

Results of a Couples-Based Randomized Controlled Trial Aimed to Increase Testing for HIV

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Background: Although couples HIV testing and counseling (CHTC) is effective for facilitating mutual disclosure and linkage to HIV care, uptake remains low. Using a randomized controlled design, we tested the efficacy of a behavioral couples-based intervention aimed to increase CHTC.

Setting: The Vulindlela district of KwaZulu-Natal, South Africa.

Methods: Couples were recruited from the community (eg, markets and community events). Couples were excluded if mutual HIV serostatus disclosure had occurred. Both partners had to report being each other's primary partner and relationship length was at least 6 months. Assessments occurred at baseline, and 3, 6, and 9 months after intervention. Eligible couples attended a group session (3–4 hours) after which randomization occurred. Intervention couples additionally received: one couples-based group session followed by 4 couples'

counseling sessions (1–2 hours). Intervention topics included communication skills, intimate partner violence, and HIV prevention. Our primary outcomes were CHTC and sexual risk behavior.

Results: Overall, 334 couples were enrolled. Intervention couples were significantly more likely to have participated in CHTC [42% vs. 12% ($P \leq 0.001$)]. In addition, their time to participate in CHTC was significantly shorter (logrank $P \leq 0.0001$) ($N = 332$ couples). By group, 59% of those who tested HIV-positive in intervention and 40% of those who tested in control were new HIV diagnoses ($P = 0.18$). There were no group differences in unprotected sex.

Conclusions: Our intervention improved CHTC uptake—a vehicle for mutual serostatus disclosure and entrée into HIV treatment, both of which exert a significant public health impact on communities substantially burdened by HIV.

Key Words: HIV testing, couples, RCT, CHTC, South Africa

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INTRODUCTION

South Africa is one of the countries most impacted by HIV, with a generalized epidemic and an HIV prevalence of 17.9% among 15–49 year olds.¹ In KwaZulu-Natal province, recent estimates indicate an HIV prevalence of 39.5% among women seeking antenatal care.² Improved and earlier access to HIV treatment are facilitating a reduced HIV burden,³ but complicating issues hinder progress in this context.⁴ These include low HIV testing rates, especially for men,⁵ and low rates of HIV serostatus disclosure.⁶ Most HIV infections in sub-Saharan Africa (SSA) occur among heterosexual primary partnerships.⁷ Therefore, couples-based approaches have been recommended as a way to leverage partner influence.⁸ However, factors such as low marriage rates and infrequent cohabitation⁹ (a result of employment-related migration) render unique challenges for couples-based approaches.

Efforts to increase HIV testing have paid less attention to innovative strategies that may combat barriers to uptake. Among a myriad of challenges (eg, low HIV testing and disclosure), couples HIV testing and counseling (CHTC) has been recommended by the World Health Organization, given its several benefits, including being: (1) an entrée into ART initiation, (2) a springboard for primary and secondary HIV prevention efforts, (3) an opportunity for adoption of safer conception strategies, and (4) a means of strengthening and enhancing positive relationship dynamics and support between partners.¹⁰ CHTC entails simultaneous HIV testing for partners

and facilitated mutual disclosure. Previous research has found that CHTC promotes sexual risk reduction, especially among serodiscordant partnerships.^{11–13} However, despite its benefits, uptake of CHTC has remained low across multiple contexts in SSA and specifically in South Africa.

Although CHTC itself addresses aspects of relationships such as communication, few couples-based interventions in SSA have focused on the role of other relationship dynamics such as satisfaction, intimacy, or gender-based power. The direction of influence of these dynamics on behaviors such as sexual risk behavior, HIV serostatus disclosure, and HIV testing has been inconsistent.^{14–16} However, couples-based studies in SSA have illustrated the importance of relationship dynamics, including trust and commitment,¹⁷ and identified the crucial role that partners can play in the context of HIV. Therefore, there is a need for interventions that target couples, increase uptake of CHTC, and examine the role of relationship dynamics on HIV testing and sexual risk behavior. Thus, the aim of our study was to test the efficacy of a behavioral couples-based RCT to increase CHTC in an area of high HIV prevalence. Based on our prior work and that of others, we also investigated whether the intervention would reduce sexual risk behavior.^{14,15} Our hypothesis was that the intervention would lead to increases in CHTC and declines in sexual risk behavior.

METHODS

Study Design

Our intervention, Uthando Lwethu (“Our Love” in isiZulu), was evaluated through an RCT (Fig. 1), conducted in rural KwaZulu-Natal, South Africa.

