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The Efficacy of Behavioral Interventions in Reducing HIV Risk Behaviors and Incident Sexually Transmitted Diseases in Heterosexual African Americans

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Abstract

Objective—To conduct a meta-analytic review of HIV interventions for heterosexual African Americans to determine the overall efficacy in reducing HIV-risk sex behaviors and incident sexually transmitted diseases (STD) and identify intervention characteristics associated with efficacy.

Methods—Comprehensive searches included electronic databases from 1988 to 2005, handsearches of journals, reference lists of articles, and contacts with researchers. Thirty-eight randomized controlled trials met the selection criteria. Random-effects models were used to aggregate data.

Results—Interventions significantly reduced unprotected sex (OR = 0.75, 95% CI = 0.67, 0.84, 35 trials, N = 14,682) and marginally significantly decreased incident STD (OR = 0.88, 95% CI = 0.72, 1.07, 10 trials, n = 10,944). Intervention characteristics associated with efficacy include: (1) culturally tailored, (2) aiming to influence social norms in promoting safe sex behaviour, (3) utilizing peer education, (4) providing skills training on correct use of condoms and communication skills needed for negotiating safer sex, and (5) multiple sessions and opportunities to practice learned skills.

Conclusion—Interventions targeting heterosexual African Americans are efficacious in reducing HIV-risk sex behaviors. Efficacious intervention components identified in this review should be incorporated into the development of future interventions and further evaluated for effectiveness.

Keywords

HIV/STD prevention; behavioral intervention; condom use; sexually transmitted diseases; African-American; Heterosexual; Meta-analysis

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INTRODUCTION

African-American heterosexuals are disproportionately impacted by HIV [1, 2]. A myriad of factors has been suggested for this finding, ranging from limited access to health care to the broader societal repercussions of racism and poverty. The impact of the HIV epidemic among African Americans underscores the importance of identifying efficacious behavioral interventions to reduce the risk of acquiring HIV via sexual behavior. Numerous interventions targeting sexual risk reduction among African-American heterosexuals have been evaluated in recent years; however, the empirical findings have not been examined as a whole. While several meta-analyses have been conducted to examine the efficacy of HIV behavioral interventions for various populations at risk for HIV infection, including men who have sex with men [3, 4, 5], women [6, 7], heterosexual men [8], drug users [9, 10] adolescents [11, 12], Hispanics [13] and sexually transmitted disease (STD) clinic patients [14, 15], there is no meta-analysis that provides the overall assessment of intervention efficacy specifically for heterosexual African Americans.

Aside from estimating the overall intervention efficacy, meta-analysis can also identify particular factors (i.e., study design, intervention features) that are associated with intervention efficacy. Qualitative systematic reviews have focused on components of HIV prevention strategies for African Americans specifically [16, 17, 18, 19], women of color [20], and culturally competent interventions [21]. All of the reviews recommended including cultural tailoring specific to the community of interest.

To make empirically driven evidence-based recommendations for programmatic efforts and future research, we conducted a meta-analytic review of randomized controlled trials (RCT) that evaluated HIV behavioral interventions for African-American heterosexual populations in the U.S. We restricted this review to only RCTs following the Cochrane Collaboration principles, which recommend focusing on RCTs for synthesizing clinical and behavioral research findings and providing the best evidence as to intervention efficacy [22]. Given methodological issues, we restricted our analyses to individual-level and group-level interventions. Our specific goals included assessing the overall efficacy of interventions in reducing heterosexual transmission of HIV among African Americans regardless of drug using status, identifying characteristics of the studies, samples and interventions that are associated with intervention efficacy, and highlighting research gaps for this population.

METHODS

Data source

As part of CDC's HIV/AIDS Prevention Research Synthesis (PRS) project [23, 24], we developed multiple search strategies to identify published and unpublished RCTs evaluating interventions to reduce HIV sex risk behaviors among African-American heterosexuals between 1988 and 2005. We developed an automated systematic search using standardized search terms cross-referenced in three areas: (a) HIV, AIDS, or STD; (b) intervention evaluation; and (c) behavior or biologic outcomes. We searched multiple electronic bibliographic databases including AIDSLINE (1988 to 2000), EMBASE, MEDLINE, PsycINFO, and Sociological Abstracts from 1988 to 2005. For each database, we searched unique index terms supplemented with keywords and phrases. We also manually searched 35 key journals, which regularly publish HIV or STD prevention research, to locate additional reports for the time period January 2004 to December 2005 and checked reference lists of pertinent reports to identify additional reports. Finally, we contacted researchers and research organizations for current and on-going research. Complete descriptions of the search strategies and terms are available on request.

Trial selection

Relevant studies were included in this review if they met all of the following criteria:

1. Evaluated individual-level or group-level interventions specifically designed to change risky sex behaviors in efforts to decrease the risk of heterosexual transmission of HIV.
2. Employed an RCT design.
3. Focused on or specifically targeted African Americans, or consisted of at least 80% African-American participants.
4. Were conducted in the United States.
5. Measured any of the following sex risk behavior and biologic variables:
 - a. any unprotected insertive or receptive anal intercourse, unprotected vaginal insertive or receptive intercourse,
 - b. consistency of condom use, or
 - c. incident STD.
6. Reported at least one post-intervention outcome.
7. Reported sufficient descriptive data or statistical tests of the intervention effects necessary to calculate an effect size. We contacted authors to obtain additional information as needed.

Data extraction

Trained pairs of reviewers independently abstracted information from eligible reports. We identified linkages among reports to ensure that multiple reports describing an intervention were included in the coding and data analysis. We coded each intervention using a standardized coding form for trial information (e.g., intervention dates, location), participant characteristics (e.g., age, gender), outcomes (type of outcome, follow-up time, STD measurement and assays [see Appendix available online]), and intervention features (theory-based, delivery method). We coded for specific features for culturally tailored interventions such as statements of cultural appropriateness, ethnically matched deliverer, and ethnographic research. We assessed the methodological quality of the studies by assessing randomization (sequence generation, allocation concealment, blinding), type of control group, participation rate, overall and differential retention rate, power analysis, and intent-to-treat analysis based on the modified Jadad criteria for RCTs [25]. There was a 90% agreement between reviewers across variables. We reconciled coding discrepancies through discussion.

Analytic approach

Because studies differed in terms of the number of arms, type of outcomes, analyses conducted, and findings reported, we used the following rules for abstracting information for meta-analysis. To meet the independence of the effect size assumption, for trials with multiple arms we selected the contrast between the intervention arm that was most theoretically potent and the comparison arm, which was typically a standard of care or wait list control. Separate analyses were conducted for sex outcomes and laboratory/clinical diagnosis of incident STDs. To prevent the correlations from multiple effect size estimates within a single study from biasing the results, we selected unprotected sex over condom use for studies that reported both measures. If a trial reported outcome data at two or more follow-ups, we selected the first follow-up for the overall effect size. Finally, to ensure non-

equivalent groups at baseline did not confound the results, we adjusted for baseline sexual behavior differences if the information was available [26, 27].

