% CI: 0.52, 0.94, $p < 0.05$), physical IPV (aOR:0.71, 95% CI: 0.51, 0.97, $p < 0.05$) and a non statistically significant reduction in perpetration of sexual IPV (aOR:0.74, 95% CI: 0.54, 1.03, $p = 0.07$) at 24 months. There was no evidence of an intervention effect on women's experiences of physical and/or sexual IPV (Gibbs, Washington, et al., 2020).

The *Indashyikirwa* trial was a community-randomized controlled trial implemented in Rwanda. According to the 2014-15 Rwanda Demographic and Health Survey, 34% of women aged 15 to 49 in the general population experienced physical and/or sexual violence by a husband/partner in the past 12 months (NISR), 2016). The *Indashyikirwa* intervention included four interlocking components: a 21 session couples' curriculum; training and support to community activists; opinion leader training; and the creation of women's safe spaces. The couples' curriculum, an intensive gender transformative and relationship strengthening intervention, addressed positive and negative types of power, key triggers of IPV (i.e. jealousy, alcohol abuse, economic stress), and taught communication and conflict resolution skills. In this paper, we use data from a longitudinal cohort of couples, recruited as part of a larger cluster randomized controlled trial and process evaluation, who participated in the couple's curriculum and were interviewed at three time points: baseline (before the intervention), and 12- and 24-months post-intervention. This cohort was comprised of adult male-female couples who were married or cohabiting, and where at least one partner was an active members of a local village saving and loan association (VSLA) (n = 1660 women and 1651 men). At 24 months, 97% of women (n = 1617), and 93% of men (n = 1536) were retained. Data were collected on tablets programmed for the study, with in-built logic and skip patterns. Further details on the study rationale, setting, methods and intervention are available elsewhere (Dunkle, Stern, Chatterji, & Heise, 2020). In the main trial analysis, women in the intervention compared to control were less likely to report severe physical and/or sexual IPV (aRR: 0.44; 95% CI: 0.34, 0.59, $p < 0.001$), physical IPV (aRR: 0.39, 95% CI: 0.29, 0.53, $p < 0.001$) and sexual IPV at 24 months (aRR: 0.49, 95% CI: 0.37, 0.66, $p < 0.001$). Men in the intervention compared to control were also significantly less likely to report perpetration of severe physical and/or sexual IPV (aRR: 0.54; 95% CI: 0.38, 0.75, $p < 0.001$), and sexual IPV (aRR: 0.52, 95% CI: 0.37, 0.74, $p < 0.001$) at 24 months. There was no evidence of an intervention impact on men's perpetration of physical IPV at 24 months (Dunkle et al., 2020).

Measures

Primary outcomes. All sites used a version of the WHO instrument

for assessing IPV, adapted for administration through tablet and/or Audio Computer-Assisted Self-Interview (ACASI) (García-Moreno, Jansen, Ellsberg, Heise, & Watts, 2005). Both sites included measures of physical IPV (assessed through 5 items) and sexual IPV (assessed with 3 items). All scales use behaviorally specific questions to inquire about women's experience and men's perpetration of specific acts of IPV over the past 12 months (e.g., in the past 12 months how many times has a current husband or boyfriend ever slapped you or thrown something at you which could hurt you?). Responses were: '0 = never', '1 = once', '2 = a few times', or '3 = many times.'

Outcome measures were created for each type of violence (physical, sexual, and physical and/or sexual violence). Each outcome was coded as a binary variable (did the respondent report any act of physical or sexual violence: yes/no) where a participant was coded as a "case of IPV" if they endorsed at least one item on either the physical or sexual violence scale. This is the primary outcome most commonly used in IPV prevention trials. Both trials used the What Works measure[1] for severe IPV as their primary outcome variable. Registered secondary outcomes included physical IPV, sexual IPV (both *Indashyikirwa* and *SS-CF*) and combined physical and/or sexual IPV (only for *SS-CF*) coded as binary variables.

Presence of IPV at baseline. To assess differences in treatment outcomes by baseline reporting of IPV, we created three new binary variables and one count variable: IPV cessation, IPV reduction (binary and count) and IPV prevention (see Fig. 1).

Among individuals who *reported* past year experience/perpetration of IPV at baseline, *reduction* measures the change in IPV score between baseline and endline. It is measured both as a binary and a count variable. The count measure of *reduction* assesses the magnitude of change in IPV score between baseline and endline (IPV score at baseline minus IPV score at endline). The binary measure of *reduction* assesses whether the IPV score reduced between baseline and endline (1 = IPV score reduced at endline, 0 = score stays the same/increased between baseline and endline). Among individuals who reported past year experience/perpetration of IPV at baseline, *cessation* measures whether IPV stopped completely at endline (1 = no IPV in the past 12 months at endline, 0 = experienced/perpetrated IPV in the past 12 months at endline). Cessation is a subset of reduction as it includes participants whose reporting of IPV experience/perpetration *reduced* to zero.

