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Sexual risk behaviors among African American and Hispanic women in five counties in the southeastern United States—2008-09

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Abstract

Purpose—We examined sexual risk behaviors and unrecognized HIV infection among heterosexually active African American (AA) and Hispanic women.

Methods—Women not previously diagnosed with HIV infection were recruited in rural counties in North Carolina (AA) and Alabama (AA), and an urban county in southern Florida (Hispanic) using multiple methods. They completed a computer-administered questionnaire and were tested for HIV infection.

Results—Between October 2008 and September 2009, 1527 women (1013 AA and 514 Hispanic) enrolled in the study. Median age was 35 years (range 18-59), 33% were married or living as married, 50% had an annual household income of \$12,000 or less, and 56% were employed full or part time. Two women (0.13%) tested HIV-positive. In the past 12 months, 19% had been diagnosed with a sexually transmitted disease (other than HIV), 87% engaged in unprotected vaginal intercourse (UVI), and 26% engaged in unprotected anal intercourse (UAI). In multivariate analysis, UAI was significantly ($p < 0.05$) more likely among those who reported: ever being pregnant, binge drinking in the past 30 days, ever exchanging sex for things needed or wanted, engaging in UVI, or being of Hispanic ethnicity. UAI was also more likely to occur with partners with whom women had a current or past relationship as opposed to casual partners.

Conclusions—A high percentage of our sample of heterosexually active women of color had recently engaged in sexual risk behaviors, particularly UAI. More research is needed to elucidate the interpersonal dynamics that may promote this high-risk behavior. Educational messages that explicitly address the risks of heterosexual anal intercourse need to be developed for heterosexually active women and their male partners.

Introduction and Background

About 25% of people living with HIV infection in the United States are women (Centers for Disease Control and Prevention [CDC], 2010). African American and Hispanic women represent 80% of all females diagnosed with HIV/AIDS in the U.S. (CDC, 2011). In 2008, compared with the prevalence of HIV infection among non-Hispanic white women (45 per 100,000), the prevalence among African American women (803 per 100,000) was almost 18 times as high, and among Hispanic women (248 per 100,000) 6 times as high (CDC, 2011).

Heterosexual sex is the primary mode of HIV acquisition among women (CDC, 2011). Risk factors for HIV infection among women of color include, but are not limited to, lower education and income, drug use, history of sexually transmitted infections (STIs), exchange sex, multiple sexual partners, inconsistent condom use, and violence victimization (Adimora et al., 2006; Amaro & Raj, 2000; Amaro, 1995; Javanbakht et al., 2010; Marin, Tschann, Gomez, & Gregorich, 1998; McNair & Prather, 2004; Moreno, El-Bassel, & Morrill, 2007; Nyamathi & Stein, 1997; Pulerwitz, Amaro, De, Gortmaker, & Rudd, 2002; Suarez & Siefert, 1998; Wingood & DiClemente, 1997; Wohl et al., 2002; Yeakley & Gant, 1997). Studies also suggest that aspects of women's sexual relationships and social/structural determinants (e.g., power dynamics, gender roles, financial decision making, communication patterns) may be important determinants of risk, both for engaging in behaviors and for doing so with partners that inadvertently place them at increased risk for HIV infection (Amaro & Raj, 2000; Krishnan et al., 2008; McNair et al., 2004; Sanders-Phillips, 2002; Suarez-Al-Adam, Raffaelli, & O'Leary, 2000; Zierler & Krieger, 1997). Furthermore, sexual contact networks, in particular how partner availability and choice may influence risk-taking behaviors, have important implications for HIV transmission (Adimora & Schoenbach, 2005; Doherty, Padian, Marlow, & Aral, 2005; Liljeros, Edling, & Nunes Amaral, 2003).

Most of the HIV epidemiologic and behavioral studies of women of color have focused on women who are at increased risk (e.g., drug users, sex workers, STI clinic attendees), pregnant women, HIV infected women, and adolescent females sampled in large urban settings with high HIV prevalence. Findings from those studies may not reflect the experiences or risks of heterosexually active women of color who do not meet high-risk inclusion criteria and who live in less urban or nonurban areas. In particular, there is limited understanding of sexual and drug-use behaviors, correlates of unsafe sex, and unrecognized HIV infection among women of color living in the southern U.S. despite increasing rates of new HIV diagnoses in this region (Fleming, Lansky, Lee, & Nakashima, 2006).

To address these issues, we conducted a cross-sectional epidemiologic study of heterosexually active African American women in rural counties of Alabama and North

Carolina and Hispanic women in an urban county in southern Florida who had not previously been diagnosed with HIV infection. We tested participants for HIV to identify those who were infected and unaware of it. With data collected in a questionnaire, we characterized participants on a broad range of demographic, interpersonal, and behavioral factors and examined their associations with the sexual behavior that carries the highest risk for women acquiring HIV infection, namely, heterosexual anal intercourse (AI). Per act, unprotected anal intercourse (UAI) among women carries five times as great a risk as unprotected vaginal intercourse (UVI) for contracting HIV infection (Varghese, Maher, Peterman, Branson, & Steketee, 2002). It is also a strong risk factor for other STIs (Halperin, 1999) as well as abnormal anal cytology (Holly et al., 2001) and anal cancer (Frisch et al., 1997) in women.