Meta-analytic methods

We used odds ratios (OR) to present the magnitude of intervention effects. For trials reporting means and standard deviations on continuous outcomes, we calculated standardized mean differences and then converted into ORs [4]. We used standardized meta-analytical methods [27, 28] to calculate individual effect size and combine effect sizes across studies. We used the natural logarithm to obtain log odds ratios (lnOR) and calculated its corresponding weight (inverse variance) for each study. In estimating the overall effect size, we multiplied each lnOR by its weight, summed the weighted lnORs across trials and then divided by the sum of the weights. We then converted the aggregated lnOR back to OR and derived a 95% confidence interval (95% CI). We also examined the heterogeneity of the effect sizes by using the Q statistic. We tested both fixed-effects and random-effects models, and both models yielded similar findings. We base the final presentation on the random-effects model because it provides a more conservative estimate of variance and generates more accurate inferences about a population of trials beyond the set of trials included in this review [29].

We conducted sensitivity analyses to determine the robustness of intervention effects and stratified analyses to determine whether methodological quality, trial and sample characteristics, or intervention features were associated with effect sizes. We assessed the likelihood of subgroup differences using the between groups' heterogeneity statistics, Q_B , which has a χ^2 distribution and degree of freedom equal to the number of subgroups minus 1 degree of freedom. We used all the available data and recalculated the overall effect size separately for trials reporting unprotected sex and trials reporting condom use. We examined intervention effects on the sex outcomes at the following follow-up times: less than 3 months, 3 months, 6 months, and longer than 6 months. Similar analyses were conducted for the STD outcomes at 6-month and 12-month post intervention. In addition, we compared the aggregated effect size estimate among all trials with the estimate obtained after excluding trials that might influence the overall estimate.

We ascertained publication bias by inspection of a funnel plot [30] and a linear regression test [31], which compared standardized effect size estimate with precision (the inverse of the standard error) of each study.

RESULTS

Description of trial, sample, and intervention characteristics

Thirty-eight RCTs, including 14,983 participants, met the inclusion criteria (Figure 1). Descriptive information for each trial is shown in Table 1 (available online) [32-69], and summary information of intervention components and design is presented in Table 2. Participants in the majority of the trials included either women only or mixed gender; non-drug users; and over 18 years old. Approximately half of the trials were set in clinics, while half were conducted in either community or educational/research settings.

With few exceptions, the trials were based-on behavioral change theories (e.g., Social Cognitive Theory, Information-Motivation Behavior Model), and two-thirds were culturally tailored specifically for African Americans (e.g., ethnically matched facilitators, ethnographic research). Most trials contained multiple intervention components aimed at reducing sexual risk. Skills training components were the most common and took specific forms including correct use of male condoms or negotiating safer sex. Most interventions

were delivered in small groups, and most trials were comprised of 2-5 sessions over 2-30 days.

Methodological quality of the trials

Only a small portion of the trials reported information pertaining to sequence generation (37%), allocation concealment (26%), and blinding (34%). Mean participation rate and retention rate at the first follow-up was 70% among 17 trials reporting participation rates and 73% among 31 trials reporting retention rates. In the majority of the trials differential retention rates among intervention and comparison groups were less than 10%, but two reported greater than 20% differential retention rates. The median sample size at baseline enrollment across all trials was 211. Only one third of the trials reported that power analysis was conducted to estimate the sample size. All trials used intent-to-treat analysis.

Effect sizes for self-reported HIV risk sexual behavior

Thirty-five RCTs provided data on self-reported HIV risk behavior from 14,682 participants. The aggregated effect size was significant (OR = 0.75, 95% CI = 0.67, 0.84), indicating that the intervention groups had 25% reduction in odds of reporting unprotected sex behavior compared to comparison groups, at an average of 3 months post intervention. Examination of the forest plot (Figure 2) and the homogeneity test ($Q_{35} = 50.63$, $p < 0.05$) indicated that there was heterogeneity between trials. However, sensitivity tests did not reveal any individual trial that exerted influence on the overall heterogeneity. Additional sensitivity tests, using all available data, showed significant intervention effects were observed in studies with a follow-up of less than 3 months (OR = 0.67, 95% CI = 0.51, 0.87, N = 8), in studies with a follow-up of approximately 3 months (OR = 0.78, 95% CI = 0.69, 0.89, N = 18), and in studies with approximately a 6-month follow-up (OR = 0.74, 95% CI = 0.61, 0.90, N = 18). Studies with a follow-up of longer than six months had marginally significant effect on risk reduction (OR = 0.81, 95% CI = 0.62, 1.05, N = 12). Significant intervention effects were observed for unprotected sex (OR = 0.79, 95% CI = 0.71, 0.88, N = 22) and condom use (OR = 0.63, 95% CI = 0.52, 0.75, N = 22).

We conducted stratified analyses to further examine heterogeneity among trials. Significantly greater efficacy was found among trials that addressed social norms toward safer sex compared to trials that did not address social norms ($Q_B = 13.02$, $p < .001$). Similarly, significantly greater efficacy was found in trials that utilized peer education, compared to trials that did not have peer education ($Q_B = 3.83$, $p = .05$). A methodological feature associated with differential efficacy was type of comparison group. Trials where comparison groups also received some HIV intervention components were less efficacious than trials where comparison groups did not receive any HIV-related intervention ($Q_B = 4.51$, $p < .05$).

As seen in Table 3, a significant intervention effect was observed in trials regardless of the participant characteristics, methodological quality of trials, or intervention features (i.e., intervention setting, self-efficacy). There were several instances where the aggregated intervention effect size was significant in trials with a specific characteristic (e.g., culturally tailored), while the aggregated effect size was not significant in trials without that characteristic. We explored those qualitative differences as they may provide clues about potentially important factors associated with efficacy (Table 3). Intervention groups were significantly less likely than comparison groups to report unprotected sex in trials that were culturally tailored for African Americans; were delivered in a minority community, were based on behavioral change theory; provided skills training on correct use of condoms and negotiation of safer sex; had more than 1 intervention session, had sessions that lasted more than 1 day, and had more than 160 minutes of cumulative intervention time.

