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Evaluation of an HIV/STD Sexual Risk-Reduction Intervention for Pregnant African American Adolescents Attending a Prenatal Clinic in an Urban Public Hospital: Preliminary Evidence of Efficacy

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Abstract

Study Objective—To evaluate an intervention to reduce HIV/STD-associated behaviors and enhance psychosocial mediators for pregnant African-American adolescents.

Design—A randomized controlled trial. Participants completed baseline and follow-up assessments.

Setting—An urban public hospital in the Southeastern U.S.

Participants—Pregnant African-American adolescents (N=170), 14-20 years of age, attending a prenatal clinic.

Intervention—Intervention participants received two 4-hour group sessions enhancing self-concept and self-worth, HIV/STD prevention skills, and safer sex practices. Participants in the comparison condition received a 2-hour session on healthy nutrition.

Main Outcome Measures—Consistent condom use.

Results—Intervention participants reported greater condom use at last intercourse (AOR = 3.9, $P = .05$) and consistent condom use (AOR = 7.9, $P = .05$), higher sexual communication frequency, enhanced ethnic pride, higher self-efficacy to refuse risky sex, and were less likely to fear abandonment as a result of negotiating safer sex.

Conclusion—Interventions for pregnant African-American adolescents can enhance condom use and psychosocial mediators.

Keywords

Adolescent; African-American; HIV/STD prevention intervention; Pregnant

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Introduction

Sexually transmitted diseases, including HIV, pose one of the most serious health threats to adolescents.¹ Rates of HIV/STDs are not, however, uniform among adolescents. African Americans are disproportionately affected by the epidemics of HIV and STDs; particularly those residing in the Southern U.S.²⁻⁵ While a number of interventions have been developed to reduce HIV/STD-associated sexual behaviors among adolescents, including African American adolescents,⁶ one African American adolescent subgroup, for whom an intervention with demonstrated evidence of effectiveness is lacking, is pregnant adolescents. Pregnant African American adolescents remain a vulnerable subgroup, understudied and underserved, at increased risk for HIV/STD.

HIV/STD-associated risk is not uncommon among this population. Research suggests that pregnant adolescents, including African Americans, may be less likely to use condoms than their non-pregnant counterparts.⁷⁻¹¹ Further elevating pregnant adolescents' risk for HIV acquisition are high STD prevalence rates. The prevalence of bacterial (Chlamydia and gonorrhea) and non-bacterial (trichomoniasis and HSV-2) are high, ranging from 10% to 39%.¹¹⁻¹³ These STDs have been identified as co-factors facilitating HIV transmission.¹⁴

In addition to the HIV/STD risk posed to pregnant adolescents' health, HIV/STD acquisition during pregnancy represents a significant health threat to their unborn child. *N. gonorrhoeae* and *C. trachomatis* are associated with diverse pregnancy complications and adverse pregnancy outcomes.^{15,16} Additionally, *T. vaginalis* has been linked to preterm birth, premature rupture of membranes, and maternal puerperal morbidity,¹⁶ and genitally-acquired herpes during the third trimester can be especially problematic.¹⁷

Further amplifying the need for HIV/STD prevention interventions is the high birth rate among African American adolescents compared to other ethnic/racial U.S. groups.¹⁸ Of concern, in 2006, the adolescent birthrate increased for the first time since 1991, with the largest increase (5%) observed among African Americans.¹⁹ Thus, pregnancy represents a critical window of opportunity to intervene with African American adolescents to reduce HIV/STD-associated sexual behaviors.

Given the intersecting challenges confronting pregnant African American adolescents, the aim of this study was to test the efficacy of a behavioral intervention designed to enhance safer sex practices among pregnant African American adolescents residing in the Southern U.S.

