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Psychosocial Outcomes of Sexual Risk Reduction in a Brief Intervention for Urban African American Female Adolescents

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Abstract

This article describes psychosocial outcomes of a group randomized controlled trial of a friendship-based HIV/STI prevention intervention grounded in the AIDS Risk Reduction Model (ARRM). A total of 264 African American adolescent females were randomized to a single-session Project ÒRÉ HIV/STI prevention intervention or a nutrition/exercise health promotion intervention with their friendship group. At posttest, Project ÒRÉ participants scored higher on knowledge of HIV/STI prevention and protection ($p < .01$), knowledge of living with HIV/STI ($p < .01$), perceived HIV risk ($p < .05$), perceived STI risk ($p < .01$), and intentions to use condoms for vaginal sex ($p < .05$). Findings suggest that a brief friendship-based HIV/STI prevention intervention for youth can impact ARRM factors that increase the ability to recognize and label risky sexual behaviors as problematic and promote commitment to changing high-risk behaviors.

Keywords

African Americans; adolescents; AIDS Risk Reduction Model; HIV/STI prevention

Introduction

During adolescence, various biological, relational, cultural, and socioeconomic factors increase the vulnerability of African American females to HIV and other sexually transmitted infections (STIs). These include early initiation of sexual intercourse, low or inconsistent rates of condom use, frequent use of alcohol and illicit substances, multiple sexual partners, and power dynamics within heterosexual relationships (Boyer, Shafer, Wibbelsman, Seeberg, Teitle, & Lovell, 2000; Crepaz et al., 2009; Hipwell, Keenan, Loeber, & Battista, 2010). Given the myriad factors associated with acquisition of HIV/STIs among

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African American female adolescents, prevention interventions are needed that are based in sexual behavior change theories (CDC, 2007; CDC, 2006). By focusing on the predictors of risk that are detailed in theoretical frameworks, intervention messages and activities can be more aptly tailored to affect changes in sexual risk behaviors and within a specific population (DiClemente et al., 2004; Jemmott, Jemmott, Braverman, & Fong, 2005; Noar, 2007).

Theories are also useful in directing the evaluation of HIV/STI interventions and determining the extent to which psychosocial factors play a role in HIV/STI risk or prevention among adolescents. One notable AIDS-specific theoretical framework that is the central focus of this article is the AIDS Risk Reduction Model (ARRM; Catania, Kegeles, & Coates, 1990). The ARRM organizes factors known to influence behavioral change into particular categories in which people could be classified and describes how movement from one category to the next may occur. Comprised of three stages, the ARRM involves: (1) recognizing and *labeling* one's behavior as high risk for infection, (2) making a *commitment* to change one's behavior to reduce risk and practice safer behaviors, and (3) *enacting* change by seeking solutions and adopting lower risk behaviors. Movement through these stages neither has to be linear nor nonreversible. Rather, individuals may progress to certain stages, slide back to earlier stages, and cycle and recycle through them many times before behavior change is sustained.

Each ARRM stage is dependent upon and facilitated by psychosocial constructs that have been previously found to be associated with the acquisition of STIs, including HIV, in adolescents. Within Stage 1, knowledge of HIV/STIs and individual beliefs that one is personally susceptible to contracting HIV are hypothesized to influence labeling of risk behaviors as problematic (Boyer, Tschann, & Schafer, 1999). Factors involved in making a commitment to change high-risk behaviors, as described in Stage 2, include perceived self-efficacy, social factors (e.g., perceived peer norms), and aversive emotional states (e.g., anxiety) (Zimmerman et al., 2007). Finally, Stage 3 suggests that actual behavior change (e.g., adoption of condom use and other safer sex strategies) may be influenced by individual characteristics (e.g., past history of risk behavior) and perceived social support for reducing high-risk behaviors (Logan, Cole, & Leukefeld, 2002). The importance of examining these ARRM-related constructs has been stressed in African American adolescent-specific HIV prevention interventions (Boyer, Sieverding, Siller, Gallaread, & Chang; 2007; DiClemente et al., 2004; Jemmott et al., 2005; DiNoia & Schinke, 2007). Recent meta-analytic reviews of HIV behavioral interventions for heterosexual African Americans (Darbes, Crepaz, Lyles, Kennedy& Rutherford, 2008) and African American females (Crepaz et al., 2009) also support the ability of these psychosocial factors to influence the efficacy of HIV/STI behavioral interventions that are tailored specifically to race/ethnicity and gender.

