Efficacy of *SISTA South Africa* on Sexual Behavior and Relationship Control Among isiXhosa Women in South Africa: Results of a Randomized-Controlled Trial

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Background: The HIV epidemic has a devastating impact among South African women. The current study evaluated the efficacy of *SISTA South Africa*, a culturally congruent HIV intervention for isiXhosa women in South Africa, which was adapted from SISTA, an HIV intervention for African American women.

Methods: A randomized-controlled trial recruited 342 isiXhosa women aged 18–35 years. Participants were randomized to the general health comparison or the *SISTA South Africa* intervention. Xhosa-speaking peer health educators tailored the *SISTA South Africa* curriculum, while maintaining the core elements of the original SISTA intervention. Participants completed assessments at baseline and 6 months follow-up.

Results: Relative to participants in the comparison, participants in the HIV intervention reduced the frequency of unprotected vaginal intercourse acts (adjusted mean difference = 1.06; $P = 0.02$), were more likely to report not desiring dry sex (adjusted odds ratio = 0.229; 95% confidence interval = 0.10 to 0.47; $P = 0.0001$), and were more likely to perceive that their main sexual partner did not desire dry sex (adjusted odds ratio = 0.24; 95% confidence interval = 0.11 to 0.52; $P = 0.0001$). In addition, women randomized to the intervention also reported an increase in HIV knowledge, greater relationship control, and had more opposing attitudes toward HIV stigma. The HIV intervention did not reduce sexually transmitted infection incidence.

Conclusions: This trial demonstrates that an HIV intervention, which is adapted to enhance its gender and cultural relevance for rural isiXhosa women, can reduce self-reported sexual risk behaviors and enhance mediators of HIV among this vulnerable population.

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INTRODUCTION

South Africa has amongst the most devastating HIV/AIDS epidemics in the world and the burden of the epidemic disproportionately affects women. According to the 2009 South African Antenatal Clinic survey, nationally, women aged 30–34 years are disproportionately affected by the HIV epidemic.[1] Thus, concern regarding HIV risk and acquisition among South African young adult women remains high.

A systematic review conducted in 2010 reported on the efficacy of 8 HIV interventions to reduce HIV risk among young men and women in sub-Saharan African.[2] HIV interventions such as the IMAGE study, have been effective in modifying risk environments to reduce HIV risk and partner violence,[3] and HIV awareness has been enhanced through LoveLife and through school-based life skills interventions.[4] Stepping Stones using a community participatory approach, observed reductions in HIV risk behaviors among men; among women reductions in number of sexual partners was observed, but reductions in condom use was not observed.[5] This review and other published articles have reiterated the need to address social factors, contextual influences and positive social norms by engaging in collective critical thinking to reduce South African women's vulnerability to HIV.

The promise of an effective preexposure prophylaxis vaginal microbicide[6] is undeniable. However, until data are available addressing adherence and cost-effectiveness, it is unlikely in the near future that a vaginal microbicide will-serve as a stand-alone HIV prevention strategy.[7] Research has shown that gender and culturally congruent behavioral interventions remain an important tool in reducing South African women's HIV risk. One mechanism of expediting the development of these interventions is through the process of adapting an existing HIV intervention, which has demonstrated efficacy in another population with similar HIV risk determinants.[8]

The current study was conducted among isiXhosa-speaking women and describes the efficacy of *SISTA South Africa*, a culturally congruent adaptation of SISTA, a widely disseminated HIV risk-reduction intervention developed for African American women in the United States. As a result of a collaborative partnership between researchers at the South African Medical Research Council in Cape Town and Emory University in the United States, the study was implemented in the rural areas of the Western Cape Province of South Africa.

METHODS

The study was conducted from March 2006 to December 2007. The study was implemented by trained, South African outreach workers, community representatives, peer educators, data collectors, retention coordinators, quality assurance monitors, and support staff who were fluent in Xhosa. Before implementing the study protocol, ethics approval was obtained from the South African Medical Association Research Ethics Committee and the Emory University Institutional Review Board.

Study Sites and Recruitment

isiXhosa-speaking women recruiters approached women attending Voluntary Counseling and Testing (VCT) programs at 5 rural, primary healthcare clinics in the Western Cape. Specifically, the clinics were located in Grabouw and Hermanus, of the Overburg district; in Strand and Sir Lowry's Village, of the CapeTown Metro district, and in Stellenbosch of the Cape Winelands's district. According to the Antenatal Clinic 2009 Western Cape survey, these locations have HIV prevalence rates ranging from 13.2% to 20.8%.