Effect sizes for incident STDs

Data on incident STDs were available from 10 RCTs that included 10,944 participants. The aggregated effect size was marginally significant (OR = 0.88, 95% CI = 0.72, 1.07), indicating that the intervention groups had 12% reduction in the odds of incident STD compared to comparison groups. The homogeneity test ($Q_{10} = 18.61, p < 0.03$) indicated heterogeneity between trials. Sensitivity tests indicated that excluding one trial [54] made the intervention effect significant (OR = 0.82, 95% CI = 0.69, 0.98, N = 9). However, none of the studies significantly reduced the overall heterogeneity. Additional sensitivity tests showed marginally significant intervention effects were observed in studies with follow-ups longer than 12 months (OR = 0.77, 95% CI = 0.59, 1.00, N = 7), but the intervention effect was not significant in trials with follow-ups less than 12 months (OR = 1.00, 95% CI = 0.82, 1.21, k = 3).

Q_B tests did not yield any meaningful group differences, primarily due to the small number of trials. We explored the qualitative differences between trials where those reporting a characteristic demonstrated a significant intervention effect compared to trials not reporting that characteristic and not demonstrating a significant effect. This pattern was found in four variables: based on behavioral change theory; providing trainings on correct use of condom and negotiation of safer sex; addressing social norms about safer sex; and peer education.

Examination for publication bias

Based on the linear regression test, we found evidence of publication bias for 35 trials that provide unprotected sex/condom use outcomes ($t = -2.614, p = 0.013$). The funnel plot was asymmetrical, suggesting that fewer studies with negative interventions effects and large variance were identified in this review (Figure not shown). There is no evidence of publication bias for the STD outcomes ($t = -0.631, p = 0.546$).

DISCUSSION

Our review shows that behavioral interventions can significantly and positively influence sexual risk behaviors among African-American heterosexuals. The significant reduction in unprotected sex remained up to six months following the completion of interventions. Our overall finding (OR = 0.75) is comparable to the findings of other meta-analyses evaluating HIV prevention interventions for heterosexual adults [8] and adolescents [70]. We also found a marginally significant effect on incident STDs (OR = 0.88), especially at follow-ups greater than 12 months post intervention. However, the effect became significant when eliminating the trial of the lowest methodological quality [54]. This evidence suggests that behavioral interventions can be efficacious not only in changing unprotected sex behaviors but may also reduce incident STDs in African-American heterosexuals.

We identified a number of intervention components associated with risk reduction. Greater efficacy was found for interventions that utilized peer education and aimed to influence social norms about safer sex. Our findings suggest that the influence of peers and the perception of the norms of one's peers should be considered in developing effective interventions for heterosexual African Americans.

When exploring differences between interventions with a particular characteristic to those without that characteristic for the sex outcomes, we identified several patterns that may provide additional information for prevention efforts. Consistent with previous qualitative reviews [16, 18, 19], cultural tailoring appears to be an important component for reducing sex risk behaviors among African-American heterosexuals. Intriguingly, we did not find any differential efficacy for the particular components of culturally tailored interventions. It is plausible that our inclusion criteria, which stipulated that trials be comprised of at least 80%

African-American participants, reduced the variance necessary to detect an effect. More research is needed to assess which specific cultural tailoring components are the active ingredients underlying behavior change.

Additional intervention components that are likely to contribute to behavior change are skills training and negotiation. Utilizing skills training is typical of interventions guided by social cognitive theories, which represent a majority of the interventions in this analysis. There is also evidence of a dose response relationship regarding number of sessions, time span, and duration of interventions. The independent contributions of these intervention characteristics cannot be disentangled within these data as the majority of the interventions utilized multiple components and sessions over multiple days. However, the overall findings suggest that behavioral interventions are more likely to achieve success if they incorporate skills training and provide opportunities for practicing skills. In addition, future interventions may benefit from utilizing multiple sessions over multiple days, lasting several hours in total length.

The findings of our review must be viewed within the context of the limitations of the available evidence. Interventions we reviewed primarily addressed heterosexual transmission of HIV although some portions of men who also engaged in same-sex behavior but did not identify themselves as homosexual may have participated. Recent studies have indicated that non-gay identified MSM are more likely to have a female partner and to have had unprotected vaginal sex [71]. Additionally the majority of the trials were unblinded and relied on self-reported sexual behavior, which may result in social desirability bias [72]. However, several factors reduce the likelihood of this being an undue influence. First, the majority of interventions made efforts to reduce this effect by techniques such as ensuring confidentiality. Second, our findings with behavioral outcomes are similar to our outcomes from STDs, which corroborates the self-reported sex behavior findings. Future research should include biological assessment as well as self-reported sexual behavior as this would increase our ability to evaluate the impact of interventions. Finally, all the trials had a comparison group and the assignment method was randomization, which reduced the likelihood that individual characteristics influenced the intervention effect. Our findings were also limited in that the majority of interventions (23/26) did not distinguish between primary and secondary partners in their analysis. Given that condom use has been found to differ between these types of partners [73], we recommend that future studies examine these partner-level differences both when assessing and reporting episodes of unprotected sex and condom use. Our meta-analysis was also limited by the fact that we only included individual-level and group-level interventions. There were only a few randomized community-level and structural-level interventions available in the literature [e.g., 74, 75, 76]. However, given that many risk factors associated with HIV risk-taking in African-American heterosexuals are structural (e.g., poverty, access to care) future research should evaluate community-level and structural level interventions when more RCTs become available.

Despite these limitations, our findings also pointed out several implications for future research. It is encouraging to see several of the intervention studies [48, 49] in our review were conducted with heterosexual African-American men, an understudied group [8, 77]. Although studies targeting African-American adolescents were well represented in this review, few of these studies focused on younger adolescents. It is possible that the approach for HIV sex risk reduction among younger African-American adolescents may be different from older adolescents (e.g., interventions may emphasize delay of sexual initiation). We also did not identify any trials that examined prison populations, which have a high HIV prevalence compared to the general population [78].