Previous findings and recommendations emphasize the importance of attending to psychosocial factors in the development of HIV/STI prevention interventions for African American female adolescents, and highlight the need to evaluate the theoretical constructs that underlie such interventions. In the present study, we expand the previously reported behavioral outcomes of a theoretically grounded, single session friendship-based HIV/STI intervention for urban African American female adolescents (Dolcini, Harper, Boyer, & Pollack, 2010). Three significant age-graded intervention group differences in behavioral outcomes were detected at 3-month follow-up. Specifically, we found decreases in risky sexual behavior among older youth (18-21 years old), decreases in multiple partners among youth between ages 16 to 17, and increases in HIV testing among youth in the youngest age group (14-15 years). By assessing intervention effects on the salient ARRM-related psychosocial factors that explain how sexual risk is reduced among youth, we will identify

specific leverage points for behavioral change for our target population. This has relevant theoretical and practical implications for maximizing the impact of brief HIV/STI interventions that focus on friendship groups among these youth.

Methods

This study is based on a group randomized controlled trial and is described fully elsewhere (Dolcini et al., 2010). The 5-hour, single-session group intervention (i.e., Project ÒRÉ, Dolcini et al., 2008) was comprised of six modules focused specifically on addressing each ARRM stage. This intervention also attended to developmental and African American cultural issues in several ways, including stimulating discussion about HIV/STIs with DVD clips of interviews with youth from the target community and reinforcing the concept of connectedness to friends and community with an African rite of passage exercise and ritual. Moreover, activities were tailored for close friendship groups since the intervention aimed to address these important social influences for African American youth. Youth in the control condition participated in a nutrition/exercise intervention designed for African American female adolescents.

Participants

To be eligible for participation as an index case, young women had to be sexually experienced, African American or mixed African American race, between 14 to 18 years of age, reside in a target community in San Francisco, and willing to nominate two to five close female friends to participate in this study. Eligibility for participation as a friend included being female and 14 to 21 years old. There were no criteria based on ethnicity or place of residence for friends. Youth were recruited through street outreach and community agency referral. Eligible friendship groups were enrolled in one of the two interventions depending on which neighborhood the index case resided. Four neighborhoods were randomly assigned to the experimental (n=2) or control (n=2) condition. Thus, only one condition was delivered in each neighborhood to avoid contamination. The intervention was delivered by trained African American female health educators at community-based organizations.

The analytic sample was comprised of 131 Project ÒRÉ participants and 133 participants in the comparison condition ($N = 264$) who represented a total of 70 friendship groups. Each intervention condition consisted of 35 friendship groups that on average included 3 to 4 friends. Table 1 shows several baseline sociodemographic and behavioral characteristics of the study participants. For descriptions of other baseline characteristics, see Dolcini et al. (2010).

Measures

Three questionnaires were completed by participants: 1) before the start of the intervention, 2) immediately following the intervention, and 3) approximately 3 to 4 months after completion of the intervention. The study investigators developed the questionnaire based on examinations of the literature, investigators' experiences working with the study population, and pilot testing with the study communities as detailed in prior studies (Dolcini et al., 2008; Dolcini, Harper, Watson, Catania, & Ellen, 2005). In addition to measures of the intended outcomes, the questionnaires included measures of psychosocial factors that represent the various stages of the ARRM. As previously reported (Dolcini et al., 2010), there was minimal attrition from posttest to follow-up ($n = 12$) and 95% of participants completed the follow-up questionnaire ($n = 252$).