The intervention was conducted with the understanding and consent of each participant. Ethical approval was obtained through the Committee on Human Research of the University of California, San Francisco, the Research Ethics Committee of the Human Sciences Research Council in South Africa, and London School of Hygiene and Tropical Medicine, United Kingdom. The study protocol is available at: <http://www.clinicaltrials.gov>. Additional details on procedures and intervention have been published previously.¹⁸

Participants

Inclusion criteria specified couples aged between 18 and 50 years, whose relationship was at least 6 months, were not in a polygamous marriage, and both partners indicated each other as their primary partner to whom they were committed and with whom they had sexual relations. Given the primary outcome of CHTC, couples were ineligible if they had previously tested together for HIV. Couples were ineligible if both partners had mutually disclosed their HIV status, as they likely had sufficient relationship and/or communication skills to achieve our study objective (mutual disclosure through CHTC). The intervention was not appropriate for couples experiencing current intimate partner violence (IPV), but we did not exclude couples for history of IPV because this would limit generalizability. Rather, we excluded and provided referrals for couples reporting current or recent severe violence (physical or sexual violence in the prior 6 months).

Procedures

Recruitment

Participants were recruited between March 16, 2012, and August 24, 2014, by trained recruiters using active and passive strategies. Active strategies included approaching couples in public areas such as markets, taxi ranks, and community events. Recruiters worked in male–female teams because we found in prior research that couples respond well to mixed-gender teams.¹⁸ Passive strategies included posting flyers. All recruitment activities were conducted using a mobile caravan with 2 private rooms, in which partners could be interviewed separately. The caravans facilitated a wide geographic catchment area, and were used for recruitment, screening, conducting baseline and follow-up surveys, and delivering intervention sessions.

After providing verbal consent, each partner completed a short initial screening, assessing key eligibility criteria (relationship length, age, sexually active, and polygamous marriage). This could be conducted by phone or in-person. If both partners (screened separately) were eligible, then a secondary screening occurred, which included written informed consent, either immediately after initial screening or at a later time. The secondary screening determined final eligibility, including history of IPV and mutual HIV serostatus disclosure. After completion of secondary screening, eligible couples were invited to enroll, and after completing informed consent, completed a baseline survey. Couples who remained eligible after the baseline survey attended the next scheduled first group session, with a target of 20 couples per session.

Randomization

Couples were randomized at the completion of the first group session. The control condition only received the first group session and participated in subsequent follow-up assessments. Intervention couples received an additional group session and 4 couples’ counseling sessions. Randomization was conducted at the couple level, using permuted-block randomization of 3 different block sizes, 8, 10, and 12, to blind staff as well as participants to the next assignment. Allocation concealment was achieved by opaque envelopes.

The random sequence was generated by the study statistician (N.M.M.), who prepared the envelopes in their entirety at the beginning of the study. Randomization was conducted by the project director (T.N.) with assistance from study staff.

Due to the nature of the intervention, masking was not possible. Therefore, neither the staff nor the participants were unaware of group assignment. However, assessment interviewers were separate staff from couples’ counselors and group facilitators.

Intervention Activities

The full intervention comprised 5 sessions (1 group and 4 couples’ counseling sessions.) All couples participated in the first group session. This was 4 hours, and co-led by a pair of male–female facilitators. Content covered information on health topics, including alcohol use, sexually transmitted infections, HIV/AIDS (including HIV testing and CHTC), and reproductive health. The format was interactive, and materials