While our findings offer some evidence for factors associated with intervention efficacy in reducing HIV-risk sex behavior in African-American heterosexuals, to make a real impact on the HIV/AIDS epidemic, it is important to translate and disseminate evidence-based research. Some progress has been made in translating scientific-based knowledge into user-friendly intervention packages for dissemination through two CDC projects - Replicating Effective Programs (REP) and Diffusion of Effective Behavioral Interventions (DEBI). Several interventions for African-American heterosexuals have been packaged or are in the process of packaging (see PRS efficacy website: <http://www.cdc.gov/hiv/topics/research/prs/about.htm>; [79]). However, translating research findings into effective interventions in real world settings remains challenging. Although additional research needs to be conducted with regard to this translation, and some limitations to our methodology have been discussed, our findings for both behavioral and biological outcomes suggest that the behavioral strategies utilized in the included interventions can reduce the frequency of HIV risk behaviors in African-American heterosexuals. Thus, we suggest that the following efficacious intervention components identified in this review should be incorporated into the development of future interventions and further evaluated for effectiveness: (1) cultural tailoring, (2) social norms in promoting safer sex behavior, (3) peer education, (4) skills training on correct use of condoms and communication skills needed for negotiating safer sex, and (5) multiple sessions and opportunities to practice skills. Future interventions that are aimed toward African-American heterosexual participants should take the unique needs of the community into account.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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All authors contributed to review concept and synthesis method. L.A. Darbes led the writing of the introduction and discussion, scope screened studies, contacted authors for additional information, and abstracted qualitative data. N. Crepez led the writing of methods and results, abstracted qualitative and quantitative data, and conducted meta-analysis. C.M. Lyles abstracted qualitative and quantitative data, helped with quantitative analysis, and provided critical review of the manuscript. G.E. Kennedy helped out screening studies, abstracted qualitative data, and provided critical review of the manuscript. G.W. Rutherford provided critical review of the manuscript.

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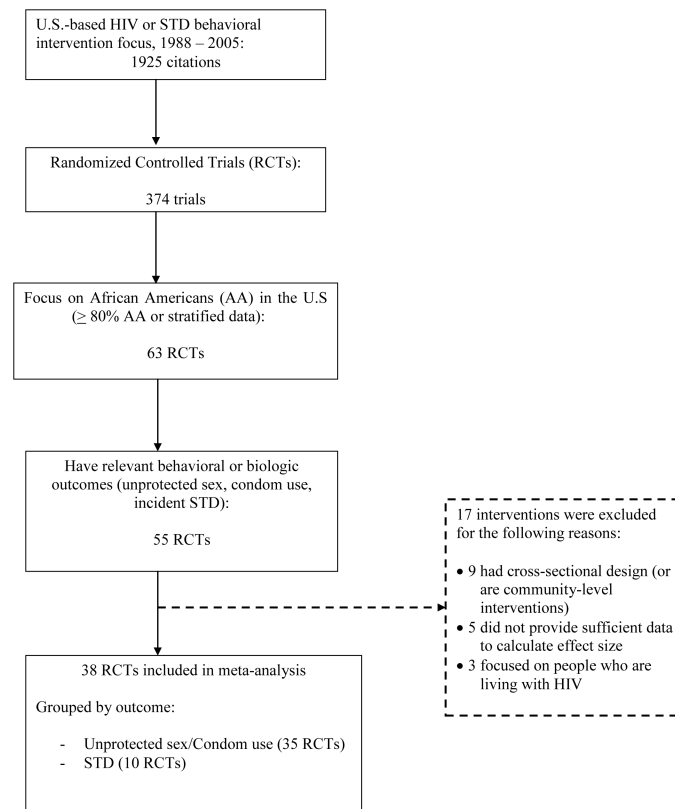


Figure 1.
Trial Selection Process for Meta-Analytic Review of HIV Prevention Interventions for African-American Heterosexuals

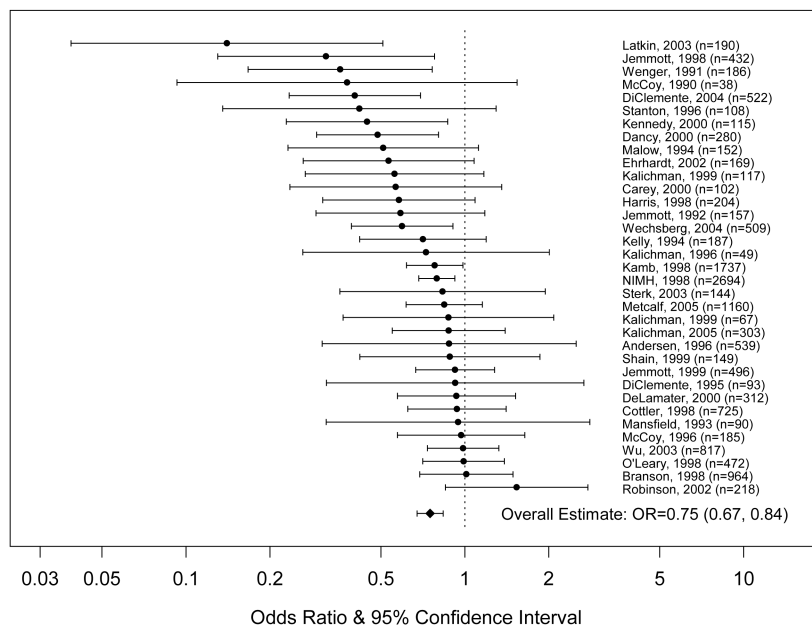


Figure 2.
Study Specific and Overall Effect Size Estimates for Unprotected Sex (N=35)

Table 1

Description of 38 Randomized Controlled Trails of HIV Prevention Interventions with African-American Heterosexuals.

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
Andersen. (1996)	421; 95% African-American 72% male Detroit, MI	Other	1 comparison group (standardized intervention, HIV related) 1 intervention group (standard int. + enhanced intervention)	Both comparison and intervention group received: Information, skills training (technical), referrals, risk reduction materials, HIV counseling and testing, perceived risk) Intervention group received components listed above plus: Counseling, emotional support, culturally tailored Intervention (5 sessions + support group) 40 minutes, 14 weeks Theory: Health Belief Model	Individual	Immediate + 6 month follow-up	Unprotected sex
Branson (1998)	964; 90% African-American 57% male Houston, TX	Clinic setting	1 comparison group (standardized intervention, HIV-related) 1 intervention group (standardized int. + enhanced)	Both comparison and intervention group received: Information Only Comparison group received: Counseling Intervention group received: Information, Skills training (technical and personal), motivation, perceived risk, self esteem, Intervention (4 group sessions + booster group) 50 minutes, 8 weeks Theory: Information-Motivation-Behavior	Group	Immediate and 6 month follow-up	Condom use
Carey (2000)	102; 88% African-American 100% female Syracuse, NY	Community setting	1 control group (Non-HIV attention control) 1 intervention group	Both control group and intervention group received: Information Control group received: Skills training (technical, personal) Intervention group received: Information, skills training (interpersonal), counseling, increase motivation	Group	3-month follow-up	Condom use