Materials and Methods

Study Sample

From April 1999 through June 2000 project recruiters screened a consecutive sample of pregnant African American adolescents (N=311) from a large prenatal clinic at a public hospital serving low-income minority residents of Atlanta, Georgia. Eligibility criteria were assessed at their initial prenatal visit and included being an unmarried African American female, 14 to 20 years of age, less than 21 weeks gestation, and having vaginal sex in the previous two months. To facilitate follow-up, we further restricted the sample to those who planned to deliver at the hospital where they were seeking prenatal care. All adolescents seeking prenatal care receive HIV/STD prevention education as part of standard-of-care prenatal services.

Of the 311 adolescents screened, 183 met eligibility criteria. Of those not eligible to participate in the study, most reported they had not engaged in sex during the previous two months, were unable to attend the intervention, or did not complete the baseline assessment. Of the 183 who

were eligible, 170 were enrolled in the study, yielding a 93% participation rate (Figure 1). The study protocol was approved by the Institutional Review Board of Emory University.

Study Design

A two-arm randomized controlled trial was conducted with a single follow-up assessment two weeks prior to delivery. Concealment of allocation techniques were used to assure the integrity of randomization.²⁰

Data Collection

Data collection was conducted at the prenatal clinic during adolescents' initial visit and again two weeks prior to scheduled delivery. Interviewers and data collection monitors were blinded to adolescents' assignment to study condition to reduce ascertainment bias. Adolescents were reimbursed \$50.00 for completing each of the baseline and follow-up assessments. Intervention efficacy was assessed using self-reported measures of HIV/STD-associated sexual behavior and psychosocial mediators associated with HIV/STD-preventive behaviors.

Measures

A trained African American female interviewer assessed participants' self-reported sexual behavior. Sexual behaviors assessed included: (1) self-reported consistent condom use, defined as use of a condom during every episode of penile-vaginal intercourse during the past 30 days, and (2) condom use at last sexual intercourse. Consistent condom use was selected as a primary outcome based on empirical evidence of effectiveness in reducing sexually transmitted infections.²¹ Condom use at last sex is a common measure used to reduce recall bias.²² Recent evidence suggests that this measure is a valid proxy for condom use behavior spanning longer time intervals.²³

Subsequent to collecting interview data, a self-administered survey was implemented in a group setting with monitors providing assistance to adolescents with limited literacy and helping to assure confidentiality of responses (See Table 1 for sample survey questions). This survey assessed sociodemographic and psychosocial mediators. Computerized readability assessments indicated a fifth-grade reading level for this survey. Psychosocial mediators of condom use were derived from the underlying theoretical frameworks, our previous research, and a review of the empirical literature. Constructs were assessed using scales with satisfactory psychometric properties previously used with adolescent African American women.²⁴ Sexual communication frequency with male partners about safer sex was assessed using a 4-item scale ($\alpha = .86$). Ethnic pride was measured using a 12-item scale ($\alpha = .68$). A single item assessed adolescents' self-efficacy to refuse sex without a condom. Also, a single item assessed their level of fear that their boyfriend would abandon them if asked to use condoms.

Subsequent to completion of baseline assessment adolescents were randomly assigned to either the intervention or the enhanced standard-of-care healthy nutrition comparison condition using concealment of allocation techniques designed to minimize assignment bias.²⁰

Intervention Methods

The intervention, based on Social Cognitive Theory and the Theory of Gender and Power, was an adapted version of a CDC-defined evidence-based HIV/STD intervention for African American female adolescents, 14–18 years of age, attending community clinics.²⁵ The original evidence-based intervention was adapted to be appropriate for the current population, pregnant African American adolescents. The two 4-hour group intervention sessions were implemented by trained African American female health educators and an African American peer educator.

To enhance realism of the interactive role play scenarios, an African American male peer health educator participated in a few specific intervention activities.