Through purposive sampling, recruiters approached women in the waiting room of the VCT clinics; they explained the purpose of the *SISTA South Africa* study and completed an initial screening process. Eligible participants included those meeting the following criteria: (1) aged 18–35 years; (2) Xhosa speaking; (3) currently living and planning to live in 1 of the 5 rural areas for 12 months; (4) unmarried; (5) sexually active in the past 6 months; and (6) tested negative for HIV in the past 60 days. To assess participants' HIV status, an oral specimen was collected and evaluated using an OraSure enzyme-linked immunosorbent rapid assay (OraSure Technologies, Inc, Bethlehem, PA). After the initial HIV screening, reactive specimens were confirmed using a Western blot assay.

Those meeting eligibility criteria and expressing interest in participating in *SISTA South Africa* were scheduled for the next available registration and assessment session and were given instructions regarding the location of the study site. On the day of registration, participants were screened again, and only those meeting eligibility criteria that day were included in the study. After obtaining informed consent and collecting contact information, participants completed a baseline computer-assisted interview. The 60-minute interview was administered in Xhosa by a trained interviewer. Participants were also instructed to self-collect 2 vaginal swabs that were subsequently tested for Chlamydia (CT) and gonorrhea (GC) and trichomoniasis (TV) at the Medunsa Laboratory in Pretoria, South Africa. After completing the assessment (baseline computerized interview and sexually transmitted infection [STI] testing), participants were scheduled to return to the study site the following week for randomization to study groups. At the 6-month postintervention follow-up assessment, participants engaged in the same data collection activities as at baseline and they were offered an HIV test. Data collectors were blinded to women's study condition.

From May 2006 to June 2007, a total of 1068 isiXhosa-speaking women were screened at the 5 study sites (Fig. 1). Of these, 197 did not meet 1 or more of the study's eligibility criteria. Of the remaining 871 eligible participants, 428 did not participate in the study. The majority of these were lost between the initial recruitment at the VCT site and the first registration appointment. Although recruiters collected contact information at the recruitment sites, 102 (23.8%) could not be recontacted at the time of registration. An additional 151 (35.2%) were not at home, were working, or were at school when contacted again for registration. Only 30 (7.0%) of participants did not participate because of lack of interest. A total of 443 participants completed the registration and the baseline assessment process. However, because randomization to study conditions and implementation of the first sessions of both the HIV prevention intervention and the control conditions occurred 1 week after registration, another 101 (22.8%) participants were lost between registration and the day of randomization to study conditions. Thus, the final sample for the *SISTA South Africa* study comprised 342 participants, representing a 32% participation rate. The 342 women were randomized to study conditions (Fig. 1). Participants received 20 Rand (approximately 4 U.S. dollars) for completing study assessments to compensate them for their time and travel expenses to the study site. In addition, participants received lunch. Although many reasons may explain the low participation rate observed in the recruitment process, the transitory nature of living arrangements among this population was a primary barrier to recruitment.

Study Design

The study used a 2-arm randomized-controlled trial design. Assignment to study conditions was conducted 1 week after baseline assessment. Participants were randomly assigned to either the HIV intervention, known as *SISTA South Africa*, or the general health comparison condition (Fig. 1).

Adapting the Original SISTA HIV Intervention

The adaptation of SISTA for isiXhosa-speaking South African women has been previously published[8]; thus, the adaptation process is only briefly described here. The adaptation process was guided by a structured, adaptation model, known as the ADAPT-ITT model.[8,9] As prescribed by this model, Xhosa-speaking peer health educators tailored *SISTA South Africa*, whereas maintaining the core elements of the original SISTA intervention and key theories, Social Cognitive Theory[10] and the Theory of Gender and Power.[11] Adaptations made to SISTA included adding written poetry by isiXhosa-speaking women to stimulate discussions on gender and cultural pride and to elaborate on the strengths of isiXhosa women