Methods

Overview

The study was conducted in two contiguous rural counties in northeastern Alabama, in two contiguous rural counties in eastern North Carolina, and in one urban county in southern Florida. We recruited African American women in Alabama and North Carolina, and Hispanic women in Florida (see below). Recruitment, screening, and enrollment were conducted from October 2008 through September 2009. Recruiters, data collectors, and HIV test counselors were matched with participants on race/ethnicity and gender, and study staff at the Florida site were bilingual (English and Spanish). The study session consisted of a 45-minute audio computer-assisted self-interview (ACASI) followed by a rapid oral HIV test and counseling. Enrollees provided written informed consent for both the ACASI and the HIV testing. Each woman was assigned a unique study identification number that linked all sources of data (i.e., screening, enrollment, ACASI, HIV test result). Participants received a \$50 gift certificate for completing the study visit. The study was approved by the CDC and local Institutional Review Boards as well as the U.S. Office of Management and Budget.

Eligibility

Eligibility screening was conducted using hand-held personal digital assistants (PDAs) at recruitment venues or over the telephone. Women were eligible for the study if they: were born a female, self-identified as African American (AL and NC) or Hispanic (FL), were between 18-59 years of age (19-59 in AL due to age of majority laws in that state), reported vaginal or anal intercourse with a man in the past 12 months, were not previously diagnosed as HIV infected, were willing to be tested for HIV using rapid oral testing, were willing and able to give informed consent, and understood English (AL and NC) or either English or Spanish (FL).

Recruitment

Using convenience sampling, women were recruited through multiple methods, including venue-based recruitment (Muhib et al., 2001), advertisements in locally posted flyers, a participant-referral incentive system similar to respondent-driven sampling (Heckathorn, 2002), and word-of-mouth referral without incentives.

For venue-based recruitment, each local study team identified a universe of potential venues for recruiting the women (e.g., beauty salons, laundromats, shopping centers, churches, local community organizations, educational/training facilities, bars/clubs, transportation centers, and health clinics). To assess the viability of venues for recruitment, we estimated the number of potentially eligible women at these venues during designated day and time periods with brief intercept interviews (e.g., asking about age, race, ethnicity, recent sexual activity with a man, willingness to undergo rapid oral HIV testing, and interest in participating in an HIV study). Venues were eliminated if they had less than five women of the target population observed during a three-hour period. Remaining venues were assigned a category code indicating the type of venue (e.g., entertainment, public and social services, shopping, health services, neighborhood). Each week, eligible venues from at least five categories were selected randomly as recruitment sites. Women, who appeared to meet the age and race (NC and AL) or ethnicity (FL) criteria, were purposively approached at these recruitment locations. Recruitment flyers informing women of the study and providing a telephone number to call for more information were also posted in the venues.

Women who enrolled in the study were given the opportunity to recruit other women. Those who were interested received a brief training about recruitment and were given three referral coupons valid for 30 days. Participant recruiters received a \$15 gift certificate for each eligible referral that completed the study (capped at three referrals).

Data collection

The study session was conducted either in a private room in a study office (located at a university, community-based organization, church) or in a study mobile unit. The mobile unit was a customized recreational vehicle parked at selected venues (with prior approval) to accommodate on-the-spot recruitment as well as scheduled study appointments. The vehicle had two private spaces for ACASI data collection and a separate room for HIV counseling and testing. Staffing in the vehicle included a female research assistant, a female rapid oral HIV testing counselor, and a driver (usually male).

The ACASI instrument collected participant-reported data on an array of demographic (e.g., age, education, marital status, income, employment, pregnancy, incarceration), interpersonal (e.g., violence, forced sex, partner type, partner demographics and risks), and behavioral variables (e.g., HIV testing, drug use, sex exchange, STI history, number of male sexual partners, sexual debut, vaginal sex, anal sex, partner concurrency). Women provided information on sexual behaviors and the number of sex partners in the past 12 months. Additionally, the women provided partner-specific information about the characteristics of and sexual behaviors with up to three of their most recent male sex partners in the past 12 months.

After completing the ACASI, women were administered an OraQuick*Advance*® rapid oral HIV testing by certified staff and participated in counseling according to local, state, and CDC recommendations. Women who had a reactive/preliminary positive result provided a second specimen (either oral or blood) for confirmatory Western blot testing. Women with a preliminary positive test result received counseling and were introduced to a case manager for assistance in entering HIV-related medical care.

Statistical analyses

Descriptive analyses examined enrollment rates and reasons for ineligibility. Women were characterized according to method of recruitment into the study and on demographic and behavioral variables assessed with the ACASI. We used chi-square tests to examine differences on the demographic and behavioral variables by research site.

Correlates of UAI in the past 12 months and UAI with their most recent partner were examined in separate multiple logistic regression models. A backward elimination procedure was used to remove variables that did not reach a p-value < 0.05. Because this procedure removes cases with missing data on any variable, we created a final model with only those variables that were significant so as to maximize the analytic sample size. Unadjusted and adjusted odds ratios (OR, adjOR) and 95% confidence intervals (CI) are presented.

In a separate set of analyses, we examined whether demographic or behavioral variables interacted with research site (NC, AL, FL) in predicting UAI in the past 12 months. Each variable was screened individually in a model that included two main effect terms (site, variable) and a single interaction term (site by variable). Interactions that reached a p-value < 0.10 were then examined one at a time in a multiple logistic regression model that included all of the significant correlates from the final model described above.

To examine whether UAI was more likely to occur with a specific type of partner, we conducted a partner-specific analysis using data the women provided on their most recent male partner. The dependent variable was occurrence of UAI with that partner. The partner was classified as a (1) casual partner (i.e., off-and-on partners, party partners, hook-ups) [referent], (2) husband, (3) boyfriend/fiancé/friend, or (4) ex-husband/ex-boyfriend. All analyses were conducted with SAS Software, Version 9.2 (Cary, NC).