The intervention focused on enhancing adolescents' self-worth and self-concept, as these psychosocial constructs have been shown to be less well developed in pregnant adolescents and associated with HIV/STD-risk taking. The intervention was also designed to heighten awareness of HIV/STD risk-reduction knowledge, specifically the adverse consequences of STDs, including HIV, on themselves and their unborn child, and reinforced the importance of condom use when having sex during pregnancy. Further, the intervention taught HIV/STD-preventive skills such as condom use, negotiation skills, and skills associated with refusing risky sex. Sessions were conducted with an average of 5 - 7 participants on consecutive Saturdays at the prenatal clinic.

The enhanced standard-of-care healthy nutrition comparison condition received a 2-hour group session which consisted of a "Good Nutrition during Pregnancy" video and a brief question and answer session.

Statistical Analysis

Analyses were performed only on pre-specified hypotheses using an intention-to-treat protocol with participants analyzed in their assigned study conditions irrespective of the number of sessions attended.^{26,27} At baseline, descriptive statistics were calculated to summarize sociodemographic variables, psychosocial mediators, and sexual behaviors between study conditions. Differences between study conditions at baseline were assessed using Student's t-tests for continuous variables and chi-square analyses for categorical variables. Variables, in which differences between study conditions approached statistical significance, or which were theoretically or empirically identified as potential confounders, were included as covariates in the intervention efficacy analyses. To examine intervention effects, logistic regression was used to compute adjusted odd ratios (AOR) for dichotomous behavioral outcomes (i.e., the two measures of condom use), and repeated measures ANCOVA was used for continuous outcomes (i.e., the psychosocial mediators). The corresponding baseline measure for the specific outcome was included as a covariate in each analysis.

Results

Baseline

Of the 170 participants randomized to study conditions, 85 were allocated to the intervention condition and 85 were allocated to the enhanced standard-of-care healthy nutrition comparison condition. For most participants, this was their first pregnancy (69%), with 23% already having one child, and 8% having 2 children. At baseline, no differences were observed in sociodemographic characteristics, condom use behaviors, or psychosocial mediators (Table 2).

Attrition

Among the 170 participants completing baseline assessments and randomized to study conditions, 137 (80.5%) were available to complete the follow-up assessment (Figure 1). Attrition analyses indicate no difference between those completing the follow-up assessment and those unavailable for follow-up assessment. Separate analyses, by study condition, also observed no difference between those completing the follow-up and those unavailable for follow-up assessment.

Intervention Effects

At follow-up, adolescents in the intervention reported higher condom use relative to the enhanced standard-of-care healthy nutrition comparison condition. Specifically, intervention participants were more likely to use condoms at last intercourse (AOR = 3.9, 95% CI = 1.00 – 15.71; $P = .05$) and more likely to use condoms consistently over the past 30 days prior to follow-up assessment (AOR = 7.9, 95% CI = 1.00 – 56.7; $P = .05$). Intervention effects were also observed for psychological mediators (Table 3). Specifically, adolescents in the intervention condition, relative to the enhanced standard-of-care healthy nutrition comparison condition, had higher sexual communication frequency ($p = .03$), enhanced ethnic pride ($p = .04$), higher self-efficacy to refuse sex without a condom ($p = .05$), and although not significant at the .05 level, participants were slightly less likely to fear the boyfriend abandoning them as a result of negotiating safer sex ($p = .06$).

Discussion

This is the first HIV/STD intervention tailored to pregnant African American adolescents residing in the Southern US, a geographic region disproportionately impacted by the twin epidemics of HIV and STDs, to demonstrate programmatic efficacy. Findings from this randomized controlled trial provide support for the efficacy of a two-session intervention tailored to be culturally and gender-appropriate for pregnant African American adolescents. The increases in condom use observed among intervention participants is important given the high and increasing birth rate among African American females, the high prevalence of STDs, including HIV, among this population, particularly in the Southern U.S., and the adverse complications and outcomes associated with HIV/STDs during gestation and delivery.¹⁵⁻¹⁷ These findings add to the collective empirical database indicating that HIV/STD behavioral interventions can be efficacious, even for high risk, pregnant adolescents.