Among individuals who did *not* report experiencing/perpetrating any given type of violence at baseline, *prevention* evaluates whether the intervention stopped new cases of IPV. This binary variable is coded 0 if at baseline a participant did *not* experience/perpetrate a given type of IPV, but then reported experiencing/perpetrating IPV at endline, and 1 if they continued reporting no IPV experience/perpetration.

Subgroup analysis

We stratified the sample by baseline reporting of IPV experience (women) and perpetration (men) and assessed treatment effects for ongoing IPV (reduction, cessation) among participants who had reported experiencing/perpetrating IPV at baseline and then assessed no new onset of IPV (prevention) among participants who did not report experiencing/perpetrating IPV at baseline. Both trials used an intention-to-treat analysis approach and we used the same models for subgroup analyses. In the *SS-CF* trial, outcomes were analyzed using generalized estimating equation models accounting for the clustered nature of the data (Gibbs, Washington, et al., 2020). The analysis for the *Indashyikirwa* trial included a generalized linear mixed effects model with a logit link function to compare the effect of the intervention between the 2 study arms for all binary variables and a negative binomial link function for count data. The district in which data were collected was added as a fixed effect term and sector (the unit of randomization) was added as a random effects term. All models adjusted for age, type of VSLA membership reported at baseline (self, partner or both), and baseline asset scores. For women, experience of physical or sexual IPV from a previous partner was an additional covariate. For men, all models adjusted for legal marriage at baseline and being beaten often or very often as a child (Dunkle et al., 2020). We report 95% confidence intervals and p-values for all outcomes. Analysis was conducted using Stata version 15.

Post-hoc analyses

The subgroup analyses presented in this paper were not pre-specified for either of the two trials and should be viewed as exploratory. For both studies, the main trial analyses evaluated the average impact of the intervention for all participants. Conversely, in this paper, we are examining differences in intervention impact based on baseline reporting of IPV. The *Indashyikirwa* study had included two secondary outcomes that assessed differences in treatment effect on physical and/or sexual IPV (What Works definition) separately for two groups of participants based on their baseline reporting of IPV. The two outcomes measured: (a) new experience (for women) or perpetration (for men) of any physical and/or sexual IPV during the 12 months before the assessment among participants who did not report physical and/or sexual IPV at baseline; and (b) recurrent physical and/or sexual IPV during the 12 months before the assessment among participants who did report physical and/or sexual IPV at baseline, at two timepoints, the 12 and 24 month follow-up. These two outcomes are different from the outcomes presented in this study (cessation, reduction, prevention) which measure change in reporting of IPV *between* baseline and endline rather than estimates at a given timepoint which have been reported elsewhere (Dunkle et al., 2020).

Ethical approval

Ethical approval for the *SS-CF* trial was granted by the ethics committees of the University of KwaZulu-Natal, Durban, South Africa (BFC043/15) and the South African Medical Research Council Ethics Committee (EC006–2-2015). Approval to undertake the *Indashyikirwa* study was obtained from the Rwandan National Ethics Committee (340/RNEC/2015) and the National Institute of Statistics Rwanda (0738/2015/10/NISR). Secondary ethics approval was also obtained from the South Africa Medical Research Council (EC033-10/2015). In both trials, written consent was obtained from all participants; illiterate participants could have the form read to them by study personnel or a trusted person of their choosing (Dunkle et al., 2020; Gibbs, Washington, et al., 2020).

Results

Demographic characteristics for all participants from both sites are presented in Tables 1 and 2. Female and male participants in the *Indashyikirwa* trial were older than participants in *SS-CF* trial and were more likely to be married. Subgroup analyses revealed a range of heterogenous outcomes across both trials depending on the presence or absence of IPV at baseline. Fig. 2 presents a visual overview of these findings and Tables 3 and 4 note the coefficients, accompanying 95% confidence intervals and p-values for all outcomes for female and male participants.

Indashyikirwa - women

In the overall sample, 60% of women in the treatment group and 51% of women in the control group reported past year physical and/or sexual IPV at baseline. Among these women who reported ongoing IPV, 79% of women in the treatment group reported a reduction in physical and/or sexual IPV at endline as compared to 59% of women in the control group. Women in the treatment group had over two times higher

[1] The What Works program adopted the following coding as its primary IPV outcome: endorsement of any of 5 physical IPV items or 3 sexual IPV items more than once or endorsement of more than one item.