Results

Participation rates, representation of catchment areas, and methods of recruitment

Of 2018 women approached, only three declined to be screened for eligibility. Of those screened, 90% (1821/2015) met the inclusion criteria, and 84% of these eligible women (1527/1821) enrolled (Table 1). Enrollment rates were similar in North Carolina (88%) and Alabama (90%), and slightly lower in Florida (75%). At each location, the most common reason for ineligibility was that women had not engaged in heterosexual vaginal or anal intercourse in the prior 12 months. Twenty women were ineligible because they reported that they had been diagnosed with HIV infection.

Women were recruited through several methods (Table 2). Forty percent were recruited through the participant-referral procedure and 41% by word of mouth. In the counties in which women were recruited, over half (range: 51-58%) of the zip codes in those counties were represented among participants.

Demographic characteristics of the participants

Approximately 84% (430/514) of the Hispanic women from Florida were born outside the U.S. The median age when they first moved to the U.S. was 27 (range <1-55 years). Of

those born outside of the U.S., 42% were from a South American country, 24% from Central America, 23% from Cuba, and 11% from other countries, including Mexico, Puerto Rico, and the Dominican Republic.

Overall, the median age of the participants was 35 years (range 18-59), 14% were college graduates, 33% were married or living as married, 50% had an annual income of \$12,000 or less, and 56% were employed full or part time. Differences by research site are shown in Table 2. Seventeen percent had been incarcerated (jail or prison) at least once for at least 24 hours in their lifetime; African American women were two times more likely than Hispanic women to report an incarceration history.

Behavioral characteristics of the participants

Table 3 displays the behavioral characteristics of the women. Overall, 73% of the women reported that they previously had been tested for HIV infection and, of these, 40% had been tested in the past 12 months. Nineteen percent of the women had been diagnosed with a STI, excluding HIV, in the past 12 months (NC: 29%; AL: 22%; FL: 8%).

Twenty-one percent reported binge drinking (5 or more drinks in a single day) in the past 30 days and 19% had used one or more non-injected illicit drug(s) in the past 12 months (NC: 23%; AL: 25%; FL: 9%); only one woman (from FL) had injected an illicit drug.

Overall, 21% had been physically hurt or threatened by a male sex partner at least once (similar across sites), and 26% of the women reported that they experienced unwanted or forced sex at least once in their lifetime (NC: 30%; AL: 31%; FL: 18%). Thirteen percent had exchanged sex for things they needed or wanted (NC: 16%; AL: 13%; FL: 8%).

In the preceding 12 months, 87% engaged in UVI (NC: 90%; AL: 90%; FL: 82%) and 26% engaged in UAI (NC: 24%; AL: 22%; FL: 31%). Of the women engaging in AI, almost all (91%) reported inconsistent condom use (one or more instances of UAI); the majority (64%) who engaged in AI never used a condom.

In reporting on the three most recent sex partners in the past 12 months, the women described a total of 2186 sexual partnerships. The proportion of women who provided information about one, two, or three partners was 69%, 18%, and 13% respectively. Of the total number of partners identified, most were boyfriend/fiancé/friend (49%) or were husbands (25%); fewer were ex-husbands/ex-boyfriends (11%) or casual partners (15%). Two percent of the women indicated that one or more of their male partners was “probably” or “definitely” having sex concurrently with men; 44% reported that one or more of their male partners was “probably” or “definitely” having sex concurrently with other women.

Results of HIV testing in the study

Two of the 1527 participants (0.13%), one from Alabama and one from Florida, tested HIV-positive (confirmed). One of the women reported having 10 male partners in the past 12 months, some of unknown HIV serostatus, and engaged in UVI but not UAI with four of the 10. The other woman reported two male partners in the past 12 months, both of unknown HIV status; she engaged in UAI and UVI with both partners.

Correlates of unprotected anal intercourse

The multiple logistic regression analysis using backward elimination of variables identified several independent correlates of UAI in the past 12 months (Table 4). The odds of UAI were lower among women from Alabama and North Carolina (vs. Florida). The odds of UAI were higher among women who had ever been pregnant, reported binge drinking in the past 30 days, ever exchanged sex, and reported UVI in the past 12 months.

In the analysis of UAI with the most recent partner, women had significantly higher odds of engaging in UAI with a husband (adjOR = 2.46, 95% CI, 1.41, 4.29), boyfriend/fiancé/friend (adjOR = 2.19, 95% CI, 1.28, 3.73), or ex-husband/ex-boyfriend (adjOR = 2.65, 95% CI, 1.39, 5.04) compared with casual partners. The other significant correlates in this partner-specific analysis matched those identified in the previous multivariate analysis of UAI in the past 12 months.

Tests of interactions

In the tests of interaction effects involving research site, only one interaction was significant in the multivariate model (site by history of pregnancy, $p = 0.02$). UAI in the past 12 months was more likely among women who had previously been pregnant compared to never pregnant in the Florida sample (34% vs. 17%) and in the Alabama sample (25% vs. 11%), but not in the North Carolina sample (24% vs. 25%).