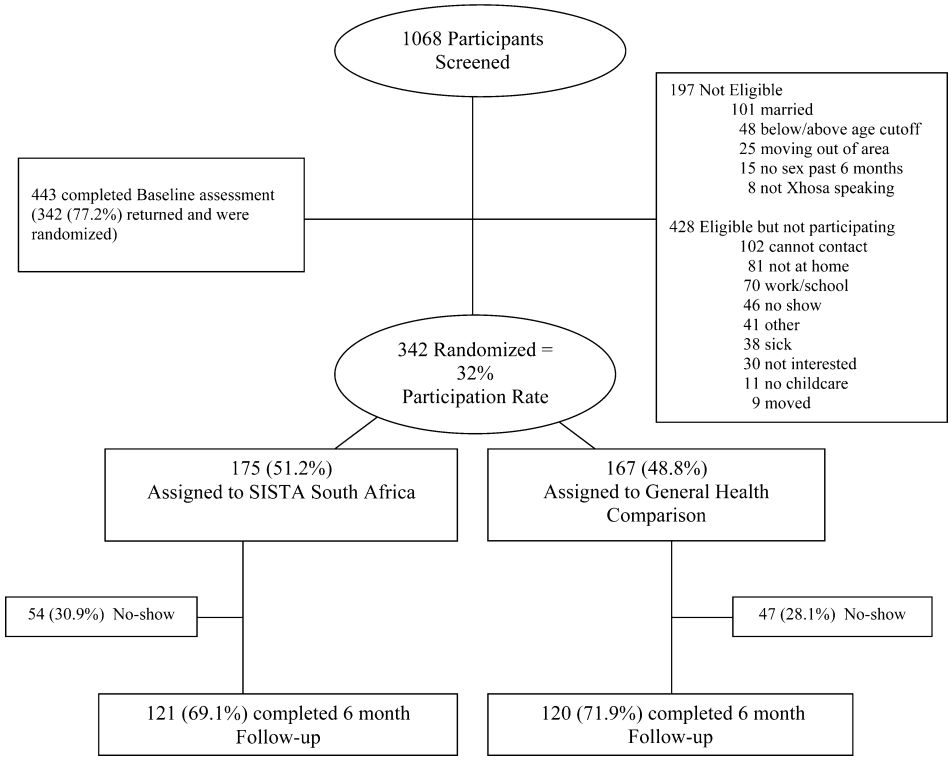

FIGURE 1. Schematic overview of study enrollment.

role models and the challenges of being an isiXhosa woman. Much of the discussion of the challenges reflected on the role of apartheid in disempowering isiXhosa women. Other adaptations included providing information on the importance of HIV testing and discussions on the role of dry sex[12–14] and HIV stigma in enhancing susceptibility to HIV.

Implementing the Adapted *SISTA South Africa*

SISTA South Africa consisted of three 2.5-hour interactive group sessions implemented on consecutive Saturdays at community centers in the 5 rural areas of the Western Cape. Each session had an average of 7–8 participants and was delivered in Xhosa by 2 trained Xhosa-speaking health educators indigenous to the region. Women randomized to the general health comparison condition received two 2.5-hour interactive group session also implemented on consecutive Saturdays by a trained Xhosa-speaking health educator. Women in the comparison condition received HIV prevention education and discussed healthy nutrition and information about hygiene and self-care.

SISTA South Africa consisted of 3 sessions. Session 1 emphasized ethnic and gender pride by exploring the unique strengths, diversity, and beauty of isiXhosa women, acknowledging accomplishments of influential Xhosa-speaking women, reading poetry written by isiXhosa women, and reflecting on the richness of cultural norms and values. Session 2 discussed social and contextual influences (including HIV stigma and dry sex) that enhance their vulnerability to HIV. Skills building activities focused in enhancing the correct application of male condoms, using condoms consistently, and reducing the number of male sexual partner. During this session, discussions were initiated regarding the importance of negotiating safer sex without being threatening or demeaning to male sexual partners. Session 3 sought to further improve participants' sexual communication skills and focused enhancing women's ability to encourage their male sex partner's to seek STI and HIV testing. This session also emphasized the importance of healthy relationships. Xhosa-speaking health educators described how unhealthy relationships (ie, abuse and coercion) serve as barriers to practicing safer sex. All workshops concluded with traditional Xhosa songs and creating traditional bead jewelry (bracelets, necklaces, and rings).