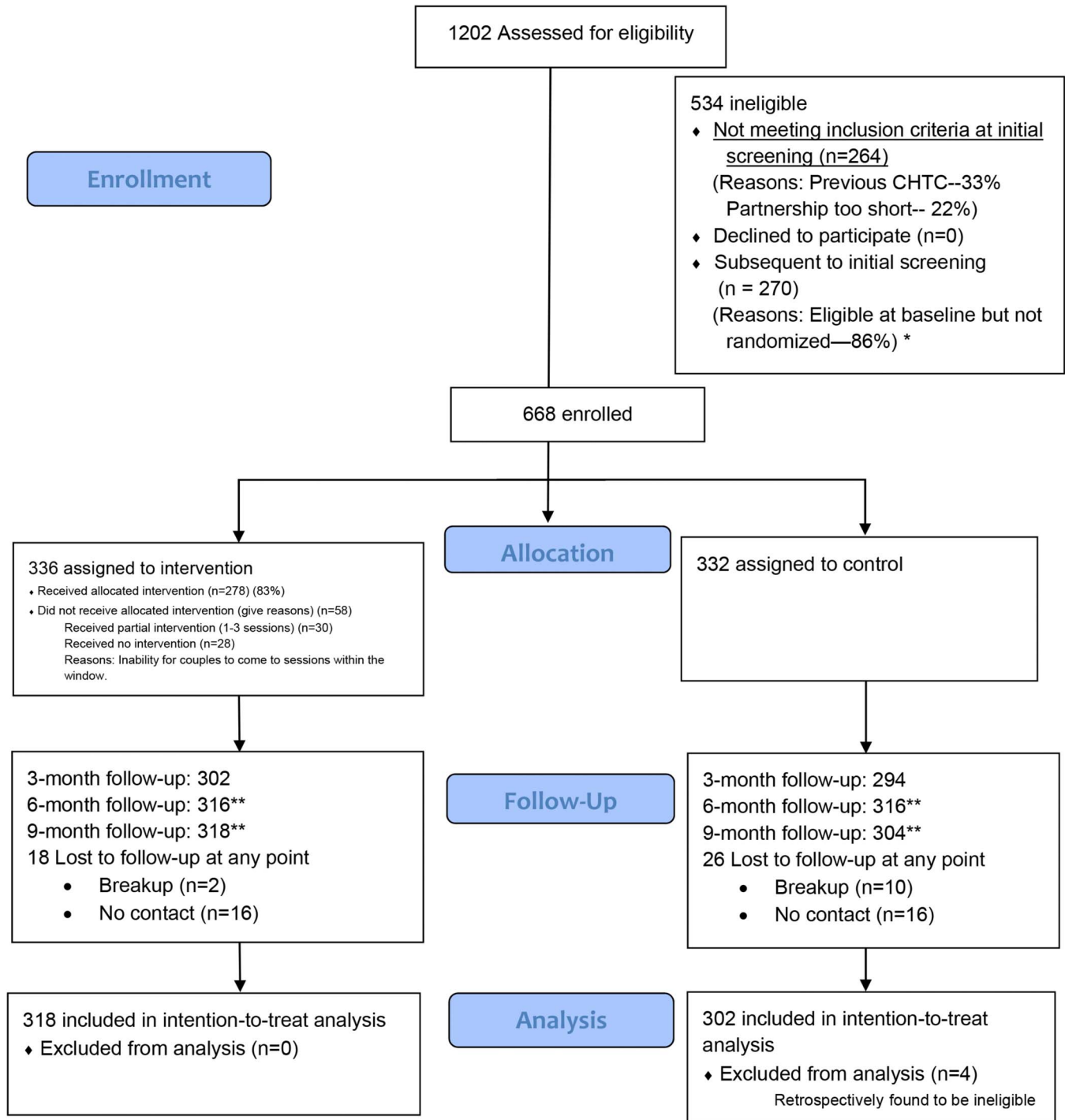


FIGURE 1. Consort diagram for Uthando Lwethu. *Couples were eligible after completing baseline but did not show up to first group session where randomization took place, thus were not enrolled. Efforts were made to follow-up after missed session to enroll in subsequent sessions. **Number reflects some couples who missed the 3-month follow-up but completed the 6- and/or 9-month follow-up.

covering local resources and referrals were provided. Occurring 1 week later, session 2 was delivered to intervention couples in single-gender groups contemporaneously. This was a smaller group of 6–10 couples, led by a gender-

matched facilitator and lasted approximately 4 hours. Topics covered included relationship dynamics and their influence on risk of HIV, IPV, and gender-based power. Communication skills were provided in the form of the “speaker–listener

technique,” adapted from the PREP couples relationship program and validated previously in a black South African population.^{15,19} Sessions 3–6 were 2-hour couples’ counseling sessions, provided by one counselor to individual couples. These sessions were delivered in the study caravan to ensure privacy. The 4 sessions follow a sequence related to a couple’s identified specific HIV-related goal. A standardized set of exercises and skills were provided, aimed to improve the couples’ ability to solve problems, improve communication, and enhance their relationship. At the final session, the counselor reviewed the couples’ progress in meeting goals, discussed any potentially challenging upcoming events, reviewed strategies to cope with them, and discussed community resources and support from their families and friends. Couples assigned to the control condition were eligible to participate in a condensed form of the couples counseling sessions after the completion of their participation (9-month follow-up).

All couples (intervention and control) were informed of the benefits of CHTC, and all couples received monthly text reminders to participate in CHTC and the location of the mobile study caravan that provided CHTC.

Assessments

Follow-up assessments were conducted at 3, 6, and 9 months after randomization. The surveys contained several standardized scales assessing relationship functioning, sexual behavior, and demographic information, and mirrored the baseline assessment. The survey was administered through a face-to-face interview with a gender-matched interviewer using mobile phone software Mobenzi Researcher (Durban, South Africa). The survey took approximately 45 minutes to 1 hour to complete. Couples completed their surveys separately but simultaneously.

The primary outcomes were participation in CHTC and unprotected sex. This was determined by the couple participating in CHTC with our study staff (a testing counselor separate from assessment and intervention staff). Each episode of CHTC was documented by study records, including the results of each partners’ HIV test. We hypothesized that the proportion of participants who participated in CHTC by 9-month follow-up would be higher in the intervention group than in the control group. We also hypothesized that the time to participation in CHTC would be shorter in the intervention group relative to the control group. For sexual risk behavior, we hypothesized that intervention participants would report fewer acts of unprotected sexual intercourse with primary sex partners relative to the control group.

Statistical Analysis

For primary analysis examining whether the intervention was successful in terms of couples participating in CHTC by the final follow-up assessment, our initial power analysis assumed 700 participants/350 couples at baseline. However, this recruitment target assumed an attrition rate of 20% due to breakups and 10% due to other causes, anticipating a final proposed sample size of 490 individuals/245 couples still in follow-up at 9 months. We computed the minimal detectable odds ratio on an

assumption of low prevalence of CHTC (10%) and a medium prevalence of CHTC (30%). For these scenarios, the resulting standardized effect size metrics were between a small ($h = 0.20$) and medium ($h = 0.50$) standardized effect size.