Discussion

A large percentage of women in our sample engaged in sexual behaviors that placed them at risk for HIV infection, and there some notable differences between the African American and Hispanic women. In the 12 months preceding enrollment, 87% engaged in UVI and 26% engaged in UAI (higher among Hispanic women than African American women). Among women who engaged in AI, 91% reported inconsistent condom use. UAI was more likely to occur with partners with whom women had a current or past relationship as opposed to casual partners. Nineteen percent of the women reported that they had been diagnosed with an STI in the past 12 months. The STI percentage was higher among the African American women. Also, a larger percentage of these women (compared with the Hispanic women) had a younger sexual debut, had more sex partners in the past 12 months, had ever experienced unwanted or forced sex, and had ever engaged in exchange sex. Some of these differences (e.g., more sex partners) may have occurred because a larger percentage of the African American women were single and younger than the Hispanic women. Social, cultural, and economic factors may have also contributed to these behavioral differences.

It is important to view our findings on AI in the context of other studies that have examined this behavior. In a 1997-2001 population-based study of risk factors for heterosexual HIV transmission in North Carolina, 18% of HIV-positive and 10% of HIV-negative African American women reported having had AI in the past 10 years (Adimora et al., 2006). The National Survey of Family Growth, a nationally representative survey among women 15-44 years of age conducted in 2002, found that 23% of Hispanic women, 22% of African

American women, and 34% of white women had ever engaged in AI (Mosher, Chandra, & Jones, 2005).

In the 2009 National Survey of Sexual Health and Behavior, 21% of the 18-39 year old women in the sample (69% of whom were white) engaged in AI in the past 12 months (Herbenick et al., 2010). Other studies have focused on higher-risk populations. Among 18-25 year old women of color from a study conducted in 2006-08 in Hartford, CT and Philadelphia, PA in neighborhoods with high STI and teen pregnancy rates, 42% of the Puerto Rican women and 26% of the African American women reported they engaged in AI at least once and that the behavior was more likely to occur with “serious” than “casual” partners (Carter, Henry-Moss, Hock-Long, Bergdall, & Andes, 2010). Among clients attending STI clinics in Los Angeles County in 2006-07, 14% of the white women, 13% of the Hispanic women, and 8% of the African American women engaged in AI in the past 90 days (Javanbakht et al., 2010). The results of these studies, including our own, cannot be directly compared because of demographic and methodological differences. Taken as a whole, however, the findings indicate that AI is practiced among some heterosexual women regardless of race or ethnicity.

Despite the relatively high percentage of women in our sample who engaged in sexual behaviors that put them at risk, we found only two cases (0.13%) of unrecognized HIV infection among our 1527 participants. One possible explanation is that the absence of reported HIV infected sexual partners may account for the low percentage of unrecognized infection. The entry of HIV infected men into these women’s sexual networks would increase their risk for acquiring HIV if they continue to engage in high-risk sexual behaviors, especially UAI. A second explanation might be that women who feared or suspected that they were HIV infected did not present for study screening. The perceived social, economic, and health-related risks of being diagnosed with a stigmatized disease might have discouraged these women from coming forward for screening.

UAI was associated with other high-risk activities such as binge drinking, ever having engaged in exchange sex, and UVI. We also found that prior pregnancy increased the odds of engaging in UAI (in FL and AL, but not NC), which may indicate that some women may have used AI as a birth control method or that AI was introduced early as a birth control method and it became part of their sexual repertoire. Other studies have found that in addition to pregnancy prevention (Halperin, 1999; Maynard et al., 2009; McBride & Fortenberry, 2010), motivations for AI include pleasure seeking (Carter et al., 2010; Maynard, Carballo-Dieiguez, Ventuneac, Exner, & Mayer, 2009), sexual experimentation (Gorbach et al., 2009), intimacy (Carter et al., 2010; Maynard et al., 2009), shifting cultural norms (Halperin, 1999; McBride & Fortenberry, 2010), avoiding vaginal sex during menses (Frederick et al., 2009; Hensel, Fortenberry, & Orr, 2010; Mackesy-Amiti, Mckirnan, & Ouellet, 2010), and power relationships (Halperin, 1999; Koblin et al., 2010; Mackesy-Amiti et al., 2010).

The correlates of UAI we identified in heterosexually active women of color in non-urban areas of Alabama and North Carolina and in south Florida are similar to correlates identified in higher-risk women residing in large cities. A study of 436 high-risk (i.e., resided or had

social connections in areas with both high prevalence of HIV infection and poverty) heterosexual women in New York City found that UAI was associated with five risk factors: frequent drug use, binge alcohol use, partnerships with incarcerated men, exchange sex partnerships, and multiple partnerships (Jeness et al., 2010). A study of women attending 13 public STI clinics in Los Angeles County found that three factors were associated with AI among women of diverse race/ethnicity: having both male and female sex partners, exchange of drugs or money for sex, and substance use (Javanbakht et al., 2010). Among African American women specifically, those who reported exchange of drugs or money for sex and anonymous sex were more likely to report AI within 90 days preceding their clinic visit (Javanbakht et al., 2010).