Study Measures

Acquiring an incident STI was the primary outcome, defined as a laboratory-confirmed test for CT, GC, or TV, at the 6-month assessment. We compared the cumulative percentage of participants in each condition with any of the three STIs from baseline to the 6-month assessment, as has been the protocol in other HIV prevention trials.[15] One swab was evaluated for *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) using the Becton Dickinson Probe-Tec ET *C. trachomatis* and *N. gonorrhoeae* Amplified DNA Assay. A second swab was tested for *Trichomonas vaginalis* (TV) using Taq-Man PCR.[16] Women testing STI positive were provided single-dose treatment and received counseling.

Self-Reported Sexual Behaviors

Number of unprotected vaginal intercourse acts was the primary self-reported behavioral outcome. This variable represents the absolute number of times a person has sex without using protection. Other self-reported behavioral

outcomes assessed included condom use at last vaginal intercourse and preference for dry sex. Dry sex was assessed by asking 2 questions, "Do you prefer that your vagina be dry while having sex?" and "Does your main partner prefer than your vagina be dry while having sex?" Self-reported consistent condom use was defined as use of a condom during every episode of vaginal intercourse. Consistent condom use, defined as use of a condom during every act of sexual intercourse, was assessed for the 30 days before the baseline and the 6-month follow-up assessment.

Psychosocial Measures

Psychosocial constructs were mapped unto the underlying theoretical frameworks and assessed using scales with satisfactory psychometric properties. Attitudes toward using condoms were measured using an 11-item scale ($\alpha = 0.89$).[17] Condom use self-efficacy was measured using a 10-item scale assessing participants' confidence in their ability to properly use condoms ($\alpha = 0.89$).[18] Participants' self-efficacy for communicating with their male sex partners was measured using a 5-item scale ($\alpha = 0.71$), with higher scores indicating greater comfort level with negotiating safer sex options.[18] HIV stigma was measured using a 6-item scale assessing participant's attitudes toward HIV seropositive individuals ($\alpha = 0.84$).[19] Relationship control was measured using a 13-item scale assessing woman's level of assertiveness and/or control in the relationship with her main male sex partner ($\alpha = 0.86$).[20] Finally, an 11-item index assessed knowledge of HIV transmission dynamics.

Statistical Analysis

Analysts were blinded to study arms. Analyses were performed using an intent-to-treat protocol in which participants were analyzed in their assigned treatment conditions irrespective of the number of treatment sessions attended.[21] At baseline, descriptive statistics summarized sociodemographic variables, psychosocial mediators, and sexual behaviors. Differences between conditions were assessed using Student's t-tests for continuous variables and chi-square analyses for categorical variables.[22–24] Sociodemographic and other variables, in which differences between study conditions approached statistical significance ($P < 0.10$), were included as covariates.

The effectiveness of *SISTA South Africa* was analyzed over the 6-month period: baseline to 6-month follow-up assessment. The intervention effects for the 6-month assessment period were analyzed using multivariate logistic regression to compute adjusted odds ratios (AOR) for dichotomous outcomes and analysis of covariance to compute adjusted means and mean differences (D) for continuous outcomes. Each model included the study condition, covariates, and the corresponding baseline measure of each outcome in the analysis.

RESULTS

Of the 342 participants randomized, 175 (51.2%) were assigned to *SISTA South Africa* and 167 (48.8%) to the general health promotion condition. Participants were, on average, aged 23.30 (SD = 4.27) years; 71.1% (N = 241) had 12 years or less of education; the majority 78.7% (N = 269) were unemployed; and 25.4% (N = 87) received most of their money from their main sexual partner. Relationship characteristics demonstrated that the majority 93.3% (N = 319) had a main male sexual partner and, on average, they have been in this sexual relationship for 3.95 (SD = 3.55) years.

Baseline differences between study conditions at $P < 0.10$ were considered significant for purposes of identifying potential covariates and included the following variables: age, employment status, risky partner type, HIV knowledge, history of physical abuse, transactional sex, and number of sex partners in the past 6 months These variables were identified as covariates and included in subsequent data analyses (Table 1).

Participants' attendance in *SISTA South Africa* was high; 100% completed the initial session, 85.7% (n = 150) completed the second session, and 80.0% (n = 140) completed the third session. Among the control group, 100% completed the initial session and 94% (n = 157) completed the second session. High ratings for participant satisfactory were observed by raters for the 3 *SISTA South Africa* sessions (range = 3–15; mean = 12.93; SD = 2.16) and the 2 general health comparison sessions (range = 2–10; mean = 9.02; SD = 1.22).