The analyses followed an intent-to-treat approach. First, we compared the proportion of couples that had participated in CHTC by 9 months between the 2 arms. A logrank test was used for a time-to-event analysis across the 2 groups. For the outcome of unprotected sex acts with the enrolled partner in the past 3 months, a negative binomial regression model accounting for couple clustering was used, with an offset for the number of sex acts with partner in the past 3 months. We originally intended to examine numbers of outside sexual partners as an outcome; however, too few occurrences of this outcome precluded this analysis (at baseline 5% of men and 0.2% of women reported any outside sexual partners in the previous 3 months).

Stata v13 was used for all analyses.

The study was overseen by a Data Safety and Monitoring Board made up of behavioral scientists and a statistician from the United States and South Africa. The trial was registered in the United States through the clinicaltrials.gov website (<http://www.clinicaltrials.gov>) (NCT01953133).

RESULTS

After screening 1202 individuals, there were 534 individuals who were either excluded ($n = 264$) or did not participate although they were eligible at screening or baseline ($n = 270$). Most exclusions were due to already participating in CHTC (33%) or due to insufficient length of partnership (22%). We randomized 334 couples (168 couples to intervention and 166 to control). Two couples retrospectively were found to have already mutually disclosed and thus were ineligible for the study. During follow-up, 6 couples broke up and 16 couples were lost to follow-up, although our attrition was much lower than assumed for sample size calculations. Retention across groups at 9-month follow-up was 93%. Please see Figure 1 for the trial profile with additional details. Baseline characteristics of the sample are included in Table 1. We checked that baseline characteristics were balanced across the 2 groups. At the couple level, all characteristics were balanced. At the individual level, individuals in the control group were more likely to be married (23% vs. 20%) and slightly older (median 27 vs. 26 years) than individuals in the intervention arm.

Completion rate for the intervention sessions was 83% for all 4 sessions, and 92% of couples attended partial intervention sessions (1–3 sessions) (Fig. 1).

Intent-to-treat analysis included 332 couples and showed that intervention couples were more likely to participate in CHTC than in control couples [42% vs. 12% ($P \leq 0.0001$)]. There was also a significantly shorter time to participate in CHTC for intervention couples (logrank $P \leq 0.0001$) (Fig. 2).

Of the intervention couples that participated in CHTC, 46% were concordant HIV-negative, 30% were concordant HIV-positive, and 24% were serodiscordant. The female partner was HIV-positive in 12/17 discordant couples. For

TABLE 1. Baseline Characteristics

Individuals (N = 664)	Control (n = 328)	Intervention (n = 336)
Demographics		
Age (in yr)	27 (23–35)	26 (22–31)
Women	26 (21–32)	24 (21–31)
Men	28 (24–36.5)	27 (23–32)
Highest education is matric or higher	42% (139)	44% (149)
Employed	23% (77)	20% (68)
Married to study partner	23% (77)	20% (68)
Coresident with study partner (12 missing)	23% (73)	18% (61)
Population group is African	100% (328)	99.4% (334)
Length of relationship with study partner (in yr)	3 (2–6)	3 (2–5.1)
Sexual behavior		
Lifetime partners among those who reported ever had vaginal sex	3 (2–7)	3 (2–5)
Of whom: A condom was used at last sex with study partner:		
Yes	45% (147)	49% (163)
No	55% (179)	51% (173)
Do not know	0.6% (2)	—
Has had sex with a nonstudy partner in the 3 months before baseline		
Male		
Yes	6% (10)	4% (7)
No	94% (154)	96% (161)
Female		
Yes	0.6% (1)	—
No	99.4% (163)	100% (168)
# Of other partners		
Male		
1 partner	7	5
2 partners	2	2
Female		
1 partner	1	—
Alcohol use: frequency of “binge” drinking		
Never	82% (270)	80% (268)
Less than monthly	9% (31)	12% (40)
Monthly	6% (19)	6% (21)
Weekly	2% (8)	2% (7)
HIV testing status		
Has ever been tested for HIV:		
Males		
Yes	59% (96)	63% (105)
No	41% (67)	37% (63)
Do not remember	0.6% (1)	—
Females		
Yes	63% (103)	60% (101)
No	37% (61)	40% (67)
Do not remember	—	—
Of whom test was within 12 months of baseline:		
Yes	72% (143)	76% (154)
No	28% (56)	24% (48)
Of whom tested and were willing to share their results: HIV status at most recent test:		
HIV+	15% (26)	14% (24)
HIV–	85% (144)	86% (152)