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				Intervention (4 sessions), 90 minutes, 2 weeks Theory: Unclear			
Cottler (1998)	605; 93% African-American 61% male St. Louis, MO	Clinic setting	1 control group (standard intervention, included HIV counseling and testing) 1 tx group (standard int. + enhanced)	Both comparison group and intervention group received: information, skills training (technical), referrals, risk reduction materials, HIV counseling and testing Intervention group received above plus: Peer education, counseling, Intervention (4 sessions, 120 minutes) Theory: None	Individual	3-month follow-up	Condom use
Dancy (2000)	280; 100% African - American; 100% female Chicago, IL	Un-specified setting	1 control group (Non-HIV attention control) 1 tx group	Both comparison group and intervention group received: information Comparison group received: information, skills training (technical) Intervention group received: information, peer education, skills training (interpersonal), social norms, attitude, improve self-efficacy, perceived risk, culturally tailored Intervention (6 90-minute sessions followed by 3 booster sessions) Theory: Social Cognitive Theory, Theory of Reasoned Action, Health Belief Model	Group	3-month follow-up	Condom use
DeLamater (2000)	312; 100% African-American; 100% male unspecified city	Clinic setting	1 comparison group (HIV-related) 1 tx group	Both comparison and intervention group received: information, risk reduction materials, counseling Intervention group received above plus: Skills training (technical), beliefs and intentions, perceived risk, self	Individual	6-month follow-up	Condom use

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				efficacy, culturally tailored Intervention (1 14 minute session) Theory: Self-regulation model of illness behavior			
DiClemente (1995)	93; 100% African-American; 100% female San Francisco, CA	Community setting	1 wait list control 1 tx group	Intervention group received: Information, Peer education, skills training (technical, interpersonal), emotional support, social norms, empowerment, culturally tailored Intervention (5 sessions, 120 minutes each), 5 weeks Theory: Social Cognitive Theory, Gender and power	Group	3-month follow-up	Condom use
DiClemente (2004)	522; 100% African-American 100% female	Clinic setting	1 comparison group (General Health Promotion) 1 intervention group	Intervention group received: Information, peer education, skills training (), self-efficacy, perception of risk, empowerment, culturally tailored Intervention (4 session, 4 hours each), 4 weeks Theory: Social cognitive theory, Gender and power	Group	6-month follow-up	Condom use/partner
Ehrhardt (2002)	360; 72% African-American 100% female	Un-specified setting	1 control group (no intervention) 1 comparison group (4 sessions) 1 intervention group (8 sessions)	Intervention group received: Information, Skills training, motivation, attitudes, beliefs and intentions, perceptions of risk, empowerment Intervention (4 vs. 8 sessions, 2 hours each) 8 session group received 1 topic per session for 8 topics, 4 session group received 2 topics each session on same 8 topics Theory: Modified AIDS Risk Reduction Model, Social learning theory	Group	6-month follow-up	Condom use (male + female)

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
Gollub (2000)	292; 91% African-American 100% female Philadelphia, PA	Clinic setting	2 comparison groups (HIV-related) (1 session) 1 intervention group (1 session)	All groups received: information, HIV testing and counseling, risk reduction materials and skills training Comparison groups received risk reduction for either only male condoms or only female condoms. Intervention group received "hierarchical risk reduction" incorporating both female and male condoms as well as other barrier methods and spermicides. Theory: Feminist	Majority Group (35% counseled individually)	4-month follow-up 6-month follow-up	Condom use
Harris (1998)	204; 100% African-American; 100% female Baltimore, MD	Clinic setting	1 comparison group (standard methadone tx) 1 intervention group	Both comparison group and intervention group received: Information, skills training (personal), counseling, emotional support Intervention group received above plus: Skills training (interpersonal), empowerment, motivation, self-esteem, Intervention (16 sessions, 120 minutes for 8 weeks, 60 minutes for 8 weeks), over 16 weeks Theory: :Leininger's prevention framework	Group	5-month follow-up	Unprotected sex
Jemmott (1992)	157; 100% African-American 100% male Philadelphia, PA	Educational setting	1 control group (attention control) 1 intervention group	Both control group and intervention group received: information Intervention group received information plus: Skills training (interpersonal, technical), influencing attitudes, beliefs and intentions, culturally tailored Intervention (1 session, 5 hours) Theory: Social Cognitive, Theory of	Group	3-month follow-up	Unprotected sex

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				Reasoned Action, Theory of Planned Behavior			
Jemmott (1998)	432; 100% African-American 47% male Philadelphia, PA	Educational setting	1 control group (attention control) 1 intervention group	Both control and intervention group received information and peer education, Control group only received: motivation Intervention group received: information, peer education, skills training (interpersonal), attitude, beliefs and intentions, self-efficacy, culturally tailored Intervention (8 sessions, 1 hour each) over 2 weeks Theory: Social Cognitive, Theory of Reasoned Action, Theory of Planned Behavior	Group	3-month follow-up	Unprotected sex
Jemmott (1999)	496; 100% African-American 46% male Philadelphia, NJ	Educational setting	1 comparison group (non-HIV, health promotion) 1 intervention group	Both comparison group and intervention group received: information Intervention group received above plus: Skills training (technical, interpersonal), attitudes, beliefs and intentions, self-efficacy, culturally tailored Intervention (1 session, 5 hours) 1 day Theory: Social Cognitive, Theory of Reasoned Action, Theory of Planned Behavior	Group	3-month follow-up	Unprotected sex
Kalichman (1996)	128?; 100% African-American 100% female Milwaukee, WI	Unspecified setting	1 comparison group (HIV related) 1 intervention group	Both comparison and intervention group received: information, perceived risk Intervention group received above plus: Skills training (technical, interpersonal), self-efficacy, culturally tailored	Group	3-month follow-up	Unprotected sex

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				Intervention (4 sessions, no information regarding session duration), 2 weeks Theory: Social Learning Theory, Cognitive Behavioral principles			
Kalichman (1999a)	108?; 100% African-American 100% male Unspecified city	Community setting	1 comparison group (HIV-related) 1 intervention group (check on this)	Both comparison group and intervention group received: information, risk reduction materials Intervention group received above plus: Skills training (technical, personal), motivation, culturally tailored Intervention (1 session, 3 hours) Theory: Information-Motivation-Behavior	Group	3-month follow-up	Condom use
Kalichman (1999b)	117; 100% African-American 100% male Atlanta, GA	Community setting	1 comparison group (HIV-related) 1 intervention group	Both comparison and intervention group received: information, risk reduction materials, motivation, attitudes Intervention group received above plus: Skills training (technical, personal, interpersonal), culturally tailored Intervention (2 sessions, 3 hours each, over 3 days) Theory: Information-Motivation-Behavior	Group	3-month follow-up	Unprotected sex
Kalichman (2005)	612; 85% African-American 69% male Milwaukee, WI	Clinic setting	3 comparison groups (HIV-related) 1 intervention group	1 Comparison group received: information 1 comparison group received: information, motivation 1 comparison group received: information, skills training (interpersonal, technical)	Individual	3-month follow-up	Unprotected sex