Of the 175 participants allocated to *SISTA South Africa*, 121 (69.1%) completed the 6-month follow-up assessment. Of the 167 participants allocated to the general health promotion condition, 120 (71.9%) completed the 6-month follow-up assessment. No significant differences in attrition were observed between *SISTA South Africa* and the comparison condition ($P = 0.58$) (Fig. 1).

Effects of *SISTA South Africa*: The HIV Risk-Reduction Intervention

Over the 6-month follow-up period, participants in *SISTA South Africa*, compared with participants in the comparison group, reported a significantly lower frequency of vaginal sex in the last 30 days (adjusted mean difference = 1.22; $P = 0.02$). Similarly, participants in *SISTA South Africa*, compared with participants in the comparison group, reported a significantly lower frequency of unprotected vaginal sex in the last 30 days (adjusted mean difference = 1.06; $P = 0.02$) (Table 2).

Over the 6-month follow-up period, significant differences were observed between participants in *SISTA South Africa*, compared with participants in the comparison group, regarding their preference for dry sex. Specifically, *SISTA South Africa* participants were 78% more likely to report no preference for dry sex compared with the comparison group (AOR = 0.229; 95% confidence interval [CI] = 0.10 to 0.47; $P = 0.0001$). Similarly, *SISTA South Africa* participants were also 76% more likely to report that their main male sex partner did not have a preference for dry sex (AOR = 0.24; 95% CI = 0.11 to 0.52; $P = 0.0001$) (Table 3). No significant differences between study conditions were observed for consistent condom use or condom use at last sexual intercourse. Further, STI incidence did not significantly differ in the intervention group compared with the control group (AOR = 1.23; 95% CI = 0.70 to 2.17; $P = 0.47$).

TABLE 1. Comparability of the HIV Prevention and General Health Promotion Conditions for Xhosa Speaking Women in Rural South Africa

Variables	HIV Prevention Condition (N = 175) Mean (SD)	N (%)	General Health Promotion Condition (N = 167) Mean (SD)	N (%)	*P*
Sociodemographics					
Age (years)	23.69 (4.49)		22.90 (4.01)		0.09
Completed less than matriculation		125 (71.4)		116 (70.7)	0.89
Unemployed		129 (73.7)		140 (83.8)	0.02
Living with main sex partner		33 (18.9)		37 (22.2)	0.45
Receives most spending money from partner		41 (23.4)		46 (27.5)	0.38
Have children		86 (49.1)		69 (41.3)	0.15
Pregnant		101 (57.7)		94 (56.3)	0.79
Partner characteristics					
Has main sex partner		164 (93.7)		157 (94.0)	0.91
Main sex partner earns an income		133 (81.1)		132 (82.8)	0.69
Older main sex partner age		117 (66.9)		106 (63.5)	0.51
Main sex partner relationship length (years)	4.09 (3.77)		3.80 (3.31)		0.46
Physical abuse by partner (ever)		80 (45.7)		59 (35.3)	0.05
Risky partner		153 (87.4)		135 (80.8)	0.10
Substance use					
3+ drinks 1+ days per week		15 (20.0)		16 (17.8)	0.72
Psychosocial mediators					
HIV knowledge	7.02 (2.40)		6.54 (2.46)		0.07
Condom attitudes	27.29 (9.97)		27.71 (10.22)		0.70
Position in relationship	37.01 (5.30)		37.17 (5.73)		0.80
Condom use self-efficacy	29.59 (7.35)		29.15 (8.18)		0.60
Posttraumatic stress symptoms	29.23 (14.61)		29.47 (13.67)		0.88
Depression	1.68 (2.89)		1.37 (2.86)		0.32
HIV stigma	21.03 (2.56)		20.90 (2.63)		0.66
Partner communication	10.94 (3.16)		11.19 (2.67)		0.43
Risk behaviors					
Ever had anal sex		13 (7.4)		14 (8.4)	0.74
Ever douched		28 (16.4)		29 (18.1)	0.67
Participant prefers dry sex		64 (37.4)		59 (36.9)	0.92
Main sex partner prefers dry sex		71 (42.0)		62 (40.0)	0.71
Transactional sex (ever)		17 (9.7)		27 (16.2)	0.08
No. sex partners in past 6 months	1.11 (0.42)		1.05 (0.28)		0.06
Condom use behaviors					
Frequency of vaginal sex past 3 months	8.43 (10.16)		8.03 (11.50)		0.73
Frequency of vaginal sex past 30 days	3.17 (4.64)		3.15 (4.06)		0.96
Percentage of condom use vaginal sex past 3 months	25.79 (39.80)		30.56 (42.51)		0.31
Percentage of condom use vaginal sex past 30 days	28.86 (42.48)		23.21 (40.83)		0.28
Unprotected vaginal sex past 3 months	6.92 (10.03)		6.52 (11.08)		0.73
Unprotected vaginal sex past 30 days	2.35 (4.43)		2.69 (3.93)		0.45
Condom use at last sex		35 (20.0)		36 (21.6)	0.72
Consistent condom use past 3 months		129 (81.6)		113 (77.9)	0.42
Consistent condom use past 30 days		104 (77.0)		98 (79.0)	0.70
STIs					
Chlamydia		53 (30.8)		42 (25.1)	0.25
Gonorrhea		18 (10.5)		30 (18.0)	0.05
Trichomoniasis		55 (32.0)		68 (40.7)	0.09
Any STI		91 (52.9)		95 (56.9)	0.46