TABLE 1. (Continued) Baseline Characteristics

Individuals (N = 664)	Control (n = 328)	Intervention (n = 336)
Of whom has disclosed most recent HIV test result to someone:		
Yes	41% (81)	37% (77)
No	59% (118)	63% (129)
Of whom study partner knows the result of any HIV test:		
Yes	24% (48)	20% (41)
No	73% (146)	73% (151)
Tried to tell, but unsuccessful	1.5% (3)	2.4% (5)
Not sure	1% (2)	4.4% (9)
Intimate partner violence		
Male		
Victim of physical violence:		
Ever in the past 6 months	—	1.2% (2)
Ever before 6 months	4.9% (8)	5.4% (9)
Victim of sexual violence:		
Ever before 6 months	0.6% (1)	—
Victim of emotional abuse:		
Ever in the past 6 months	3.7% (6)	0.6% (1)
Ever before 6 months	3.7% (6)	3.6% (6)
Perpetrator of physical violence:		
Ever in the past 6 months	—	1.2% (2)
Ever before last 6 months	4.9% (8)	5.4% (9)
Perpetrator of sexual violence:		
Ever before 6 months	0.6% (1)	—
Perpetrator of emotional abuse:		
Ever in the past 6 months	3.7% (6)	0.6% (1)
Ever before last 6 months	3.7% (6)	3.6% (6)
Female		
Victim of physical violence:		
Ever in the past 6 months	—	0.6% (1)
Ever before 6 months	0.6% (1)	—
Victim of sexual violence:		
Ever before 6 months	0.6% (1)	—
Victim of emotional abuse:		
Ever in the past 6 months	0.6% (1)	1.2% (2)
Ever before 6 months	1.2% (2)	—
Perpetrator of physical violence:		
Ever in the past 6 months	—	0.6% (1)
Ever before last 6 months	0.6% (1)	—
Perpetrator of sexual violence:		
Ever before 6 months	0.6% (1)	—
Perpetrator of emotional abuse:		
Ever in the past 6 months	0.6% (1)	1.2% (2)
Ever before the past 6 months	1.2% (2)	—
Couples (N = 332)	Control (n = 164)	Intervention (n = 168)
Demographics		
Cohabitation status		
Cohabiting	26% (41)	21% (35)
Not cohabiting	74% (119)	79% (132)
Shared a pregnancy together		
Yes—both partners agree	36% (59)	37% (62)
No—both partners agree	52% (86)	57% (96)
Couple does not agree	12% (19)	6% (10)

(continued on next page)

TABLE 1. (Continued) Baseline Characteristics

Couples (N = 332)	Control (n = 164)	Intervention (n = 168)
Couple marital status		
Agree, married	13% (21)	8% (13)
Agree, not married	87% (143)	92% (155)
Employment status		
Both employed	4% (6)	% (5)
Neither employed	57% (93)	63% (105)
Male employed	32% (53)	30% (51)
Female employed	7% (12)	4% (7)
Sexual behavior		
Condom use at last sex		
Yes condom used—both partners agree	35% (58)	39% (65)
No condom used—both partners agree	45% (74)	42% (70)
Couple disagree	18% (30)	20% (33)
One or both missing/refused to answer	1.2% (2)	—
HIV testing		
Both partners HIV tested	41% (67)	41% (69)
Female partner HIV tested only	21% (35)	19% (32)
Male partner HIV tested only	18% (29)	21% (36)
Neither partner HIV tested	20% (32)	18% (31)
One or both do not remember	—	—
Outside partners		
Neither has outside partner	93% (153)	96% (161)
Male has outside partner	6% (10)	4% (7)
Female has outside partner	0.6% (1)	—

control couples, 55% were concordant HIV-negative, 30% were concordant HIV-positive, and 15% were serodiscordant. The female partner was HIV-positive in 1 of 3 discordant couples. By group, 59% of those who tested HIV-positive in the intervention arm and 40% of those who tested in the control arm were new HIV diagnoses ($P = 0.18$) (Table 2).

For unprotected sex, the group-by-time interaction was not significant in the model overall ($P = 0.08$), but there was a significant reduction in unprotected sex with primary partners for intervention couples at 3-month follow-up (incidence rate ratio = 0.74, $P \leq 0.022$).

One adverse event occurred during the course of the trial; a couple broke up and the male partner attributed their breakup to trial participation although the female partner did not.

DISCUSSION

Our study demonstrated the efficacy of a relationship-focused, couples-based intervention on participation in CHTC as compared to control. The hypotheses were supported as the intervention successfully promoted CHTC, and a rapid uptake of this service. At baseline, almost 40% of the participants had never tested for HIV—in an area of high HIV prevalence. Furthermore, most of the participating couples had not disclosed the results of any prior HIV test to their study partner at

baseline. Both findings indicate that the study reached a population in need of intervention. High retention rates for both intervention activities and follow-up assessments in a sample of couples with low rates of cohabitation indicate that a couples-focused approach is feasible even with nonmarried and noncohabitating couples.