ARRM Stage 1 Measures—*Knowledge of HIV/STI prevention and protection* was measured via a 7-item scale with 4-point Likert response options that queried content areas

about HIV/STI transmission and awareness of preventive behaviors (α = .67). Items were dichotomized into agree/disagree responses with "0" assigned to the incorrect answer and "1" assigned to the correct answer. Missing data were considered as incorrect answers. All items were summed to derive a total score. Higher scores indicate more accurate HIV/STI knowledge about modes of transmission and preventive behaviors.

Knowledge of living with HIV/STI was measured via a 5-item scale with 4-point Likert response options that assessed concerns about STI transmission when symptomatic and whether HIV/STI can be cured (α = .59). The scoring process was similar to that described for the previous Knowledge scale. Higher scores indicate more accurate knowledge about living with HIV/STI.

Perceived HIV risk was assessed by a single item with a 4-point Likert scale that asked, "How worried or concerned are you that you will get HIV/AIDS from having sex?"

Perceived STI risk was assessed by a single item with a 4-point Likert scale that asked, "How worried or concerned are you that you will get some other STI from having sex?"

ARRM Stage 2 Measures—*Condom attitudes regarding the use or importance of condoms* was measured via a 9-item scale with 4-point Likert response options that asked about the influence of condoms on sexual enjoyment (α = .81). Higher mean-item scores indicate favorable attitudes toward using condoms as important to one's health and safety and pleasure.

Condom attitudes regarding the protective function of condoms was measured via a 4-item scale with 4-point Likert response options that asked about the health benefits of condom use (α = .86). Higher mean-item scores indicate favorable attitudes toward using condoms to prevent HIV infection.

Peer norms (situational) was assessed by a 5-item scale with 4-point Likert scale response options regarding perceptions close friends have about pressures to have sex in different relationships (α = .74). Higher mean-item scores indicate a strong endorsement of a safer sex norm governing the circumstances or context in which sex occurs (particularly the relationship context).

Peer norms (behavioral) was assessed by a 3-item scale with 4-point Likert scale response options regarding perceptions close friends have about condom use in different sexual relationships (α = .73). Higher mean-item scores indicate a strong endorsement of a safer sex norm governing the type of behavior (safe versus unsafe) in which one engages.

Intentions to test for HIV was measured by a single item with a 4-point Likert scale that asked, "How likely are you to get tested for HIV in the next 3 months?"

Intentions to test for STIs was measured by a single item with a 4-point Likert scale that asked, "How likely are you to get tested for STIs in the next 3 months?"

ARRM Stage 3 Measures—A single psychosocial measure relevant to this stage was assessed in the current study. Due to the nature of this study (i.e., single session intervention), this measure was included only in the follow-up questionnaire. In addition, this measure was asked only of participants who were sexually active in the past three months.

Sexual Communication was measured using a 6-item scale (α = .80) that asked about discussing health protective concerns with sexual partners (e.g., asking about the number of

past sex partners) in the past 3 months. Response options included “yes, with all partners,” “yes, with some partners” and “no.” Higher mean-item scores indicate more frequent sexual communication practices.

Analysis

Between-condition differences in ARRM outcome measures were assessed in Stata (Release 11) using linear regression for continuous variables and logistic regression for dichotomous variables. All analyses adjusted for clustering by friendship group. All participants experienced their assigned intervention in a group setting with their close female friends.

Results

There were no pre-intervention group differences on any of the outcomes of interest that could limit our ability to observe significant effects at later time points (see Table 2). Of note at baseline, scale scores for several ARRM Stage 2 variables, including *condom attitudes regarding the usage or importance of condoms (M* = 3.36, median = 3.33, mode = 4.00), *condom attitudes regarding the protective function of condoms (M* = 3.51, median = 3.75, mode = 4.00), *peer norms (situational) (M* = 3.42, median = 3.60, mode = 4.00), and *peer norms (behavioral) (M* = 3.42, median = 3.67, mode = 4.00) were negatively skewed.