These findings, coupled with our own, point to specific risk factors that need attention in behavioral interventions for women and their male partners. Additionally, characteristics of our sample present important considerations for such interventions. First, 21% of our participants reported binge drinking. Comprehensive risk-reduction interventions for women and men should give attention to alcohol use, particularly binge drinking, as a risk factor for unsafe sexual practices. Second, most of our participants (69%) reported a single male partner in the past 12 months. Compared with women reporting multiple sexual partners, women with a single partner were 3.6 times (68% vs.19%) more likely to report UVI and almost 8 times (23% vs. 3%) more likely to report UAI. Moreover, among women with a single partner, 27% reported that they thought that their partner that was “probably” or “definitely” having concurrent sexual relations with another woman. Our findings suggest that interventions would benefit from including focused messages about sexual risk within the context of an ongoing relationship where partner exclusivity is desired or intended. Further, researchers should strive for a better understanding of the relationship dynamics that may promote AI among heterosexual men and women. As others have noted, interventions for heterosexual women need to devote more attention to AI as a risk factor for HIV infection (Brody & Potterat, 2004; Halperin, 1999; Martino, Collins, Elliott, Kanouse, & Berry, 2009; Potterat, Brewer, & Brody, 2008; Risser, Padgett, Wolverton, & Risser, 2009).

In clinical settings, inquiring about AI should be a standard practice in assessing risk behaviors among women. After establishing that a woman is sexually active, it is important to ask questions about the specific types of sexual activities that are taking place, including AI. Answers to these questions can help identify who would benefit most from educational messages about AI, risk-reduction counseling, and screening for anorectal STIs (e.g., human papillomavirus, gonorrhea, Chlamydia). Such screening occurs infrequently among women (Javanbakht et al., 2010). HIV testing may also be needed.

Our study had limitations. The African American women in our sample were from rural counties and included a large number of women with lower income. The Hispanic women were from one urban county in southern Florida and were predominately foreign-born. The county in southern Florida has a unique mix of Cuban, Caribbean, South American and Central American ancestries, which may not represent Hispanic women residing elsewhere. Our use of convenience sampling does not permit estimation of the prevalence of sexual and other risk behaviors in the larger communities from which the women were recruited.

Further, because women were asked highly sensitive questions about their own and their partners' behaviors it is possible that some women may have misreported some of their sexual behaviors. Encouragingly, relatively few refused to answer these questions and ACASI has been shown to be an effective tool for collecting sensitive data (Ghanem, Hutton, Zenilman, Zimba, & Erbedling, 2005; Kurth et al., 2004; Rogers et al., 2005). Some women may have under-reported their participation in AI due to the potentially stigmatizing nature of that behavior.

In conclusion, our study found that a relatively high percentage of African American women residing in rural counties in North Carolina and Alabama and Hispanic women from an urban county in southern Florida engaged in sexual behaviors including UAI, which placed them at increased risk for HIV infection. Clinicians should ask their female patients about AI and should conduct anorectal STI screening as well as HIV testing when indicated. More research is needed to understand the motivations and reasons for engaging in AI and to elucidate the interpersonal dynamics that promote the practice among heterosexual African American and Hispanic women. Such information will help guide the development of educational messages and the design of behavioral interventions to reduce the risks of heterosexual AI among women and their male partners. Most behavioral interventions have focused on women and men residing in large urban areas. More attention is needed to those residing outside of major cities, especially in the southeastern U.S.

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Table 1

Screening, Eligibility, and Enrollment Data in Five Counties in the southeastern US, 2008-09

	Total	African American women (NC)	African American women (AL)	Hispanic women (FL)
Women approached	2018	613	630	775
	n/N (%)	n/N (%)	n/N (%)	n/N (%)
Women screened ^a	2015/2018 (>99)	611/613 (>99)	629/630 (>99)	775/775 (100)
Women eligible ^b	1821/2015 (90)	571/611 (93)	567/629 (90)	683/775 (88)
Women enrolled (ACASI and HIV test) ^c	1527/1821 (84)	501/571 (88)	512/567 (90)	514/683 (75)
Women not eligible ^d	194/2015 (10)	40/611 (7)	62/629 (10)	92/775 (12)
Did not meet age criteria	32/194 (17)	7/40 (18)	4/62 (7)	21/92 (23)
No vaginal/anal sex past 12 mos	145/194 (75)	34/40 (85)	50/62 (81)	61/92 (66)
Previously diagnosed HIV+	20/194 (10)	5/40 (13)	1/62 (2)	14/92 (15)
Not willing to test for HIV	7/194 (4)	2/40 (5)	4/62 (7)	1/92 (1)
Other reasons ^e	11/194 (6)	1/40 (3)	2/62 (3)	8/92 (9)

Note: ACASI = Audio computer-assisted self-interview.

^a74.5% of women were screened by phone; 25.5% were screened in person.

^bFive women that screened eligible were deemed ineligible based on their ACASI survey responses. They were excluded from the analysis.

^cOne eligible woman declined enrollment. 288 eligible women not enrolled due to missed study appointments, failed contact attempts, transportation difficulties, etc.

^dWomen might be ineligible for more than one reason.

^eOther reasons for ineligibility: not Hispanic or Latina at Florida site; not African American or Black at North Carolina and Alabama sites; not born a female.