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				Intervention group received: information, motivation, skills training (interpersonal, technical) Theory: Information-Motivation-Behavior			
Kamb (1998)	5758: 59% African-American 43% female Baltimore, MD, Denver, CO, Long Beach, CA, Newark, NJ, San Francisco, CA	Clinic setting	2 comparison groups (HIV-related) (1 group participated in follow-up visits, one did not) 2 intervention groups (1 standard, 1 enhanced)	Comparison groups received: Information, HIV-testing and counseling (10 minutes over 2 sessions) Standard intervention group received: Counseling, HIV-testing and counseling, information, perception of risk (40 minutes over 2 sessions) Enhanced intervention group received: Counseling, HIV-testing and counseling, information, self-efficacy, attitudes, intentions, beliefs (200 minutes over 4 sessions, 1 st session 20 minutes, 60 minutes thereafter) Theory: Theory of reasoned action, social cognitive theory	Individual	3-month follow-up	Condom use
Kelly (1994)	187; 87% African-American (separate analysis for AA participants) 100% female Milwaukee, WI	Clinic setting	1 comparison group (non HIV-related, family and child health) 1 intervention group	Both comparison and intervention group received: information Intervention group received above plus: Skills training (technical, interpersonal), social norms, attitude, beliefs and intentions Intervention (5 sessions, 4 90-minute sessions in 4 consecutive weeks, 1 at 1 month follow-up)	Group	3-month follow-up	Unprotected sex

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				Theory: Theory of Reasoned Action, AIDS Risk Reduction Model			
Kennedy (2000)	115; 100% African-American 41% male Nashville, TN	Community setting	1 wait-list control 1 intervention group	Intervention group received: Information, skills training (interpersonal), attitude, beliefs and intentions Intervention (1 session, 7 hours) Theory: Theory of Reasoned Action	Group	1-month follow-up	Unprotected sex
Latkin (2003)	250; 94% African-American 61% male Baltimore, MD	Clinic setting	1 comparison group (HIV-related) 1 intervention group	Comparison group received: information, (10 sessions, 90 minutes each, only 1 st session was HIV-related) Intervention group received: information, skills training, referrals, risk reduction materials, motivation, self-efficacy, (10 sessions, 90 minutes each) Theory: Social Cognitive theory, Social influence, harm reduction	Group (para-professional male and female indigenous facilitators)	6-month follow-up	Condom use (casual and main partners)
Maher (2003)	581; 100% African-American 100% male Miami, FL	Clinic setting	1 comparison group (HIV-related) 1 intervention group	Comparison group received routing STD counseling Intervention group received: 3 enhanced counseling sessions (1 hour each): information, skills training, referrals, social norms, perception of risk, motivation, empowerment, attitudes, beliefs, intentions, culturally tailored	Individual	Passive follow-up (examined clinic records for STD re-infection)	STD re-infection
Malow (1994)	152; 100% African-American 100% male New Orleans, LA	Clinic setting	1 comparison group (HIV-related) 1 intervention group	Both comparison group and intervention group received: information Intervention group received above plus: Skills training (technical, interpersonal), emotional support)	Group	3-month follow-up	Unprotected sex

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				Intervention (3 sessions, 1 hour each over 3 days) Theory: AIDS Risk Reduction Model			
Mansfield (1993)	90; 83% African-American 8% male Unspecified city	Clinic setting	1 comparison group (standard intervention, HIV-related) 1 intervention group (standard care + enhanced)	Both comparison group and intervention group received: information, referrals, counseling Intervention group received above plus: perceived risk Intervention (1 30-minute session) Theory: None	Individual	2-month follow-up	Condom use
McCoy (1996)	185; 100% African-American; 100% male Miami, FL	Un-specified setting	1 comparison group (Standardized intervention, HIV-related) 1 intervention group (standardized int. + enhanced)	Both comparison group and intervention group received: information, skills training (technical), referrals, risk reduction materials, HIV counseling and testing, counseling, perceived risk Intervention group received above plus: skills training (interpersonal), emotional support culturally tailored Intervention group 3 sessions (Control group 2 sessions—including HIV counseling and testing); No information on duration/time span of sessions	Group	6 month follow-up	Unprotected sex
McCoy (1990)	237?; 92% African-American; 61% male Belle Glade,	Other setting	1 comparison group (standard intervention, HIV-related) 1 intervention group	Both comparison group and intervention group received: information, risk reduction materials, counseling Intervention group received above plus: Skills training (technical, interpersonal) Intervention (3 sessions, no information on length or duration) Theory: Health Belief Model, Theory	Group	6-month follow-up	Condom use

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
	FL		(standard + enhanced)	of Reasoned Action, Conflict Theory			
Metcalf (2005)	3342; 51% African-American; 54% male Denver, CO, Long Beach, CA, Newark NJ	Clinic setting	1 comparison group (no booster session following HIV counseling) 1 intervention group (booster session following HIV counseling)	Comparison group received: no intervention (Had already received standard HIV counseling) Intervention group received: 20 minute booster sessions 6 months after standard HIV counseling, included perception of risk Theory: Booster session reinforced messages in initial counseling sessions, based on cognitive behavioral theories	Individual (Counselor)	3-month follow-up	Unprotected sex
NIMH (1998)	2694; 74% African-American % male New York, NY; New Jersey, Baltimore, MD; Atlanta, GA	Un-specified setting	1 comparison group (HIV related) 1 intervention group	Both comparison group and intervention group received: information Intervention group received above plus: Skills training (interpersonal, personal, technical), motivation, perceived risk, self-efficacy Intervention (7 sessions, between 90-120 minutes) over 3 weeks Theory: Social Cognitive Theory	Group	3-month follow-up	Unprotected sex
O'Donnell (1998)	2004; 62% African-American 100% male New York, NY	Clinic setting	2 intervention groups (1 video viewing only 1 video viewing + group discussion) 1 control group (standard STD clinic services)	Both group and intervention group received: Information Counseling Risk reduction materials Intervention (1 session, 20 minutes) Theory: Theory of reasoned action	Group	Average 18-month follow-up	STD reinfection
O'Leary (1998)	472; 91% African-American 59% male MD, GA, NJ	Clinic setting	1 comparison group (usual care in STD clinics) 1 intervention group	Comparison group received: usual care in STD clinics (information, counseling) Intervention group received: information, skills training, self-efficacy, perception of risk	Group (2 trained professional or paraprofessional facilitators)	3-month follow-up	Unprotected sex