As shown in Table 3, immediately following the intervention, all four psychosocial outcomes of Stage 1 and one psychosocial outcome of Stage 2 varied significantly by condition. Compared to those in the comparison intervention, youth who participated in the Project ÒRÉ intervention scored higher on *knowledge of HIV/STI prevention and protection*, *knowledge of living with HIV/STI*, *perceived HIV risk*, *perceived STI risk*, and *intentions to use condoms for vaginal sex*. There were no significant group differences in ARRM-related outcomes three months after completion of the intervention, including the Stage 3 variable *sexual communication*, which was assessed only at follow-up among sexually active females (56 from the Project ÒRÉ intervention and 65 sexually active females from the comparison intervention).

Discussion

This study sought to explore the impact of a brief friendship-based HIV/STI prevention intervention for African American female adolescents on psychosocial factors included in the ARRM. In addition to reductions in risk behavior outcomes reported earlier (Dolcini et al., 2010), the current findings show that the Project ÒRÉ intervention also yields positive short-term effects on theorized psychosocial predictors of sexual risk behavior. Significant intervention effects were observed at the immediate post-intervention evaluation among cognitive antecedents of condom use (i.e., knowledge of HIV/STI prevention and protection, knowledge of living with HIV/STI, perceived HIV risk, perceived STI risk) that comprise ARRM stage 1. These results are consistent with other ARRM-based HIV prevention interventions directed toward urban female adolescents that successfully impacted perceived risk and increased awareness about HIV/STI (Crepaz et al., 2009; DiNoia & Schinke, 2007; AUTHOR, 2009). Similar to these previous studies, the Project ÒRÉ intervention utilized culture- and gender-specific messages and activities to affect change.

Another factor that was successfully impacted by the Project ÒRÉ intervention at post-test was intentions to use condoms for vaginal sex. This is particularly encouraging since intentions are an important aspect of ARRM stage 2 that helps establish commitment to safer sex. This underscores the significance of having intervention components that attend to socioecological factors that affect HIV risk and provide skills training in correct condom use (Crepaz et al., 2009; Darbes et al., 2008), which this study did. In addition, this result

provides additional support for the merit a single-session intervention has on psychosocial precursors to behavior change among young women of color (Roye, Silverman, & Krauss 2007) and African American women in particular (Crepaz et al., 2009).

Although several meaningful ARRM constructs were significantly impacted by the Project ÒRÉ intervention immediately after its implementation, other Stage 2 factors were not affected. The intervention was not associated with higher condom attitudes or peer norms that promote safer sex behaviors. These findings may be due to the high baseline levels evidenced by participants in both conditions, thus limiting our ability to observe further changes. Prior work has also suggested that compared to non-African Americans and male adolescents, African American females have more favorable condom attitudes (Mizuno, Kennedy, Seals, & Myllyluoma, 2000) and that African American youth generally exhibit pro-condom norms (Catania & Dolcini, 2006). Considerable support linking peer factors with adolescent sexual experiences exists, including among African American adolescents (Boyer et al., 1999; Dolcini & Adler, 1994; Hipwell et al., 2010), and future studies will want to continue to explore methods of further strengthening safer sex norms among friendship groups. Research is also warranted to examine the role of different types of peer influence (e.g., direct peer pressure, indirect peer modeling) on African American adolescents' risks for HIV/STIs since there are notable ethnic differences in perceived peer influence (Padilla-Walker & Bean, 2009).

Previous examination of sexual behavior data revealed that the majority of participants were not sexually active during the 3 to 4 months following the intervention (Dolcini et al., 2010). This finding may account for the absence of longer term intervention effects on psychosocial predictors, particularly on other ARRM Stage 2 factors (e.g., intentions to test for HIV/STI) and the enactment of sexual communication skills (ARRM Stage 3). Female youth who are not currently engaged in sexual intercourse may have delayed benefits from intervention strategies that seek to modify normative attitudes and skills and are essential for negotiating HIV risk-related sexual situations. In order to further motivate female adolescents to engage in risk-reduction behaviors and improve the accuracy of their risk perceptions, intervention efforts should focus strategies on participants' current level of sexual risk within the context of their current sexual relationships and risk knowledge (Zimmerman et al., 2007), while also helping them plan for the future. Moreover, to better understand whether individuals' current perceptions of their personal risk result in subsequent risk behavior changes, Weinstein and Nicolich (1993) emphasize the importance of evaluating longitudinal outcome data. Accurate interpretations are likely to result by allowing considerable time to pass so that after a young woman learns about a risk or a new way of reducing a risk, she has ample opportunity to take action. Future assessments may therefore be implemented beyond 3 to 4 months following the intervention in order to more effectively comprehend what barriers prevent individuals from implementing protective behaviors (Yep et al., 2002-2003).