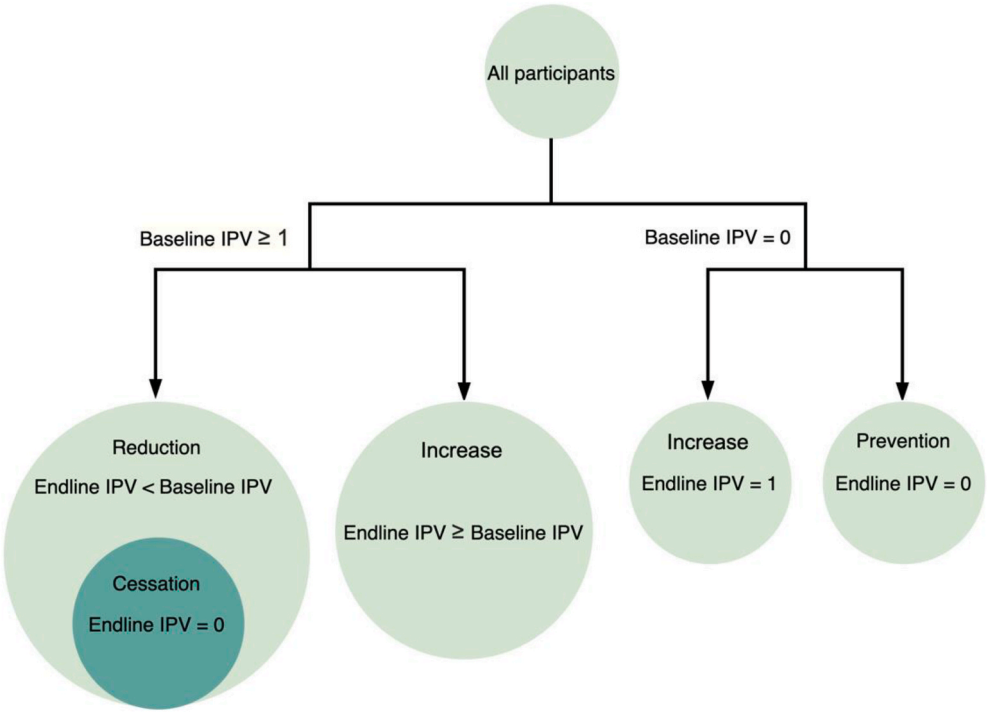

Fig. 1. Schematic of trial outcomes when sample is stratified by baseline reporting of IPV.

Table 1
Baseline characteristics of female participants.

Characteristic	South Africa		Rwanda	
	Control	Intervention	Control	Intervention
	N = 285	*N* = 260	*N* = 799	*N* = 813
	Mean/N (SE/%)	Mean/N (SE/%)	Mean/N (SE/%)	Mean/N (SE/%)
Age	24.13 (3.83)	23.7 (3.38)	32.5 (0.29)	31.9 (0.30)
Education				
No schooling			147 (18.68)	134 (16.73)
Primary school	22 (7.72)	15 (5.77)	524 (66.58)	562 (70.16)
Secondary or above	263 (92.28)	245 (94.23)	116 (14.74)	105 (13.11)
Marital status				
Married/Living together	46 (16.14)	42 (16.15)	506 (63.33)	564 (69.37)
Boyfriend/ girlfriend	184 (64.56)	174 (66.92)		
Other	55 (19.30)	44 (16.92)	293 (36.67)	249 (30.63)
Food insecurity				
None	37 (12.98)	69 (26.54)	626 (78.35)	668 (82.16)
Mild	158 (55.44)	115 (44.23)	173 (21.65)	145 (17.84)
Severe	90 (31.58)	76 (29.23)		
Experience of physical and/or sexual IPV	183 (64.21)	164 (63.08)	408 (51.32)	483 (59.85)
Experience of physical IPV	171 (60.00)	148 (56.92)	263 (33.08)	344 (42.63)
Experience of sexual IPV	80 (28.07)	73 (28.08)	301 (37.81)	366 (45.24)

Table 2
Baseline characteristics of male participants.