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				7 90-minute sessions Theory: Social cognitive theory, Theory of reasoned action (as per Jemmott et al., 1992)			
Robinson (2002)	185; 100% African-American 100% female Minneapolis, MN	Community setting	1 comparison group (HIV-related) 1 intervention group	Both comparison group and intervention group received: information Intervention group received above plus: Skills training (interpersonal, personal, technical), peer education, emotional support, attitude, beliefs and intentions, empowerment, self-esteem, culturally tailored Intervention (2 sessions, 2 hours each) over 2 days Theory: Sexual Health Model	Group	3-month follow-up	Unprotected sex
Shain (1999)	617; 31% African-American 100% female San Antonio, TX	Clinic setting	1 comparison group (HIV-related, wait-list control) 1 intervention group	Comparison group received: counseling (1 visit, 15 minutes) Intervention group received: counseling, information, skills training, self-efficacy, perception of risk, empowerment, attitudes, beliefs, intentions, (3 weekly sessions, 3-4 hours each) Theory: AIDS Risk Reduction Model	Group (female facilitator)	6-month follow-up	Unprotected sex
Stanton (1996)	108; 100% African-American 56% male Unspecified city	Community setting	1 comparison group (HIV-related) 1 intervention group	Both comparison group and intervention group received: information, risk reduction materials Intervention group received above plus: Skills training (interpersonal), emotional support, culturally tailored Intervention (8 weekly meetings—7 90-minute sessions + 1 day-long sessions, + 6 monthly booster sessions following	Group	6-month follow-up	Condom use

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				completion, 1 additional booster session at 15 months post-intervention) Theory: Social Cognitive Theory, Protective-Motivation Theory			
Sterk (2003)	71; 100% African-American 100% female Atlanta, GA	Community setting	1 comparison group (HIV-related) 2 intervention groups	All participants received HIV counseling and testing Comparison group received: information, NIDA standard intervention for drug users (2 sessions) Intervention group (enhanced motivation) received: power, control, motivation, information, empowerment (4 sessions) Intervention group (enhanced negotiation) received: information, power, control, motivation, skills training Theory: Social-cognitive theory, Theory of Reasoned Action, Theory of Planned Behavior, transtheoretical model of change, Theory of gender and power	Individual (trained female interventionists, 1 Caucasian, 1 African-American)	6-month follow-up	Condom use
Wechsberg (2004)	620; 100% African-American, 100% female Wake and Durham counties, NC	Community setting	1 comparison group 1 standard intervention group 1 enhanced intervention group	Comparison group: delayed treatment control Standard intervention: NIDA standard prevention intervention (skills training, information, risk reduction materials, HIV counseling and testing) 2 individual sessions, 2 group sessions, within 2 weeks Enhanced intervention: empowerment,	Individual and group (trained African-American indigenous women)	3-month follow-up	Unprotected sex

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				information, skills training, HIV counseling and testing, risk reduction materials, control, coping skills, referrals, motivation 2 individual sessions, 2 group sessions, within 2 weeks Theory: empowerment theory, African-American feminism			
Wenger (1991)	186; 88% African-American 67% male Los Angeles, CA	Clinic setting	1 comparison group (standard intervention, HIV-related) 1 intervention group	Both comparison group and intervention group received: information, counseling Intervention group received above plus: HIV counseling and testing, perceived risk, culturally tailored Intervention (2 sessions, 25 minutes total, over 2 weeks) Theory: None	Individual	2-month follow-up	Unprotected sex
Wu (2003)	817; 100% African-American 42% male Baltimore, MD	Community setting	1 standard intervention (HIV-related) (FOK) 2 intervention: (FOK + ImPACT), (FOK + ImPACT + Booster)	All groups received (FOK): information, risk reduction materials, skills training (interpersonal), emotional support, culturally tailored (see Stanton, 1996, above) (delivered to adolescent) FOK + ImPACT received: FOK + information, skills training, (delivered to adolescent and parent) FOK + ImPACT + booster received: FOK + ImPACT + booster session (review of previous content, delivered to adolescent) FOK = 8 sessions ImPACT = 1 session Booster sessions (2 boosters/1 session each, delivered at 6- and 10-month follow-up)	Group (FOK) Adolescent and parent (ImPACT) Individual (boosters)	6-month follow-up	Unprotected sex

Study	Sample size and description	Setting	Study groups	Intervention description (components, duration, time span, theory)	Unit of delivery	Assessment	Outcome
				Theory: social cognitive theory, protection motivation theory			

Table 2

Summary of Sample and Intervention Characteristics of 38 RCTs of HIV Prevention Interventions in African-American Heterosexuals

Overall:	K = 38, N = 14,983
Population Characteristics	
% African Americans:	
100% ^a	25 (66%)
80-99%	13 (34%)
Specifically targeting youth:	
Yes	9 (24%)
No	29 (76%)
Specifically targeting drug users:	
Yes	11 (29%)
No	27 (71%)
Gender:	
Male only	8 (21%)
Female only	15 (39%)
Mixed	15 (39%)
Demographics:	
Age (Range) (k = 15)	9 – 66
Income (range) (k = 11)	<\$500 - <\$20,000
Education (median)	< high school
Intervention setting	
Clinic settings	18 (47%)
Community settings	11(29%)
Educational/Research	9 (24%)
Intervention delivery	
Small groups	27 (70%)
Individually	9 (24%)
Individual and small groups	2 (5%)
Sessions	
# of sessions (range)	1-16
time of delivery (range)	14-960 minutes
delivery span (range)	1-270 days

^aInclude trials that consisted of 100% African Americans or trials that targeted or focused on African Americans and provided stratified data for African Americans

Table 3

Stratified Analysis for Intervention Components for RCTs with African-American Heterosexuals.

	OR (95% CI, no. of trials) Unprotected Sex	OR (95% CI, no. of trials) Incident STD
Overall:	0.75 (0.68, 0.84, k = 35)	0.86 (0.71, 1.03, k = 10)
Population Characteristics		
% African American		
100% ^a	0.73 (0.66, 0.82, k = 23)	0.83 (0.65, 1.04, k = 7)
80-99%	0.80 (0.63, 1.03, k = 12)	0.95 (0.70, 1.30, k = 3)
Specifically targeting youth:		
Yes	0.67 (0.51, 0.89, k = 9)	---
No	0.77 (0.69, 0.86, k = 26)	0.87, (0.73, 1.04, k = 9)
Specifically targeting drug users:		
Yes	0.67 (0.52, 0.87, k = 10)	---
No	0.77 (0.68, 0.87, k = 25)	0.86 (0.71, 1.03, k = 10)
Gender:		
Male only	0.77 (0.59, 1.00, k = 6)	0.99, (0.58, 1.71, k = 2)
Female only	0.70 (0.59, 0.83, k = 14)	0.67 (0.44, 1.01, k = 5)
Mixed	0.78 (0.66, 0.92, k = 15)	0.96, (0.79, 1.16, k = 3)
Design and Assessment:		
Reporting of RCT (reporting some combination of RCT components, retention rates, or power)		
Reported 0	0.90 (0.70, 1.16, k = 5)	0.92 (0.63, 1.34, k = 2)
Reported 1-3	0.75 (0.63, 0.89, k = 17)	----
Reported 4-7	0.70 (0.58, 0.84, k = 13)	0.85,(0.67, 1.09, k = 7)
Comparison group received HIV-related intervention component		
Yes	0.83 (0.75, 0.93, k = 24)	0.87 (0.73, 1.03, k=9)
No	0.60 (0.48, 0.72, k =11)	--
Participation rate		
< 70%	0.73 (0.56, 0.96, k = 7)	0.83 (0.62, 1.09, k = 3)
=> 70%	0.71 (0.61, 0.83, k = 13)	0.87 (0.66, 1.14, k = 7)
Retention rate		
< 70%	0.82 (0.68, 0.99, k = 9)	0.98, (0.78, 1.24, k = 4)