Findings support and extend recent studies with couples from similar contexts. First, we focused on improving relationship quality and included communication skills to improve partners' abilities to discuss HIV. Discussions between partners about CHTC increased likelihood of participating in CHTC among couples in rural Uganda.²⁰ Similarly, Matovu et al²¹ reported that motivations for CHTC were relationship focused (eg, wanting to increase trust) and recommended that efforts to increase uptake of CHTC similarly engage couples. Second, a couples-based approach facilitates engaging male partners—often a challenge in the SSA context. For example, men may perceive health care clinics as aversive and avoid attending them with their female partners²²—targeting couples may address this problem. Similar efforts have focused on improving uptake of CHTC by pregnant women and their partners.²³ Finally, the findings mirror the results of a meta-analysis of HIV-related interventions that compared interventions delivered to couples to those delivered to individuals.²⁴ There was a significant effect for HIV testing given to couples, and the authors emphasized the positive repercussions of CHTC to facilitate mutual serostatus disclosure and as a potential entrée into HIV

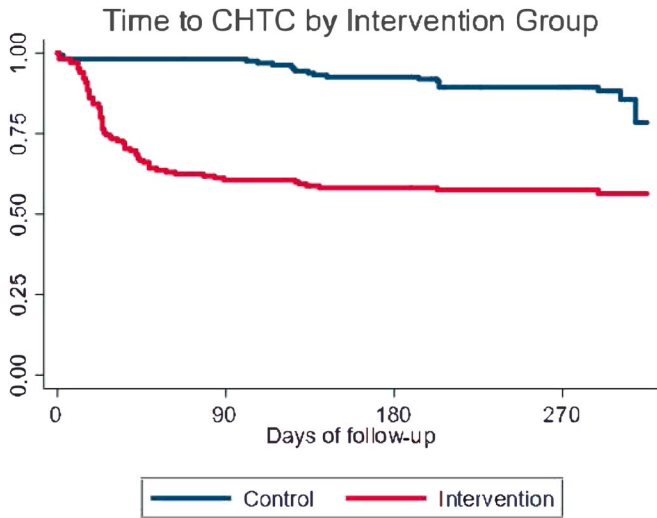


FIGURE 2. Kaplan–Meier plot: time to CHTC by intervention group.

treatment. We identified more newly diagnosed HIV-positive individuals among couples who participated in CHTC in the intervention group, as compared to the control group (although the difference was not statistically significant), thereby demonstrating the utility of the intervention for individuals missed by other testing efforts.

Findings for unprotected sex were not significant at final follow-up, and the reductions at first follow-up reflect a common finding of dissipating effects in behavioral prevention trials.²⁵ Prior recommendations include providing booster sessions to promote continued behavioral risk reduction. Our high retention suggests that couples may be willing to attend additional sessions. Nonetheless, the significant reduction at 3 months after intervention indicates that the intervention also positively impacted unprotected sex in the short term, in addition to its impact on CHTC.

To the best of our knowledge, this is one of the first interventions to use CHTC as its outcome. By comparison, the CHTC intervention of Matovu et al²⁶ only included married or cohabiting couples. CHTC has been praised for its ability to reduce sexual risk behavior and improve disclosure and thus touted as a high-leverage intervention²⁷; yet, uptake has been relatively low, even in areas where it is widely available.²⁸ Thus, this intervention represents a step forward in improving uptake. Our outcome measure (CHTC) was conducted and verified by our team, as opposed to being by self-report. Furthermore, our intervention was implemented by members of

the local community in conditions reflective of local resources, thereby supporting subsequent implementation.²⁹

One factor that suggests feasibility for implementation in communities that could benefit from increased HIV testing and linkage to care was the identification and training of lay couples’ counselors from the communities themselves. The utilization of lay counselors [who typically did not have advanced degrees, but rather had the equivalent of a high-school education (“matric”)], coupled with manualized training increases the feasibility of eventual scale-up for use by community-based organizations or health programs aiming to work with couples. Future efforts should examine whether efficacy translates into effectiveness in nonresearch settings.

There are some limitations to the results. The intervention and control groups were not time- and attention-matched; intervention couples were exposed to more sessions than control couples. However, this design decision was based on the absence of any comparable “standard of care” pertaining to couples-based services, while balancing the need to provide participants pertinent and helpful information regarding HIV and other health-related issues. The sexual behavior outcome was based on self-report, and thus subject to social desirability and reporting bias. But, this bias is likely the same across arms, therefore only impacting the overall levels of reported unprotected sex. The trial was conducted in a rural community with high migration, high unemployment, and low marriage rates that could affect generalizability to other contexts. Nonetheless, this contrasts to other couples-based studies as most studies of CHTC retain samples recruited from HIV clinics, as opposed to community-based settings. Reported IPV rates were low, which is in contrast to other reports from South Africa: figures range from 23% in the Eastern Cape (as defined by more than one episode of physical or sexual IPV)³⁰ to 19.6% of HIV-positive pregnant women reporting physical IPV in Mpumalanga.³¹ Although this could limit generalizability to broader samples of couples (eg, casual partners), few studies have examined violence among committed couples; rather, most focus on women’s reports outside of a primary relationship.³⁰ Even less is known about rates of violence among committed partnerships. It is likely that the study attracted couples with positive relationship dynamics, as they represent those couples most likely to want to participate in a couples-based intervention, indicating a possible selection bias, potentially limiting generalizability. Future research should focus on relationship-based interventions for couples coping with violence to improve their ability to participate in CHTC.