Characteristic	South Africa		Rwanda	
	Control	Intervention	Control	Intervention
	N = 267	*N* = 237	*N* = 762	*N* = 749
	Mean/N (SE/%)	Mean/N (SE/%)	Mean/N (SE/%)	Mean/N (SE/%)
Age	23.7 (3.81)	23.8 (3.39)	35.4 (0.29)	35.7 (0.38)
Education				
No schooling			111 (14.72)	125 (16.87)
Primary school	21 (7.87)	20 (8.44)	504 (66.84)	496 (66.94)
Secondary or above	246 (92.13)	217 (91.56)	139 (18.44)	120 (16.19)
Marital status				
Married/Living together	40 (14.98)	18 (7.59)	490 (64.30)	526 (70.23)
Boyfriend/ girlfriend	180 (67.42)	162 (68.35)		
Other	47 (17.60)	57 (24.05)	272 (35.70)	223 (29.77)
Food insecurity				
None	37 (12.98)	69 (26.54)	581 (76.25)	592 (79.04)
Mild	158 (55.44)	115 (44.23)	181 (23.75)	157 (20.96)
Severe	90 (31.58)	76 (29.23)		
Perpetration of physical and/or sexual IPV	150 (56.18)	131 (55.27)	250 (32.68)	286 (37.78)
Perpetration of physical IPV	126 (47.19)	116 (48.95)	170 (22.22)	200 (26.32)
Perpetration of sexual IPV	82 (30.71)	65 (27.43)	149 (19.35)	171 (22.56)

Significant effect seen in victimization of women?	*Indashykirwa*	*Stepping Stones Creating Futures*
Reduction in sexual/physical IPV	Yes	No
Reduction in physical IPV	Yes	No
Reduction in sexual IPV	Yes	No
Cessation of sexual/physical	Yes	No
Cessation of physical IPV	Yes	No
Cessation of sexual IPV	Yes	No
Prevention of sexual/physical IPV	No	No
Prevention of physical IPV	No	No
Prevention of sexual IPV	No	No
Significant effect seen in perpetration by men?	*Indashykirwa*	*Stepping Stones Creating Futures*
Reduction in sexual/physical IPV	Yes	No
Reduction in physical IPV	No	No
Reduction in sexual IPV	p=.05	No
Cessation of sexual/physical	Yes	No
Cessation of physical IPV	No	No
Cessation of sexual IPV	Yes	No
Prevention of sexual/physical IPV	No	p=.08
Prevention of physical IPV	No	No
Prevention of sexual IPV	No	Yes

Fig. 2. Visual results for trial impact on IPV experience among women and perpetration among men in the stratified sample (binary variables).

odds of reporting a reduction in physical and/or sexual IPV (aOR: 2.55, C.I.: 1.88, 3.46, $p < 0.001$) at endline. The count measure of reduction illustrates the magnitude of reduction in the score of physical and/or sexual IPV. Women in the treatment group reported an average reduction of 3.07 points in physical and/or sexual IPV, which is a 57% reduction in the mean score of physical and/or sexual IPV reported at baseline. In contrast, the average reduction reported by women in the control group was 0.79 points, which is a 17% reduction in the mean score of physical and/or sexual IPV reported at baseline. Multivariate analyses indicated that on average, women in the treatment group reported a two-point greater reduction in the score of physical and/or sexual IPV as compared to women in the control group (β: 2.14, C.I.: 1.55, 2.73, $p < 0.001$). Among women experiencing IPV at baseline, 47% of women in the treatment group reported cessation of physical and/or sexual IPV at endline as compared to 32% women in the control group. Women in the treatment group had 80% greater odds of reporting cessation of physical and/or sexual IPV as compared to women in the control group (aOR: 1.80, C.I.: 1.35, 2.39, $p < 0.001$).

On average, women in the treatment group reported three times higher odds of reporting reductions in physical IPV (aOR: 3.03, C.I.: 2.01, 4.55, $p < 0.001$) and two times higher odds of reporting reductions in sexual IPV (aOR: 2.17, C.I.: 1.53, 3.08, $p < 0.001$) at endline as compared to women in the control group. Women in the treatment group reported a higher reduction in the score of physical IPV (β: 1.48, C.I.: 0.90, 2.06, $p < 0.001$) than sexual IPV (β: 0.95, C.I.: 0.61, 1.29, $p < 0.001$) as compared to women in the intervention group between baseline and endline.

At baseline, 40% of women in the treatment and 49% in the control group did not report past year experience of physical and/or sexual IPV. In this group, there was no evidence that the intervention was effective at preventing new onset of IPV for either the combined physical and/or sexual IPV measure, the physical IPV measure or the sexual IPV measure.

Indashyikirwa - men

In the overall sample, 38% of men in the treatment group and 33% of men in the control group reported perpetrating physical and/or sexual IPV in the past year. Among these men, a higher proportion of men in the treatment group reported both reduction (I:83% vs. C:74%) and cessation (I:66% vs. C:55%) of physical and/or sexual IPV in the past year at endline. Men in the treatment group had 80% greater odds of reporting reduction (aOR: 1.80, C.I.: 1.15, 2.80, $p < 0.05$) of perpetration of physical and/or sexual IPV and 64% higher odds of reporting cessation of physical and/or sexual IPV (aOR: 1.64, C.I.: 1.09, 2.45, $p < 0.05$) as compared to men in the control group. Among those who reported perpetrating sexual IPV at baseline, participants reported greater reduction (I:87% vs. C:78%) and more cessation (I:76% vs. C:62%) of sexual IPV in the intervention group as compared to the treatment group. The trial had a statistically significant impact on cessation (aOR: 1.94, C.I.: 1.16, 3.26, $p < 0.05$) and marginally significant impact on reduction (aOR: 1.88, C.I.: 0.99, 3.55, $p = 0.05$) of perpetration of sexual IPV between baseline and endline.