While the immediate psychosocial impacts of the Project ÒRÉ intervention are encouraging, study findings also lead to suggestions for further refinement of the ARRM. Future studies may do well to examine additional factors that are influential in young women's risk for HIV but are not explicitly addressed in the ARRM. Since the Project ÒRÉ intervention attended to gender norms and beliefs associated with sexual risk, mediators that are relevant to women's power in heterosexual relationships should be considered for future examination. This is consistent with previous research which acknowledges the influence of factors related to gender-based power within heterosexual relationships and complement those included within the ARRM (Dworkin, Exner, Melendez, Hoffman, & Ehrhardt, 2006; Rosenthal & Levy, 2010).

Results of this study should be considered in light of several limitations. First, similar findings might not be obtained with friendship groups focused on adolescent males, female youth from other ethnic backgrounds, or youth in other geographic areas. Further research is needed to determine the extent to which findings are generalizable to other African American female adolescents with different sociodemographic characteristics or risk profiles. Study outcomes are based on self-report. Previous research has established, within the limits of self-report, that measures of adolescent sexual behavior are reliable, specifically for young African American women (Plichta, Weisman, Nathanson, Ensminger, & Robinson, 1992).

Our study did not implement a structural intervention; social interaction threats to internal validity may have influenced observations of intervention effects. To maintain friendship groups, we did not establish residential criteria for the index cases' friends recruited for this study. As a result, there may have been interactions between friends who lived in the communities where the agencies that were assigned to the opposite arm of the study were located and those actually enrolled in the opposite arm. Finally, our study design did not compare the friendship-based intervention with a standard group intervention. The impacts of a friendship-based intervention will need to be tested in future studies.

Conclusion

This study provides support for the short-term efficacy of a single-session, 5-hour friendship-based HIV/STI intervention on theorized psychosocial predictors of sexual risk behavior. Observed changes in the cognitive antecedents associated with ARRM stage 1 and in intentions to use condoms for vaginal sex (ARRM stage 2) are consistent with results from previous interventions that utilize culture- and gender-specific strategies to reduce HIV/STI risk among urban female adolescents. While the Project ÒRÉ intervention most affected ARRM stage 1 factors, future research should examine the influence of additional constructs (e.g., peer influences, gendered power dynamics) salient to adolescents' sexual behavior. The ARRM does not focus specifically on these mediators of heterosexual risk behavior, but may be complemented by other theoretical frameworks that do.

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Table 1

Baseline Characteristics of Study Participants by Intervention Group

Baseline Characteristics	Intervention Group *n* (%) 131 (49.6)	Control Group *n* (%) 133 (50.4)	Total Percentage *N* (%) 264 (100)
Age			
14 – 15	50 (38.2)	34 (25.6)	84 (31.8)
16 – 17	41 (31.3)	47 (35.3)	88 (33.3)
18 – 21	40 (30.5)	52 (39.1)	92 (34.8)
History of vaginal sex	93 (71.0)	95 (71.4)	188 (71.2)
Has a child	22(16.8)	9 (6.8)	31 (11.7)*
Tested for HIV (ever)	66 (50.4)	65 (48.9)	131 (49.6)
Tested for STI (ever)	57 (43.5)	79 (59.4)	136 (51.5)*
Behavior past 3 months			
Vaginal sex	69 (52.7)	74 (55.6)	143 (54.2)
Oral sex	20 (15.3)	36 (27.1)	56 (21.2)*
Anal sex	2 (1.5)	4 (3.0)	6 (2.3)

*$p \leq .05$. See Dolcini et al. (2010) for descriptions of additional baseline characteristics.