Table 2

Demographic Characteristics of Study Participants in Five Counties in the southeastern US, 2008-09

	Total sample n/N (%)	African American women (NC) n/N (%)	African American women (AL) n/N (%)	Hispanic women (FL) n/N (%)	χ^2
<i>Recruitment Source^a</i>					73.54**
Approached at venue	171/1500 (11)	89/489 (18)	51/500 (10)	31/511 (6)	
RDS coupon	596/1500 (40)	162/489 (33)	246/500 (49)	188/511 (37)	
Word-of-mouth	611/1500 (41)	202/489 (41)	179/500 (36)	230/511 (45)	
Flyer/Brochure/Saw study van/Other	122/1500 (8)	36/489 (7)	24/500 (5)	62/511 (12)	
<i>Demographics</i>					
Median age (range)	35 (18-59)	35 (18-59)	30 (19-59)	40 (18-59)	
Age categories (years)					72.80**
18-24	358/1527 (23)	102/501 (20)	168/512 (33)	88/514 (17)	
25-34	388/1527 (25)	145/501 (29)	136/512 (27)	107/514 (21)	
35-44	392/1527 (26)	143/501 (29)	112/512 (22)	137/514 (27)	
45 and older	389/1527 (26)	111/501 (22)	96/512 (19)	182/514 (35)	
Education					41.80**
Less than high school graduate	275/1522 (18)	81/501 (16)	83/511 (16)	111/510 (22)	
High school graduate/GED	551/1522 (36)	219/501 (44)	181/511 (35)	151/510 (30)	
Tech/trade school graduate; some college	484/1522 (32)	138/501 (28)	193/511 (38)	153/510 (30)	
College graduate	212/1522 (14)	63/501 (13)	54/511 (11)	95/510 (19)	
Marital status					144.64**
Single, never married	688/1523 (45)	279/501 (56)	285/510 (56)	124/512 (24)	
Married or living as married	508/1523 (33)	117/501 (23)	142/510 (28)	249/512 (49)	
Separated, divorced or widowed	327/1523 (22)	105/501 (21)	83/510 (16)	139/512 (27)	
Annual household income					28.57**
Less than \$6,000	333/1472 (23)	96/494 (19)	148/493 (30)	89/485 (18)	
\$6,001-\$12,000	392/1472 (27)	124/494 (25)	127/493 (26)	141/485 (29)	
\$12,001-\$24,000	432/1472 (29)	149/494 (30)	130/493 (26)	153/485 (32)	
More than \$24,000	315/1472 (21)	125/494 (25)	88/493 (18)	102/485 (21)	
Employed full or part time	856/1517 (56)	326/500 (65)	315/510 (62)	215/507 (42)	62.10**
Ever pregnant	1268/1527 (83)	430/501 (86)	415/512 (81)	423/514 (82)	4.40
Ever incarcerated ^b	263/1516 (17)	98/499 (20)	116/506 (23)	49/511 (10)	34.26**

Note. RDS = Respondent driven sampling. Sample sizes fluctuate slightly for some variables due to missing data. Some percents do not sum to 100 due to rounding. * $p < 0.05$;

** $p < 0.01$.

^aElectronic screening data missing for 27 participants.

^bIncarceration includes time in jail or prison.

Table 3

Behavioral Characteristics of Study Participants in Five Counties in the southeastern US, 2008-09

	Total sample n/N (%)	African American women (NC) n/N (%)	African American women (AL) n/N (%)	Hispanic women (FL) n/N (%)	χ^2
<i>HIV Testing History</i>					
Ever had HIV test	1115/1526 (73)	385/501 (77)	367/512 (72)	363/513 (71)	5.52
Had HIV test past 12 mos	441/1527 (29)	151/501 (30)	153/512 (30)	137/514 (27)	1.88
<i>STI Diagnoses</i>					
Diagnosed with STI (not HIV) past 12 mos ^e	297/1526 (19)	144/501 (29)	113/512 (22)	40/513 (8)	74.28**
<i>Alcohol/Drug Use</i>					
Binge drinking past 30 days ^a	323/1522 (21)	94/501 (19)	113/510 (22)	116/511 (23)	2.75
Non-injection drug use past 12 mos ^b					62.35**
None	1237/1527 (81)	382/501 (76)	383/512 (75)	472/514 (92)	
1 drug	235/1527 (15)	97/501 (19)	109/512 (21)	29/514 (6)	
2 or more drugs	55/1527 (4)	22/501 (4)	20/512 (4)	13/514 (3)	
Injection drug use past 12 mos ^c	1/1527 (<1)	0/501 (0)	0/512 (0)	1/514 (<1)	----
<i>Violence/Forced Sex</i>					
Ever physically hurt or threatened by male sex partner	324/1513 (21)	115/501 (23)	117/505 (23)	92/507 (18)	4.85
Ever experienced unwanted or forced sex	397/1512 (26)	149/501 (30)	157/505 (31)	91/506 (18)	27.11**
<i>Sexual Debut</i>					
Age at sexual debut (years)					172.99**
Less than 15	339/1510 (23)	147/496 (30)	133/505 (26)	59/509 (12)	
15-18	926/1510 (61)	314/496 (63)	328/505 (65)	284/509 (56)	
More than 18	245/1510 (16)	35/496 (7)	44/505 (9)	166/509 (33)	
Sexual debut before age 18 years with a partner at least 5 years older	194/1506 (13)	60/495 (12)	57/505 (11)	77/506 (15)	3.86
<i>Sexual Behavior</i>					
Ever engaged in exchange sex ^d	190/1515 (13)	81/501 (16)	67/506 (13)	42/508 (8)	14.69**
Number of male sex partners past 12 mos					33.40**
1 partner	1043/1518 (69)	335/500 (67)	314/510 (62)	394/508 (78)	
2 partners	275/1518 (18)	90/500 (18)	112/510 (22)	73/508 (14)	
3 or more partners	200/1518 (13)	75/500 (15)	84/510 (17)	41/508 (8)	
Concurrent male partners past 12 mos	249/1515 (16)	87/499 (17)	108/510 (21)	54/506 (11)	20.95**
VI past 12 mos ^f	1499/1506 (99)	495/497 (99)	506/507 (99)	498/502 (99)	----
UVI past 12 mos	1321/1514 (87)	447/499 (90)	458/509 (90)	416/506 (82)	17.39**