Among men not reporting IPV perpetration at baseline, there was no evidence of an intervention effect in terms of preventing new onset of perpetration of physical and/or sexual IPV, physical IPV or sexual IPV.

SS-CF - women

In South Africa, 63% of women in the treatment and 64% in the control group reported experiencing physical and/or sexual IPV in the past 12 months at baseline. In this group, there was no evidence that *SS-CF* reduced (I:62% vs. C:62%) or stopped (I:32% vs. C:33%) physical and/or sexual IPV. Similarly, there was no impact on the reduction or cessation of physical IPV or sexual IPV.

Among women who did not report experiencing IPV in the past 12 months at baseline, analyses indicated that there was no difference between the treatment and control groups in preventing the onset of physical and/or sexual IPV (I:58% vs. C:52%), or physical IPV (I:67% vs. C:60%) or sexual IPV (I:71% vs. C:69%).

SS-CF men

In the overall sample, 55% of men in the treatment group and 56% of in the control group reported past year perpetration of physical and/or sexual IPV at baseline. In this group, there was no evidence that *SS-CF* reduced (I:65% vs. C:60%) or stopped (I:45% vs. C:38%) the perpetration of physical and/or sexual IPV over time. Among men who reported past year physical IPV perpetration at baseline, there was no impact on cessation (I:52% vs. C:42%) or reduction (I:68% vs. C:63%) of continued

Table 3
Trial results for IPV experience among women (stratified sample).

Outcome	Arm	Mean/N at endline	SE/% at Endline	aOR/ β	Lower Bound	Upper Bound	*p*	Direction if intervention successful*
Panel 1: South Africa								
Cessation of ongoing physical and/or sexual IPV	I	53	32.32	0.94	0.64	1.38	0.76	Upwards
	C	61	33.33					
Reduction of ongoing physical and/or sexual IPV (binary)	I	102	62.2	0.99	0.65	1.53	0.98	Upwards
	C	114	62.3					
Reduction of ongoing physical and/or sexual IPV (count)	I	0.84	6.40	−0.74	−1.92	0.45	0.22	Positive
	C	1.57	6.21					
Prevention of new onset physical and/or sexual IPV	I	56	58.33	1.29	0.74	2.24	0.38	Upwards
	C	53	51.96					
Cessation of ongoing physical IPV	I	51	34.46	0.93	0.57	1.49	0.75	Upwards
	C	62	36.26					
Reduction of ongoing physical IPV (binary)	I	97	65.54	1.06	0.64	1.75	0.82	Upwards
	C	110	64.33					
Reduction of ongoing physical IPV (count)	I	1.11	4.67	−0.31	−1.16	0.55	0.48	Positive
	C	1.42	4.64					
Prevention of new onset physical IPV	I	75	66.96	1.36	0.80	2.33	0.25	Upwards
	C	68	59.65					
Cessation of ongoing sexual IPV	I	41	56.16	1.19	0.68	2.08	0.54	Upwards
	C	42	52.5					
Reduction of ongoing sexual IPV (binary)	I	51	69.86	0.91	0.51	1.62	0.74	Upwards
	C	58	72.5					
Reduction of ongoing sexual IPV (count)	I	1.47	3.07	−0.67	−1.61	0.27	0.16	Positive
	C	2.14	3.04					
Prevention of new onset sexual IPV	I	133	71.12	1.09	0.67	1.76	0.73	Upwards
	C	142	69.27					
Panel 2: Rwanda								
Cessation of ongoing physical and/or sexual IPV	I	228	47.11	1.80	1.35	2.39	<.001	Upwards
	C	132	32.27					
Reduction of ongoing physical and/or sexual IPV (binary)	I	383	79.30	2.55	1.88	3.46	<.001	Upwards
	C	239	58.58					
Reduction of ongoing physical and/or sexual IPV (count)	I	3.07	4.46	2.14	1.55	2.73	<.001	Upwards
	C	0.79	4.27					
Prevention of new onset physical and/or sexual IPV	I	229	70.46	1.01	0.72	1.42	0.96	Positive
	C	269	69.51					
Cessation of ongoing physical IPV	I	212	61.45	2.33	1.54	3.51	<.001	Upwards
	C	112	42.59					
Reduction of ongoing physical IPV (binary)	I	288	83.72	3.03	2.01	4.55	<.001	Upwards
	C	165	62.74					
Reduction of ongoing physical IPV (count)	I	2.62	3.52	1.48	0.9	2.06	<.001	Positive
	C	1.05	3.49					
Prevention of new onset physical IPV	I	390	84.23	1.34	0.95	1.90	0.10	Upwards
	C	426	80.08					
Cessation of ongoing sexual IPV	I	200	54.64	1.74	1.25	2.41	<.001	Upwards
	C	116	38.54					
Reduction of ongoing sexual IPV (binary)	I	281	76.78	2.17	1.53	3.08	<.001	Upwards
	C	176	58.47					
Reduction of ongoing sexual IPV (count)	I	1.96	2.13	0.95	0.61	1.29	<.001	Positive
	C	0.92	2.22					
Prevention of new onset sexual IPV	I	348	78.56	1.14	0.83	1.57	0.42	Upwards
	C	377	76.16					