Table 2

Between-Arm Comparisons of ARRM-Related Outcomes Pre-Intervention

		Intervention Group			Control Group		
	p[1]	N	Mean	%	N	Mean	%
ARRM Stage I Variable							
Knowledge (Protective/Protection Function)	.583	131	5.69	--	133	5.79	--
Knowledge (Living with HIV/STI)	.977	131	3.76	--	133	3.76	--
Perceived HIV risk[2]	.119	131	--	60.3	133	--	50.4
Perceived STI risk[2]	.325	131	--	61.8	133	--	55.6
ARRM Stage II Variable							
Condom attitudes (Usage/Importance)[3]	.236	97	3.28	--	133	3.36	--
Condom attitudes (Protective Function)[3]	.433	98	3.48	--	133	3.55	--
Peer norms (Situational)	.738	118	3.36	--	117	3.33	--
Peer norms (Behavioral)	.648	96	3.40	--	93	3.35	--
Intentions to use condoms (Vaginal Sex)[4]	.251	131	--	64.1	133	--	56.4
Intentions to use condoms (Oral Sex)[4]	.510	123	--	59.3	132	--	54.5
Intentions to use condoms (Anal Sex)[4]	.715	122	--	69.7	131	--	67.2
Intentions to test for HIV[5]	.609	131	--	56.5	133	--	60.2
Intentions to test for STIs[5]	.370	131	--	56.5	133	--	63.2

[1] P-value is for the Intervention Group vs. Control Group difference derived from regressing the variable on group and is based on robust standard errors calculated to accommodate clustering by friendship group (as defined by the index case). Dichotomous variables required logistic regression instead of linear regression.

[2] % worried or very worried

[3] The condom attitude items were inadvertently excluded from the pre-intervention instrument administered to 33 intervention Group participants.

[4] % always use condoms

[5] % somewhat likely or very likely

Table 3

Between-Arm Comparisons of ARRM-Related Outcomes Immediately Post-Intervention

		Intervention Group			Control Group		
	p[1]	N	Mean	%	N	Mean	%
ARRM Stage I Variable							
Knowledge (Protective/Protection Function)	.006	131	6.32	--	133	5.83	--
Knowledge (Living with HIV/STI)	.005	131	4.05	--	133	3.62	--
Perceived HIV risk[2]	.016	131	--	69.5	133	--	54.1
Perceived STI risk[2]	.008	131	--	71.8	133	--	54.1
ARRM Stage II Variable							
Condom attitudes (Usage/Importance)	.253	130	3.40	--	133	3.33	--
Condom attitudes (Protective Function)	.943	131	3.51	--	133	3.50	--
Peer norms (Situational)	.113	118	3.49	--	115	3.35	--
Peer norms (Behavioral)	.181	109	3.48	--	95	3.36	--
Intentions to use condoms (Vaginal Sex)[3]	.041	131	--	71.0	133	--	57.1
Intentions to use condoms (Oral Sex)[3]	.066	126	--	68.3	133	--	52.6
Intentions to use condoms (Anal Sex)[3]	.377	125	--	70.4	133	--	63.9
ARRM Stage II Variable							
Intentions to test for HIV[4]	.242	128	--	74.2	133	--	66.9
Intentions to test for STIs[4]	.238	129	--	76.0	133	--	68.4
ARRM Stage III Variable							
Sexual communication[5]	.346	57	2.16	--	66	2.27	--

[1] P-value is for the Intervention Group vs. Control Group difference derived from regressing the variable on group and is based on robust standard errors calculated to accommodate clustering by friendship group (as defined by the index case). Dichotomous variables required logistic regression instead of linear regression.

[2] % worried or very worried

[3] % always use condoms

[4] % somewhat likely or very likely

[5] Sexually inactive excluded