The efficacy of the intervention may be attributable, partly, to conceptualizing HIV/STD risk-reduction strategies within a broader culturally- and gender-appropriate framework designed to enhance adolescents' ethnic pride. Enhancing ethnic pride may personalize the risk of HIV/STD not only to the individual adolescent, but frames the HIV/STD epidemics in the broader cultural context of the threat posed to young African American women in their community and, more broadly, as a health disparity that disproportionately impacts African Americans. By framing the HIV/STD epidemics within this cultural context, adolescents may have been motivated to adopt safer sex practices and psychosocial mediators associated with safer sex practices not only for themselves, but also for their unborn child, their family, and their community. To our knowledge, this is the first HIV/STD prevention intervention to demonstrate enhancement of ethnic pride.

The intervention also emphasized cognitive and behavioral factors historically known to influence adolescents' HIV/STD risk. The intervention promoted skills designed to enhance negotiation with male sex partners, emphasizing persuasive communication techniques, used modeling and interactive learning exercises, including male health educators, to enhance role play realism. Interactive learning opportunities fostered skills designed to encourage male partner condom use and promote norms supportive of condom use during pregnancy as a strategy to reduce risk of HIV/STD to themselves and their unborn child. The use of multiple intervention modalities and strategies, working in concert, may partly account for the observed intervention effect on sexual behaviors.

Limitations

The study is not without limitations. First, the findings may not be applicable to pregnant African American adolescents with different sociodemographic characteristics or risk profiles

(e.g., injecting drug users). Another methodological concern is the reliability of self-reported outcome measures (i.e., sexual behaviors and psychosocial scales). While previous research has, however, established the validity and reliability of self-report sexual behavior,²⁸⁻³⁰ specifically for young African American women,³¹⁻³² similar studies have not been conducted with pregnant African American adolescents. Another limitation was that the comparison condition was not a true control as all participants received prenatal counseling which included HIV/STD prevention education. Thus, the provision of HIV/STD risk reduction education may have reduced the study's capacity to detect significant changes in participants' condom use and psychosocial mediators. Additionally, whether the findings are generalizable to other geographic regions of the U.S. is undetermined. The findings are also limited by attrition, despite statistical assurances that attrition bias did not occur. Furthermore, the small sample size reduces precision of effect estimates and confidence intervals. Larger studies, conducted in other regions with improved retention rates are needed to corroborate these findings. And, finally, data were not collected to determine whether these behavioral changes were sustained post-partum. Thus, subsequent studies, designed to replicate and expand this study, could evaluate whether intervention effects, observed during pregnancy are durable, and maintained post-partum.

Conclusion

Numerous challenges confronting the development of a prophylactic HIV vaccine suggest that an effective vaccine may not be available in the foreseeable future.³³ In the absence of a vaccine, there is a clear, cogent, and compelling need to develop new and innovative intervention research to optimize intervention effectiveness for vulnerable populations to reduce their risk for HIV infection.³⁴ This is a particularly salient need for pregnant African American adolescents, a vulnerable subgroup of adolescents. The value of such programs is greatly magnified by the immediate public health benefit of averting HIV/STD-associated pregnancy complications as well as complications occurring during delivery.

Because pregnant adolescents are an underserved and understudied population with respect to HIV/STD prevention efforts, these findings may help to address a marked disparity in prevention practice --- a disparity that is exacerbated through the magnified risk of HIV/STD acquisition experienced by African Americans.³⁵ Ultimately, HIV/STD prevention interventions designed for pregnant African American adolescents, demonstrated to be efficacious in reducing HIV/STD-associated sexual behaviors and enhancing HIV/STD-prevention mediators, need to be disseminated, scaled up, and integrated into existing prenatal programs to achieve their promise in reducing HIV/STD risk.