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	Total sample n/N (%)	African American women (NC) n/N (%)	African American women (AL) n/N (%)	Hispanic women (FL) n/N (%)	χ^2
Number of UVI partners past 12 mos					25.33**
None	193/1514 (13)	52/499 (10)	51/509 (10)	90/506 (18)	
1 partner	1033/1514 (68)	337/499 (68)	351/509 (69)	345/506 (68)	
2 or more partners	288/1514 (19)	110/499 (22)	107/509 (21)	71/506 (14)	
AI past 12 mos	427/1495 (29)	126/492 (26)	125/502 (25)	176/501 (35)	15.99**
UAI past 12 mos	388/1507 (26)	119/495 (24)	113/506 (22)	156/506 (31)	10.68**
Number of UAI partners past 12 mos					13.13*
None	1119/1507 (74)	376/495 (76)	393/506 (78)	350/506 (69)	
1 partner	345/1507 (23)	103/495 (21)	105/506 (21)	137/506 (27)	
2 or more partners	43/1507 (3)	16/495 (3)	8/506 (2)	19/506 (4)	
VI or AI with one or more HIV-positive or HIV- unknown male partners past					13.48**
12 mos ^g	509/1511 (34)	182/497 (37)	189/510 (37)	138/504 (27)	
<i>Partner Characteristics</i>					
Types of partners in past 12 mos ^h					----
Husband	540/2186 (25)	131/735 (18)	153/791 (19)	256/660 (39)	
Boyfriend, fiancé, friend	1064/2186 (49)	431/735 (59)	401/791 (51)	232/660 (35)	
Ex-husband/ex-boyfriend	251/2186 (11)	73/735 (10)	101/791 (13)	77/660 (12)	
Casual partner ⁱ	331/2186 (15)	100/735 (14)	136/791 (17)	95/660 (14)	
Type of partner in most recent sexual encounter					81.50**
Husband	516/1519 (34)	126/500 (25)	148/512 (29)	242/507 (48)	
Boyfriend, fiancé, friend	718/1519 (47)	288/507 (58)	264/512 (52)	166/507 (33)	
Ex-husband/ex-boyfriend	130/1519 (9)	35/500 (7)	48/512 (9)	47/507 (9)	
Casual partner ⁱ	155/1519 (10)	51/500 (10)	52/512 (10)	52/507 (10)	
Reported ^j her partner(s) had concurrent male partner(s) in past 12 mos	27/1513 (2)	6/500 (1)	11/57 (2)	10/506 (2)	1.51
Reported ^k her partner(s) had concurrent female partner(s) in past 12 mos	662/1513 (44)	237/500 (47)	269/507 (53)	156/506(31)	54.87**

Note. STI = sexually transmitted infections; VI = vaginal intercourse; UVI = unprotected vaginal intercourse; AI = anal intercourse; UAI = unprotected anal intercourse. Sample sizes fluctuate slightly for some variables due to missing data. Some percents do not sum to 100 due to rounding. Under the chi-squared column, dashes indicate that a valid chi-squared test could not be conducted due to extreme skewness of the variable (injection drug use, vaginal intercourse in past 12 months) or lack of independence of subgroups (types of sexual partners in the past 12 months).

* $p < 0.05$.

** $p < 0.01$.

^a 5 or more alcoholic drinks in single day.

^b Sniffed/swallowed/smoked Marijuana, Crack, Powder Cocaine, Heroin, Methamphetamine, club drugs (e.g., Ecstasy, Roofies, GHB), narcotics (e.g. Oxycontin, Vicodin, Dilaudid), downers (e.g. Ambien, Ativan, Valium, Xanax).

^c Injected Cocaine, Heroin, Speedball, Methamphetamine, Goofball, street Methadone.

^d Exchanged sex for things needed or wanted (e.g. money, food, shelter, drugs/alcohol, gifts/other).

^e Gonorrhea, Chlamydia, Syphilis, Trichomonas, genital HPV, bacterial vaginosis, pelvic inflammatory disease.

^f To be eligible to enroll in the study, women must have had vaginal or anal sex in the past 12 months. Seven participants reported only anal sex.

^g Only five participants reported vaginal or anal sex with an HIV-positive male partner.

^h Participants provided information on up to three of their most recent male partners in the past 12 months. The denominator for this variable is the total number of male partners reported (up to three per participant).

ⁱ Casual partners were off-and-on partners, men they party with, or hook-ups.

^j Participant reported that the partner(s) “probably” or “definitely” had concurrent male (or female) partners.

Table 4

Percent and Odds of Unprotected Anal Intercourse in Past 12 Months, Stratified by Study Variables^a, in Five Counties in the Southeastern US, 2008-09