Note: For all aORs, an odds ratio of 1 denotes that there is no difference between the treatment and control groups. An aOR >1 or in the upwards direction indicates that participants in the intervention group are more likely to report a positive outcome. For all βs, a coefficient of 0 indicates that there is no difference between the treatment and control groups. A positive β ($\beta > 0$) denotes that the intervention group are more likely to report a reduction in IPV.

physical IPV. There was also no evidence of impact on cessation (I:51% vs. C:59%) or reduction (I:71% vs. C:71%) in the perpetration of ongoing sexual IPV among the intervention group, compared to the control group.

The *SS-CF* intervention was, however, successful in preventing the onset of IPV perpetration. In the overall sample, 45% of men in the treatment group and 44% in the control group did not report perpetration of physical and/or sexual IPV in the past year at baseline. Among these men, 88% of men in the treatment group and 79% of men in the control group who did not report perpetrating sexual IPV at baseline reported no new perpetration of sexual IPV. Men in the treatment group had two times higher odds of reporting no onset of sexual IPV than those in the control group (aOR: 2.02, 95% C.I.: 1.25, 3.26, $p < 0.01$). A higher proportion of men in the treatment group (I:75% vs. C:65%) as compared to the control group reported no new onset of perpetration of physical and/or sexual IPV at endline that was marginally significant (aOR: 1.55, 95% C.I.: 0.95, 2.55, $p = 0.08$).

Discussion

This is one of the first studies to examine differences in treatment effect in IPV prevention programs across two different subgroups of participants, and whether interventions impact differently on ongoing IPV or new IPV. Understanding whether interventions have differential impact for participants with different characteristics is important for refining and targeting programs (Kane et al., 2016). We assessed whether intervention effects were affected by baseline reporting of IPV and found that the *Indashyikirwa* and the *SS-CF* intervention differed in their impact on ongoing vs. new IPV. In *Indashyikirwa,* the main trial analysis showed female intervention participants reported reductions in severe physical and/or sexual IPV, physical IPV and sexual IPV. Subgroup analyses indicate that this reduction was mainly achieved through

Table 4
Trial results for IPV perpetration among men (stratified sample).