CHTC facilitates mutual disclosure, fosters sexual risk reduction, and is a vehicle for treatment referral and engagement for those who test HIV-positive. These findings provide evidence for the feasibility, acceptability, and efficacy of a couples-based program aimed to increase participation in CHTC among nontraditional couples that have high rates of nondisclosure and low rates of HIV testing. This intervention could serve as the foundation for future preventive behavior, as Delavande et al³² reported that among a sample of serodiscordant couples, repeat HIV testing did not improve seroconversion outcomes, thereby suggesting that one-time testing can be sufficient. Efforts to increase availability of CHTC in urban

TABLE 2. HIV Serostatus for Couples That Participated in CHTC

Couples (N = 332)	Control (n = 164)	Intervention (n = 168)
Participated in CHTC	12% (20)	42% (71)
Concordant HIV-negative	55% (11)	46% (33)
Concordant HIV-positive	30% (6)	30% (21)
HIV discordant	15% (3)	24% (17)

settings in South Africa have been successful,³³ demonstrating that demand for CHTC is not limited to rural settings. In addition, even as strategies for alternative modes of HIV testing increase (eg, self-testing), similar barriers remain regarding partners testing together and disclosing. For example, findings from a community-level HIV self-testing intervention in Malawi found relatively low rates of partners testing together, and described long-standing barriers to testing together—including fear of an HIV-positive result, wanting to avoid disclosing any infidelity/outside partners, poor communication, and lack of trust.³⁴ Overcoming these relationship-based barriers was a focus of the Uthando Lwethu intervention.

Although general assessments of rates of HIV testing in South Africa have shown increases in numbers of individuals tested for HIV, significant issues remain. Even when tested for HIV, rates of disclosure are low, and we enrolled a significant number of never-tested individuals in a high HIV prevalence area. When considering the World Health Organization guidelines of immediate treatment on diagnosis of HIV, the benefits of participating in CHTC are exponentially increased and underscore the need for increasing its uptake and availability. However, choosing to engage in CHTC can be challenging for couples, and we investigated the utility of influencing the decision-making process by improving communication skills and relationship quality. The results demonstrate that this approach produced increased mutual disclosure of serostatus for heterosexual couples at increased risk of HIV and could exert a significant impact on public health outcomes in a community substantially burdened by HIV.