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Figure 1. Participant Allocation and Retention Table

Table 1
Sample items from the survey

Sample survey question
Partner Communication Questions
During the last 6 months, how many times have you and your sex partner discussed...
....how to prevent STDs?
....your partner's sex history?
With a boyfriend or steady partner (that you've had sex with before) how hard is it for you to...
...ask if he would use a condom?
...refuse to have sex if he won't wear a condom?
I have been worried that if I talk about using condoms, my boyfriend or sex partner would...
....threaten to leave me.
....go out with other girls.
I feel confident that....
....I could easily suggest using condoms to a sex partner even if we hadn't used condoms in the past.
...I could easily refuse to have sex with someone who didn't use a condom.
Ethnic Pride
I am proud to be Black.
I have spent time trying to find out more about Black history, traditions and culture.
I am active in Black organizations or social groups.
Health Relationships
Your boyfriend wants to know your opinion about things.
Your boyfriend expects you to do things his way because he takes care of you.

Table 2
Baseline comparison between the intervention and comparison condition

Characteristics	HIV/STD Prevention Intervention Condition (n = 85)	Enhanced Standard-of- care Healthy Nutrition Comparison Condition (n = 85)	P-value
Sociodemographics			
Age, mean (SD), y	17.9 (1.6)	17.8 (1.7)	.70
Weeks pregnant at enrollment, mean (SD)	10.74 (3.63)	10.89 (3.57)	.77
Highest grade, mean (SD)	10th (1.2)	10th (1.2)	.63
Dropped out of school	44.7%	44.7%	.60
Not currently in school	60.0%	54.1%	.28
Live with mother	43.5%	44.7%	.66
Family AFDC recipient	27.7%	21.3%	.32
Psychosocial mediators, mean (SD)			
Condom use self-efficacy	33.89 (9.21)	33.55 (9.36)	.65
Partner communication self-efficacy	21.66 (2.93)	22.32 (3.24)	.24
Partner communication frequency	6.28 (3.82)	6.38 (3.59)	.86
Condom negotiation self-efficacy	14.07 (2.82)	14.28 (2.08)	.58
Fear of condom negotiation	6.66 (3.15)	6.52 (1.76)	.72
Ethnic identity	37.20 (4.19)	38.00 (4.14)	.24
Healthy relationships	26.31 (4.42)	25.54 (4.53)	.26
Condom attitudes	42.23 (5.85)	42.00 (6.24)	.80
STD knowledge	32.22 (4.00)	32.55 (3.83)	.58
Sexual behaviors			
Age 1 st willing sex, mean (SD)	14.7 (1.7)	14.8 (1.9)	.91
Consistent condom use in past 14 d	13.0%	15.9%	.63
Condom use during last sex	28.4%	28.2%	.98
Covariates			
Depression, mean (SD)	6.10 (5.46)	7.46 (6.21)	.14
Social support, mean (SD)	41.44 (9.29)	43.13 (8.33)	.21
Gender norms, mean (SD)	18.00 (4.83)	18.23 (4.91)	.76
Self-esteem, mean (SD)	33.20 (5.44)	33.34 (4.97)	.86
Body image, mean (SD)	27.65 (5.00)	27.66 (5.51)	.99

Table 3
Effects of the intervention on HIV/STD-preventive psychosocial mediators

	HIV/STD Intervention		Comparison Condition		P value
	Baseline	Follow-up ^b	Baseline	Follow-up ^b	
Psychosocial Mediators					
Sexual communication frequency	6.27	7.62	6.74	6.41	0.03
Ethnic pride	37.58	42.73	38.69	41.68	0.04
Refuse sex without condom	3.36	3.54	3.65	3.42	0.05
Fear of boyfriend leaving because of demanding condom use ^a	1.05	1.02	1.04	1.28	0.06

^aThis item is scored such that higher scores indicate more fear

^bFollow-up means are adjusted by condition, cohort, school enrollment, living with boyfriend, physical abuse by boyfriend during pregnancy, boyfriends desire for pregnancy, locus of control, depression, social support, and worry about STDs.