	UAI n/N (%)	Unadjusted Results		Adjusted Results ^b	
		OR	95% CI	adjOR	95% CI
Site					
Florida	156/506 (31)	1.00		1.00	
North Carolina	119/495 (24)	0.71	0.54, 0.94	0.64	0.47, 0.86
Alabama	113/506 (22)	0.65	0.49, 0.86	0.55	0.40, 0.74
Recruitment source					
Approached at venue	34/169 (20)	1.00			
RDS coupon	152/588 (26)	1.38	0.91, 2.10		
Word-of-mouth	166/603 (28)	1.51	0.99, 2.29		
Flyer/Brochure/Saw study van/Other	29/120 (24)	1.27	0.72, 2.22		
Age (years)					
18-24	73/356 (21)	1.00			
25-34	110/385 (29)	1.55	1.10, 2.18		
35-44	110/385 (29)	1.55	1.10, 2.18		
45 and older	95/381 (25)	1.29	0.91, 1.82		
Education					
Less than high school graduate	97/268 (36)	1.00			
High school graduate/ GED	134/544 (25)	0.58	0.42, 0.79		
Tech/trade school graduate; some college	111/483 (23)	0.53	0.38, 0.73		
College graduate	45/209 (22)	0.48	0.32, 0.73		
Marital Status					
Single, never married	163/682 (24)	1.00			
Married or living as married	128/503 (26)	1.09	0.83, 1.42		
Separated/divorced/widowed	97/318 (31)	1.40	1.04, 1.88		
Annual income					
Less than \$6000	104/327 (32)	1.00			
\$6001 - \$12,000	102/387 (26)	0.77	0.56, 1.06		
\$12,001 - \$24,000	103/430 (24)	0.68	0.49, 0.93		
More than \$24,000	68/314 (22)	0.59	0.42, 0.85		
Employment					
Not employed full or part time	185/647 (29)	1.00		1.00	
Full or part time employment	197/852 (23)	0.75	0.60, 0.95	0.82	0.64, 1.06
Ever pregnant					
No	44/257 (17)	1.00		1.00	
Yes	344/1250 (28)	1.84	1.30, 2.60	1.56	1.08, 2.34
Ever incarcerated					
No	307/1244 (25)	1.00			

	UAI n/N (%)	Unadjusted Results		Adjusted Results ^b	
		OR	95% CI	adjOR	95% CI
Yes	78/254 (31)	1.35	1.01, 1.82		
HIV testing past 12 mos					
No	275/1071 (26)	1.00			
Yes	113/436 (26)	1.01	0.79, 1.31		
Binge drinking past 30 days					
No	271/1188 (23)	1.00		1.00	
Yes	115/316 (36)	1.94	1.48, 2.53	1.60	1.21, 2.12
Non-injection drug use past 12 mos					
None	300/1222 (25)	1.00			
1 drug	68/232 (29)	1.27	0.93, 1.74		
2 or more drugs	20/53 (38)	1.86	1.05, 3.30		
Ever physically hurt or threatened by male sex partner					
No	277/1179 (24)	1.00			
Yes	104/317 (33)	1.59	1.21, 2.08		
Ever experienced unwanted or forced sex					
No	264/1104 (24)	1.00			
Yes	118/390 (30)	1.38	1.07, 1.78		
Participant's age at sexual debut (years)					
Less than 15	100/336 (30)	1.00			
15-18	230/917 (25)	0.79	0.60, 1.04		
More than 18	54/240 (23)	0.69	0.47, 1.01		
Sexual debut before age 18 years with a partner at least 5 years older					
No	324/1300 (25)	1.00			
Yes	59/190 (31)	1.36	0.97, 1.89		
Ever engaged in exchange sex					
No	308/1316 (23)	1.00		1.00	
Yes	73/182 (40)	2.19	1.59, 3.03	1.57	1.10, 2.24
Diagnosed with STI (not HIV) past 12 mos					
No	305/1212 (25)	1.00			
Yes	83/294 (28)	1.17	0.88, 1.56		
Number male partners past 12 mos					
1 partner	225/1037 (22)	1.00			
2 partners	86/273 (32)	1.66	1.24, 2.23		
3 or more partners	75/195 (39)	2.26	1.63, 3.12		
Concurrent male partners past 12 mos					
No	296/1255 (24)	1.00			
Yes	89/247 (36)	1.83	1.37, 2.44		
Number of UVI partners in past 12 mos					
None	16/193 (8)	1.00		1.00	

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	UAI n/N (%)	Unadjusted Results		Adjusted Results ^b	
		OR	95% CI	adjOR	95% CI
1 partner	255/1023 (25)	3.67	2.16, 6.25	3.89	2.24, 6.75
2 or more partners	114/285 (40)	7.38	4.20, 12.96	6.89	3.79, 12.51
VI or AI with one or more HIV-positive or HIV unknown male partners ^c					
No	239/995 (24)	1.00			
Yes	143/504 (28)	1.25	0.98, 1.60		
Reported ^d partner(s) had concurrent male partner(s) in past 12 mos					
No	373/1473 (25)	1.00			
Yes	12/26 (46)	2.53	1.16, 5.52		
Reported ^d partner(s) had concurrent female partner(s) in past 12 mos					
No	209/844 (25)	1.00			
Yes	176/655 (27)	1.12	0.88, 1.41		

Note. STI = sexually transmitted infection; UVI = unprotected vaginal intercourse; VI = vaginal intercourse; AI = anal intercourse; OR = odds ratio; adjOR = adjusted odds ratio; CI = confidence interval. For some variables, the denominators in Table 4 differ slightly from Tables 2 or 3 due to missing data on the anal intercourse variable.

^aThe following variables were not included: injection drug use and vaginal intercourse (due to extreme skewness), number of UAI partners (it was tied too closely to the outcome variable), and type of sexual partner in most recent encounter (this variable was examined in a separate model described in the text).

^bBased on a multiple logistic regression analysis (N = 1482) that included only those variables identified as significant ($p < 0.05$) in a backward elimination procedure that screened all variables in this table.

^cOnly five participants reported vaginal or anal sex with an HIV-positive male partner.

^dParticipant reported that the partner(s) “probably” or “definitely” had concurrent male (or female) partners.