	OR (95% CI, no. of trials) Unprotected Sex	OR (95% CI, no. of trials) Incident STD
70% - 79%	0.77 (0.65, 0.92, k = 14)	0.74 (0.52, 1.06, k = 3)
> 80%	0.65 (0.52, 0.82, k = 12)	0.64 (0.33, 1.26, k = 3)
Intervention characteristics:		
Culturally tailored		
Yes	0.73 (0.66, 0.82, k = 23)	0.85 (0.60, 1.18, k = 5)
No	0.80 (0.63, 1.03, k = 12)	0.85 (0.67, 1.10, k = 5)
Cultural Tailoring Aspects:		
Ethnically matched deliverer		
Yes	0.69 (0.55, 0.86, k = 13)	0.63 (0.38, 1.04, k = 3)
No	0.79 (0.71, 0.89, k = 22)	0.92 (0.74, 1.14, k = 7)
Delivered intervention in minority community		
Yes	0.75 (0.67, 0.84, k = 30)	0.86 (0.69, 1.07, k = 8)
No	0.72 (0.52, 1.01, k = 5)	0.80 (0.46, 1.37, k = 2)
Reported ethnographic research		
Yes	0.75 (0.64, 0.88, k=18)	0.85 (0.60, 1.18, k=5)
No	0.74 (0.63, 0.87, k=17)	0.85 (0.67, 1.10, k=5)
Theory:		
Reported	0.76 (0.68, 0.84, k = 31)	0.78 (0.66, 0.94, k = 8)
Not Reported	0.64 (0.36, 1.14, k = 4)	1.24 (0.91, 1.68, k = 2)
Setting:		
Community	0.67 (0.47, 0.95, k = 8)	1.37 (0.85, 2.19, k=1)
Clinics	0.76 (0.66, 0.87, k = 16)	0.84 (0.70, 1.01, k = 8)
Education/Research	0.80 (0.67, 0.96, k = 11)	0.57 (0.29, 1.13, k=1)
Unit of delivery		
Individual	0.81 (0.70, 0.94, k = 8)	0.85 (0.58, 1.24, k = 4)
Group	0.72 (0.62, 0.83, k = 25)	0.87 (0.70, 1.08, k = 6)
Individual and group	0.63 (0.43, 0.93, k = 2)	----
Type of deliverer ^b		
Health care provider	0.68 (0.51, 0.90, k = 6)	----
Peer	0.59 (0.40, 0.89, k = 8)	----
Research staff	0.78, (0.69, 0.89, k = 17)	0.76 (0.55, 1.04, k = 4)
Counselor	0.84 (0.71, 0.99, k = 5)	0.91, (0.71, 1.17, k = 6)

	OR (95% CI, no. of trials) Unprotected Sex	OR (95% CI, no. of trials) Incident STD
Intervention components:		
Skill Training		
No condom skill or interpersonal skill	0.79 (0.60, 1.06, k = 5)	0.92 (0.74, 1.14, k = 3)
Have either condom or interpersonal skill	0.73 (0.58, 0.92, k = 11)	1.00 (0.77, 1.29, k = 3)
Have both condom and interpersonal skill	0.74 (0.64, 0.86, k = 19)	0.68 (0.47, 0.98, k = 4)
Attitude toward condom use		
Yes	0.71 (0.58, 0.87, k = 24)	0.86 (0.66, 1.13, k = 4)
No	0.77 (0.68, 0.88, k = 24)	0.85 (0.63, 1.13, k = 6)
Self-efficacy		
Yes	0.74 (0.64, 0.87, k = 15)	0.76 (0.56, 1.02, k = 5)
No	0.74 (0.64, 0.88, k = 20)	0.95 (0.74, 1.20, k = 5)
Motivation for protective behavior		
Yes	0.80 (0.70, 0.90, k = 8)	0.92 (0.70, 1.20, k = 5)
No	0.72 (0.62, 0.83, k = 26)	0.81 (0.62, 1.06, k = 5)
Social norms		
Yes	0.51 (0.40, 0.66, k = 8)	0.57 (0.08, 4.28, k = 2)
No	0.82 (0.74, 0.90, k = 27)	0.83 (0.71, 0.98, k = 8)
Peer education		
Yes	0.59 (0.40, 0.89, k = 8)	0.17 (0.03, 0.94, k = 1)
No	0.81 (0.74, 0.87, k = 27)	0.87 (0.73, 1.03, k = 9)
Intervention # sessions		
1 session	0.87 (0.76, 1.01, k = 10)	0.89 (0.71, 1.12, k = 4)
2-5 sessions	0.76 (0.65, 0.89, k = 16)	0.82 (0.61, 1.11, k = 6)
> 5 sessions	0.59 (0.43, 0.80, k = 8)	---
Intervention time span		
1 day	0.87 (0.74, 1.03, k = 8)	0.85 (0.60, 1.22, k = 3)
2-30 days	0.67 (0.55, 0.81, k = 14)	0.78 (0.53, 1.16, k = 5)
> 30 days	0.77 (0.63, 0.94, k = 8)	0.96 (0.77, 1.19, k = 2)
Intervention duration		
<160 minutes	0.87 (0.73, 1.03, k = 7)	0.96 (0.76, 1.22, k = 5)
160-400 minutes	0.78 (0.67, 0.90, k = 12)	0.76 (0.53, 1.10, k = 2)
>400 minutes	0.62 (0.49, 0.79, k = 12)	0.64 (0.33, 1.26, k = 3)

^a Include trials that consisted of 100% African Americans or trials that targeted or focused on African Americans and provided stratified data for African Americans

^b Not mutually exclusive