All study participants were offered HIV testing at the 6-month follow-up; 57.1% of participants (N = 137) accepted the HIV test. Individuals who did not accept HIV testing at 6-months follow-up were encouraged to seek testing services at a clinic or voluntary testing and counseling site. In *SISTA South Africa*, 70 of the 121 participants who completed the 6-month follow-up (57.9%) accepted an HIV test. Among the 70 participants who accepted an HIV test, 4 (5.7%) tested HIV positive. In the control

TABLE 2. Effects of *SISTA South Africa* HIV Intervention on Dichotomous Behavioral Outcomes

	SISTA South Africa HIV Intervention, N (%)	General Health Condition, N (%)	Prevalence Ratio	AOR	95% CI	*P*
Behavioral outcomes						
Consistent condom use (30 days)	26 (37.7)	19 (28.8)	0.88	0.54	0.21 to 1.43	0.22
Consistent condom use (3 months)	30 (36.6)	23 (28.8)	0.89	0.66	0.30 to 1.46	0.31
Condom use at last sex	65 (65.0)	59 (64.1)	0.98	0.96	0.50 to 1.85	0.90
Lack of preference for dry sex	108 (89.3)	81 (68.1)	1.31	0.22	0.10 to 0.47	0.0001
Male partners' lack of preference for dry sex	107 (88.4)	81 (68.1)	1.30	0.24	0.11 to 0.52	0.0001

condition, 67 of the 120 participants who completed the 6-month follow-up (55.8%) accepted the HIV test. Among the 67 participants who accepted an HIV test, 2 (3.0%) tested HIV positive. There were no significant differences between the study conditions in acceptance of HIV testing at 6-month follow-up (P = 0.81). Overall, of the women accepting an HIV test at 6-month follow-up, 6 (4.38%) tested HIV positive.

Psychosocial Outcomes

Over the 6-month follow-up period, participants in *SISTA South Africa*, compared with participants in the comparison group, reported significantly higher HIV knowledge (adjusted mean difference = 0.62; P = 0.03). Similarly, participants in *SISTA South Africa* reported a significantly higher perceived control in their relationship with their male sex partner (adjusted mean difference = 1.34; P = 0.03). Finally, over the 6-month follow-up period, participants in *SISTA South Africa* HIV intervention reported significantly higher scores opposing HIV stigma (adjusted mean difference = 0.76; P = 0.006) (Table 3). No differences were observed at 6-month follow-up between the conditions regarding attitudes toward condom use (P = 0.90), communication (P = 0.15), and condom use self-efficacy (P = 0.42) (Table 3).