Outcome	Arm	Mean/N at endline	SE/% at Endline	aOR/ β	Lower Bound	Upper Bound	*p*	Direction if intervention successful
Panel 1: South Africa								
Cessation of ongoing physical and/or sexual IPV	I	59	45.04	1.30	0.85	1.97	0.22	Upwards
	C	57	38					
Reduction of ongoing physical and/or sexual IPV (binary)	I	85	64.89	1.23	0.74	2.05	0.42	Upwards
	C	90	60					
Reduction of ongoing physical and/or sexual IPV (count)	I	1.82	5.77	0.36	−1.00	1.71	0.61	Positive
	C	1.46	5.48					
Prevention of new onset physical and/or sexual IPV (binary)	I	79	74.53	1.55	0.95	2.55	0.08	Upwards
	C	76	64.96					
Cessation of ongoing physical IPV	I	60	51.72	1.47	0.88	2.47	0.14	Upwards
	C	53	42.06					
Reduction of ongoing physical IPV (binary)	I	79	68.1	1.25	0.67	2.33	0.48	Upwards
	C	80	63.49					
Reduction of ongoing physical IPV (count)	I	1.63	4.31	0.21	−0.95	1.37	0.72	Positive
	C	1.42	3.94					
Prevention of new onset physical IPV	I	91	75.21	1.39	0.88	2.19	0.16	Upwards
	C	97	68.79					
Cessation of ongoing sexual IPV	I	33	50.77	0.78	0.52	1.16	0.21	Upwards
	C	48	58.54					
Reduction of ongoing sexual IPV (binary)	I	46	70.77	1.00	0.52	1.91	0.99	Upwards
	C	58	70.73					
Reduction of ongoing sexual IPV (count)	I	1.45	3.13	−0.18	−1.12	0.77	0.72	Positive
	C	1.62	2.41					
Prevention of new onset sexual IPV	I	152	88.37	2.02	1.25	3.26	<.01	Upwards
	C	147	79.46					
Panel 2: Rwanda								
Cessation of ongoing physical and/or sexual IPV	I	190	66.43	1.64	1.09	2.45	<.05	Upwards
	C	137	54.58					
Reduction of ongoing physical and/or sexual IPV (binary)	I	237	82.87	1.80	1.15	2.80	<.05	Upwards
	C	185	74.00					
Reduction of ongoing physical and/or sexual IPV (count)	I	1.96	2.83	0.07	−0.44	0.58	0.78	Positive
	C	1.85	3.08					
Prevention of new onset physical and/or sexual IPV	I	399	84.00	1.04	0.72	1.48	0.85	Upwards
	C	436	84.01					
Cessation of ongoing physical IPV	I	139	69.5	1.23	0.79	1.94	0.36	Upwards
	C	109	63.74					
Reduction of ongoing physical IPV (binary)	I	163	81.50	1.18	0.69	2.03	0.55	Upwards
	C	135	79.41					
Reduction of ongoing physical IPV (count)	I	1.50	2.18	−0.12	−0.59	0.34	0.60	Positive
	C	1.65	2.32					
Prevention of new onset physical IPV	I	504	90.00	1.08	0.71	1.62	0.73	Upwards
	C	535	89.77					
Cessation of ongoing sexual IPV	I	130	76.02	1.94	1.16	3.26	<.05	Upwards
	C	93	62.42					
Reduction of ongoing sexual IPV (binary)	I	148	86.55	1.88	0.99	3.55	0.05	Upwards
	C	116	77.85					
Reduction of ongoing sexual IPV (count)	I	1.78	1.67	0.16	−0.22	0.55	0.40	Positive
	C	1.6	1.74					
Prevention of new onset sexual IPV	I	539	91.82	1.38	0.91	2.08	0.13	Upwards
	C	557	89.69					

Note: For all aORs, an odds ratio of 1 denotes that there is no difference between the treatment and control groups. An aOR >1 or in the upwards direction indicates that participants in the intervention group are more likely to report a positive outcome. For all βs, a coefficient of 0 indicates that there is no difference between the treatment and control groups. A positive β ($\beta > 0$) denotes that the intervention group are more likely to report a reduction in IPV.

a reduction and/or cessation of ongoing IPV (both physical and sexual) rather than preventing the onset of IPV directed at women. Male participants in the overall *Indashyikirwa* trial also reported a significant reduction in perpetrating severe physical and/or sexual IPV and sexual IPV. This reduction too was achieved through the reduction and/or cessation of physical and/or sexual IPV perpetration and cessation of sexual IPV. In the main trial analysis in *SS-CF,* male participants reported a reduction in severe physical and/or sexual IPV and physical IPV, and a marginal impact on sexual IPV and subgroup analyses indicate that this reduction was mainly achieved through the prevention of onset of sexual IPV. There was no evidence of an intervention effect on women's experiences of physical and/or sexual IPV.

A possible explanation for the differential impact on reduction and cessation versus prevention of perpetration of sexual IPV may be the populations of men enrolled in the two studies. Male participants in the *Indashyikirwa* trial were older and substantially more likely to be cohabitating and married than participants in the *SS-CF* trial. Participants in long-term cohabiting martial relationships may be more likely to commit to improving their existing relationships than younger single men. It is also possible that *Indashyikirwa* was more successful at addressing ongoing IPV because couples had an opportunity to reflect and work together to develop new skills to improve their relationship. Qualitative data from the evaluation indicates that participatory approaches and critical reflection helped couples to recognize the negative implications of 'power over' and the benefits of positive forms of power (including balancing power in negotiating sex) (Stern & Heise, 2019). These findings are similar to results from *SASA!* which indicated that *SASA!* worked in part by affecting couple dynamics, and had a greater impact on ongoing IPV rather than new IPV (Abramsky et al., 2016).

The differential impact of *Indashyikirwa* and *SS-CF* on new versus ongoing IPV among male participants may also reflect different mechanisms and pathways of influence which can be tested in future research.