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REFERENCES

- Shishana O, Rehle T, Simbayi LS, et al. *South African National HIV Prevalence, Incidence and Behavior Survey, 2012*. Cape Town, South Africa: HSRC Press; 2014.
- South Africa Department of Health. *The 2010 National Antenatal Sentinel HIV & Syphilis Prevalence Survey in South Africa*. Pretoria, South Africa: National Department of Health; 2010.
- Tanser F, Bärnighausen T, Grapsa E, et al. High coverage of ART associated with decline in risk of HIV acquisition in rural KwaZulu-Natal, South Africa. *Science*. 2013;339:966–971.
- Haber N, Tanser F, Bor J, et al. From HIV infection to therapeutic response: a population-based longitudinal cascade-of-care study in KwaZulu-Natal, South Africa. *Lancet HIV*. 2017;4:e223–e230.
- Matthews LT, Moore L, Crankshaw TL, et al. South Africans with recent pregnancy rarely know partner's HIV serostatus: implications for serodiscordant couples interventions. *BMC Public Health*. 2014;14:843.
- McGrath N, Richter N, Newll ML. Sexual risk after HIV diagnosis: a comparison of pre-ART individuals with CD4>500 cells/ul and ART-eligible individuals in a HIV treatment and care programme in rural KwaZulu-Natal, South Africa. *J Int AIDS Soc*. 2013;16:18048.
- Dunkle KL, Stephenson R, Karita E, et al. New heterosexually transmitted HIV infections in married or cohabiting couples in urban Zambia and Rwanda: an analysis of survey and clinical data. *Lancet*. 2008;371:2183–2191.
- Burton J, Darbes L, Operario D. Couples-focused behavioral interventions for prevention of HIV: a systematic review of the state of the evidence. *AIDS Behav*. 2010;14:1–10.
- Hosegood V, McGrath N, Moultrie T. Dispensing with marriage: marital trends in rural KwaZulu-Natal, South Africa 2000–2006. *Demographic Res*. 2009;20:279–312.
- World Health Organization. *Guidance on Couples HIV Testing and Counselling Including Antiretroviral Therapy for Treatment and Prevention in Serodiscordant Couples*. Geneva, Switzerland: WHO; 2012.
- Allen S, Meinen-Derr J, Kautzman M, et al. Sexual behavior of HIV discordant couples after HIV counseling and testing. *AIDS*. 2003;17:733–740.
- Rosenberg NE, Graybill LA, Wesevich A, et al. The impact of couple HIV testing and counseling on consistent condom use among pregnant women and their male partners: an observational study. *J Acquir Immune Defic Syndr*. 2017;75:417–425.
- Wall KM, Kilembe W, Vwalika B, et al. Sustained effect of couples' HIV counselling and testing on risk reduction among Zambian HIV serodiscordant couples. *Sex Trans Infect*. 2017;93:259–266.
- Leddy A, Chakravarty D, Dladla S, et al. Sexual communication self-efficacy, hegemonic masculine norms and condom use among heterosexual couples in South Africa. *AIDS Care*. 2016;28:228–233.
- Pettifor A, MacPhail C, Nguyen N, et al. Feasibility and acceptability of project connect: a couples-based HIV-risk reduction intervention among young couples in Johannesburg, South Africa. *AIDS Care*. 2014;26:476–482.
- Bhatia DS, Harrison AD, Kubeka M, et al. The role of relationship dynamics and gender inequalities as barriers to HIV serostatus disclosure: qualitative study among women and men living with HIV in Durban, South Africa. *Front Public Health*. 2017;5:188.
- Rogers AJ, Achiro L, Bukusi EA, et al. Couple interdependence impacts HIV-related health behaviors among pregnant couples in southwestern Kenya: a qualitative analysis. *J Int AIDS Soc*. 2016;19:21224.
- Darbes L, Van Rooyen H, Hosegood V, et al. Uthando Lwethu (“our love”): a protocol for a couples-based intervention to increase testing for HIV: a randomized controlled trial in rural KwaZulu-Natal, South Africa. *Trials*. 2014;15:64.
- Markman HJ, Renick MJ, Floyd FJ, et al. Preventing marital distress through communication and conflict management training: a 4- and 5-year follow-up. *J Consult Clin Psychol*. 1993;61:70–77.
- Muhindo R, Nakalega A, Nankumbi J. Predictors of couple HIV counseling and testing among adult residents of Bukomero sub-county, Koboga district, rural Uganda. *BMC Public Health*. 2015;15:1171.
- Matovu JK, Wanyenze RK, Wabwire-Mangen F, et al. “Men are always scared to test with their partners...it is like taking them to the police”: motivations for and barriers to couples' HIV counselling and testing in Rakai, Uganda: a qualitative study. *J Int AIDS Soc*. 2014;17:19160.
- Ladur AN, Colvin CJ, Stinson K. Perceptions of community members and healthcare workers on male involvement in prevention of mother-to-child transmission services in Khayelitsha, Cape Town, South Africa. *PLoS One*. 2015;10:e0133239.
- Rosenberg NE, Mtande TK, Saidi F, et al. Recruiting male partners for couple HIV testing and counselling in Malawi's option B programme: an unblinded randomised controlled trial. *Lancet HIV*. 2015;2:e483–e491.
- Crepaz N, Tungol-Ashmon MV, Vosburgh HW, et al. Are couple-based interventions more effective than interventions delivered to individuals in promoting HIV protective behaviors? A meta-analysis. *AIDS Care*. 2015;27:1361–1366.
- Team HLP. Effects of a behavioral intervention to reduce risk of transmission among people living with HIV: the Health Living Project randomized controlled study. *J Acquir Immune Defic Syndr*. 2007;44:213–221.
- Matovu JK, Todd J, Wanyenze RK, et al. Evaluation of a demand-creation intervention for couples' HIV testing services among married or cohabiting individuals in Rakai, Uganda: a cluster-randomized intervention trial. *BMC Infect Dis*. 2016;16:379.

27. Medley A, Baggaley R, Bachanas P, et al. Maximizing the impact of HIV prevention efforts: interventions for couples. *AIDS Care*. 2013;25:1569–1580.
28. Naik R, Tabana H, Doherty T, et al. Client characteristics and acceptability of a home-based HIV counseling and testing intervention in rural South Africa. *BMC Public Health*. 2013;12:824.
29. Tunis S, Stryer D, Clancy C. Practical clinical trials: increasing the value of clinical research for decision making in clinical and health policy. *JAMA*. 2011;290:1624–1623.
30. Jewkes R, Dunkle K, Nduna M, et al. Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: a cohort study. *Lancet*. 2010;376:41–48.
31. Matseke G, Rodriguez VJ, Peltzer K, et al. Intimate partner violence among HIV-positive pregnant women in South Africa. *J Psychol Afr*. 2016;26:259–266.
32. Delavande A, Wagner Z, Sood N. The impact of repeat HIV testing on risky sexual behavior: evidence from a randomized controlled trial in Malawi. *J AIDS Clin Res*. 2016;7:549.
33. Kilembe W, Wall KM, Mokgoro M, et al. Implementation of couples' voluntary HIV counseling and testing services in Durban, South Africa. *BMC Public Health*. 2015;15:601.
34. Kumwenda MK, Corbett EL, Chikovore J, et al. Discordance, disclosure and normative gender roles: barriers to couple testing within a community-level HIV self-testing intervention in urban Blantyre, Malawi. *AIDS Behav*. 2018;22:2491–2499.