DISCUSSION

This randomized-controlled trial demonstrates that *SISTA South Africa* reduced self-reported sexual risk behaviors and enhance theoretically important mediators of HIV among rural isiXhosa women residing in the Western Cape Province of South Africa. To our knowledge, this is the first HIV behavioral intervention to achieve this range of outcomes for South African women. Although not translating into significant reductions in incident STIs, the impact of the intervention is witnessed in the significant reductions in the mean number of unprotected vaginal intercourse acts over the 6-month follow-up period. Furthermore, significant reductions were also reported in women's preference for dry sex and in the perceptions of their male partner's preference for dry sex. As this practice may increase women's susceptibility to HIV infection,[12] it was an important target for the

TABLE 3. Effects of *SISTA South Africa* HIV Intervention on Continuous Behavioral and Psychosocial Outcomes

	SISTA South Africa HIV Intervention Adjusted, Mean (SD)	General Health Condition Adjusted, Mean (SD)	Adjusted Mean Difference, (95% CI)	% Relative Change (95% CI)	*P*
Behavioral outcomes					
Frequency of vaginal sex (30 days)	2.25 (0.35)	3.49 (0.36)	1.25 (0.25 to 2.25)	35.82 (30.45 to 41.19)	0.02
Frequency of vaginal sex (3 months)	6.55 (1.01)	9.36 (1.05)	2.80 (−0.12 to 5.73)	29.91 (14.22 to 45.60)	0.06
Frequency of unprotected vaginal sex (30 days)	1.31 (0.31)	2.43 (0.32)	1.12 (0.23 to 2.01)	46.09 (41.29 to 50.89)	0.01
Frequency of unprotected vaginal sex (3 months)	4.01 (0.90)	6.57 (0.94)	2.57 (−0.04 to 5.18)	39.12 (25.13 to 53.11)	0.05
Psychosocial outcomes					
HIV knowledge	7.65 (0.20)	7.03 (0.20)	0.62 (0.49 to 1.19)	8.82 (5.75 to 11.89)	0.03
Relationship control	39.98 (0.41)	38.64 (0.41)	1.34 (0.18 to 2.50)	3.47 (2.77 to 9.71)	0.02
Opposition to HIV stigma	21.43 (0.19)	20.67 (0.19)	0.75 (0.21 to 1.29)	3.63 (0.73 to 6.53)	0.007
Attitudes toward condom use	37.28 (0.57)	37.15 (0.57)	0.13 (−1.49 to 1.76)	0.35 (−8.38 to 9.08)	0.87
Partner communication	10.61 (0.26)	11.17 (0.26)	0.55 (−0.18 to 1.28)	4.92 (1.00 to 8.84)	0.14
Condom use self-efficacy	26.41 (0.77)	27.86 (0.78)	1.45 (−0.76 to 3.67)	5.20 (−6.72 to 17.12)	0.20

current study.[14] Noteworthy is that the observed findings were obtained with a population of isiXhosa-speaking women who report being in long-term sexual relationships, averaging nearly 4 years in length. Stable long-term partnerships can create significant barriers for women to initiate safer sex practices. The current study adds to the empirical body of literature demonstrating significant changes in condom use among women in committed relationships.

A hallmark of isiXhosa women's vulnerability to HIV is their lack of control in sexual relationships with their main partner, thus, self-reports of increased relationship power among women in the intervention is critical. Consistent with the Theory of Gender and Power, it is possible that participation in *SISTA South Africa* provided women with an external source of social validation,[25] which in turn empowered them in their relationships with their main partner. Further, knowledge of the existence of *SISTA South Africa* and the perceived usefulness of the intervention may have been critical for promoting perceived relationship power. Power is embedded within social groups and within individuals, and the gender system of a society is central to individual women's ability to negotiate power within their households. An alternative hypothesis is that participation in *SISTA South Africa* may have been perceived as a social resource, which fostered social contacts, enhanced social networking, and provided valuable information, thereby increasing participants' perceived relationship power.

This study also demonstrated that participation in *SISTA South Africa* increased HIV knowledge. In addition, this study also observed that participants randomized to the intervention had more accepting attitudes toward people living with HIV. Research has found that greater knowledge about HIV is positively associated with accepting attitudes.[26] In this study, the *SISTA South Africa* had as a goal preventing HIV infection among isiXhosa-speaking women in rural communities; however, the sense of collective action and social support generated among group members while working toward this goal may have fostered more accepting attitudes toward people living with HIV.

Limitations of the study include a relatively short follow-up and the absence of a placebo attention or time-matched comparison condition to guard against potential Hawthorne effects. Future studies of HIV interventions conducted in South Africa would benefit by addressing these limitations. Moreover, future efforts in this area may explore opportunities in combining behavioral and biomedical HIV intervention approaches.

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