It is possible that *SS-CF* was successful in aiding young men to challenge normative conceptualizations of masculinity. In qualitative research from the pilot for the trial, men described how the intervention helped them 'grow up' and move away from a more youthful masculinity (which included drinking and socialization) towards a more responsible 'older' masculinity, focused on achieving respectability through work and restraint (Gibbs, Jewkes, Sikweyiya, & Willan, 2015). This approach may have been more suited to preventing new versus ongoing IPV among younger men.

Indeed, this analysis highlights the possibility that interventions may work to different extents for different sub-populations and may have differential impacts on primary versus secondary prevention. Prior subgroup analyses also suggest that interventions may work differently for perpetrators who were report low versus high levels of violence at baseline (Christofides et al., 2020; Gibbs, Dunkle, et al., 2020). These results suggest that IPV prevention programs need to be tailored to suit the needs of different subpopulations. For example, the results presented in this study emphasize the importance of distinguishing between intervention strategies that prevent the onset of abuse versus those that reduce/stop its intensity. Primary prevention programs may have better success with younger individuals while interventions that are more successful in addressing ongoing IPV can be targeted to individuals in long-term and/or cohabiting relationships.

Given these differences, there is a need for more detailed analyses on how interventions work and the extent to which they are primary or secondary prevention (or a mixture of both). To our knowledge, although close to 95 impact evaluation studies of IPV interventions have been conducted, the differential impact of an intervention on primary versus secondary prevention has previously been investigated only for the *SASA!* intervention. We suggest that the violence prevention field begin to report not only the average effect of an intervention, but also the extent to which it prevents the onset of violence, reduces the intensity of violence, and/or ceases violence over the course of follow up. There is also a need for more subgroup analyses to deepen our understanding of the efficacy of IPV prevention programs for different subpopulations.

Limitations

Both trials had their own limitations as described in their primary outcomes papers (Dunkle et al., 2020; Gibbs, Washington, et al., 2020) which remain valid for the secondary analyses conducted in this current study. For instance, all measures rely on self-report, making them subject to reporting bias. It is possible that women and men in *Indashyikirwa* who reported IPV at baseline were more forthcoming about violence than those who did not report violence at baseline; therefore, part of the difference between the two groups could reflect willingness to report. Both trials attempted to mitigate this type of reporting and social desirability bias by using anonymous reporting through ACASI data collection. Research suggests that ACASI encourages more truthful and forthcoming reporting compared to face-to-face interviews or self-administered methods for stigmatized topics (Fenton, Johnson, McManus, & Erens, 2001).

Subgroup analyses ideally require outcomes of interest to be pre-specified in an analysis plan prior to the study being conducted and the data analyzed. This ensures that the trial is adequately powered to capture potential differences in outcome by subgroups of interest. Neither the *SS-CF* nor the *Indashyikirwa* trials were designed to conduct this particular subgroup analysis and therefore our results must be seen as exploratory (although *Indashyikirwa* did register IPV by baseline IPV status as a pre-specified secondary outcome). The *SS-CF* trial in particular had small sample sizes which makes it harder to detect a treatment effect by subgroup (Espinoza et al., 2014; Sun et al., 2012; Wang et al., 2007). Our analysis nonetheless makes an important contribution to the violence literature given that few other studies have explored the extent to which IPV prevention programs yield heterogenous effects on different subgroups.

Conclusion

Subgroup analyses are crucial to understanding the extent to which interventions benefit different subpopulations. Secondary analysis of the *Indashyikirwa* study indicated that the trial was more successful in reducing or stopping the intensity of ongoing IPV rather than preventing IPV from starting, while in *SS-CF* the intervention worked to prevent new onset of IPV among men who did not report IPV perpetration at baseline. Subgroup analyses are critical to unpacking trial results and future trials should plan for these types of analyses to ensure adequate sample sizes for all subgroups of interest. Such analyses in IPV intervention programs can help identify the extent to which existing interventions are addressing the needs of different populations and thereby inform future programmatic, funding, and policy decisions.

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Author contributions

LH and SC conceptualized the project with input from KD and AG. SC conducted the quantitative analysis; LH and KD gave input on all analyses. SC drafted the manuscript with input from LH, KD, and AG. All authors read and approved the final manuscript.

Ethical statement

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committees [University of KwaZulu-Natal, Durban, South Africa (BFC043/15) and the South African Medical Research Council Ethics Committee (EC006–2-2015) for the *SS-CF* trial in South Africa; Rwandan National Ethics Committee (340/RNEC/2015), the National Institute of Statistics Rwanda (0738/2015/10/NISR), and the South Africa Medical Research Council (EC033-10/2015) for the *Indashykirwa* trial in Rwanda] and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: In both trials, written consent was obtained from all participants; illiterate participants could have the form read to them by study personnel or a trusted person of their choosing. All participants could withdraw at any point in the study without negative consequences to them.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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