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Prevalence and correlates of knowledge of male partner HIV testing and serostatus among African-American women living in high poverty, high HIV prevalence communities (HPTN 064)

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Abstract

Knowledge of sexual partners' HIV infection can reduce risky sexual behaviors. Yet, there are no published studies to-date examining prevalence and characteristics associated with knowledge among African-American women living in high poverty communities disproportionately affected by HIV. Using the HIV Prevention Trial Network's (HPTN) 064 Study data, multivariable logistic regression was used to examine individual, partner, and partnership-level determinants of women's knowledge (n=1,768 women). Results showed that women's demographic characteristics alone did not account for the variation in serostatus awareness. Rather, lower knowledge of partner serostatus was associated with having two or more sex partners (OR=0.49, 95%CI: 0.37-0.65), food insecurity (OR=0.68, 95%CI: 0.49-0.94), partner age>35 (OR=0.68, 95%CI: 0.49-0.94), and partner concurrency (OR=0.63, 95%CI: 0.49-0.83). Access to financial support (OR=1.42, 95%CI: 1.05-1.92) and coresidence (OR=1.43, 95%CI: 1.05-1.95) were associated with higher knowledge

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of partner serostatus. HIV prevention efforts addressing African-American women's vulnerabilities should employ integrated behavioral, economic, and empowerment approaches.

Keywords

knowledge; male sexual partner; HIV; serostatus; African-American women

Introduction

Knowledge of sexual partners' infection with the human immunodeficiency virus (HIV) is a key component of comprehensive HIV prevention strategies and has important implications in the effective control of the epidemic in the United States (U.S.) and abroad [1, 2]. Awareness of a partner's HIV status through disclosure and notification can lead to reductions in risky sexual behaviors, such as inconsistent or no condom use [3-10], multiple sex partners [3, 7, 9, 11], casual sex exchange [11], and substance abuse prior to or during sexual intercourse [7, 9, 11]. Knowledge of a sex partner's HIV status can also influence individuals' perception of sexual risk, facilitate joint sexual decision-making among couples, and motivate untested partners to use HIV testing and counseling services [1, 11, 12].

However, given what is known regarding the association between knowledge of partner serostatus and sexual risk behaviors, no published studies to-date have examined lower-income African-American women's awareness of male partners' HIV serostatus, and the characteristics associated with whether such women discuss HIV testing and subsequent results with their partners. These data limitations persist despite disproportionate rates of HIV infection among African-American women compared to women of other racial and ethnic groups. According to the most recent estimates from the Center for Disease Control and Prevention, African-American women represent 12% of the U.S. population of women, but account for 64% of new HIV infections among U.S. women and 67% of new AIDS diagnoses, the majority (87%) through heterosexual sex [13, 14]. Due to high HIV seroprevalence in predominately African-American communities, the risk of HIV exposure is higher among African-Americans than any other racial or ethnic group [14]. In addition, although the number of HIV diagnoses among women has declined in recent years, the rate of new HIV infections is 20 times higher among African-American women (38.1 per 100,000) compared to white women (1.9 per 100,000) and nearly 5 times higher than the rate among Hispanic women (8.0 per 100,000) [14].

The increased risk of HIV infection among African-American women is a growing concern particularly in light of differential gender imbalances among predominately African-American sexual networks [15]. Research has shown that compared to men, women are significantly less likely to know their partner's HIV status [1], and more likely to inform their partners of their serostatus than men [9, 16]. There are also concerns that HIV-positive men who have sex with both men and women less often notify female sex partners of their seropositivity [17]. Other characteristics shown to be associated with not knowing a partner's serostatus include younger age, low education, being childless, short-term and extramarital relationships, having two or more sexual partners, lack of history of HIV

testing, and inconsistent condom use [1, 3, 11]. However, most studies investigating characteristics associated with knowledge of partner serostatus have been conducted outside of the U.S. or focused on men who have sex with men (MSM), men who have sex with men and women (MSMW), transgender women, or HIV-seropositive individuals. This has limited the ability of U.S. HIV prevention programs targeting African-Americans to address women's knowledge of partner serostatus as a component of strategies to reduce HIV transmission risks for this population [18-20].

In order to inform prevention efforts geared towards women with greatest vulnerability, this study examines the prevalence and characteristics associated with knowledge of partner's serostatus among a cohort of African-American women from defined geographic areas with high HIV prevalence and poverty. Specifically, we investigate the proportion of women who knew their male partner's receipt of prior HIV testing and test results, as well as the association of individual, partner, and partnership level determinants with knowledge of partner HIV status.

Methods

Study Design

This study used baseline data from the HIV Prevention Trial Network's Women's HIV SeroIncidence Study (HPTN 064), a multisite, longitudinal cohort study examining HIV incidence and behavioral risk factors among 2,099 U.S. women who were living in one of 10 urban and peri-urban communities with high poverty and high HIV prevalence in Atlanta, GA; Baltimore, MD; New York City; NY; Newark, NJ; Raleigh-Durham, NC; or Washington, D.C.A detailed description of the study's methodology and ethics approval is described elsewhere [21]. In sum, women were eligible to participate if they were: (1) 18-44 years of age; (2) living in a high poverty and high HIV prevalence community; (3) reported at least one episode of unprotected vaginal and/or anal sex with a man in the 6 months before enrollment; (4) reported at least one additional personal or partner HIV risk factor, such as illicit drug use, alcohol dependence, binge-drinking, or prior incarceration; (5) had no prior HIV diagnosis; and (6) were willing to have HIV rapid testing. Venue-based sampling was used to recruit women from May 2009 to June 2010. Participants were interviewed at the time of study enrollment (baseline) and followed in 6-month intervals up to 12 months.

Outcome Measure

Knowledge of male partner's HIV serostatus was the primary outcome. Using audio computer-assisted self-interviews (ACASI), each respondent was asked to list her three most recent male sex partners in the 6 months prior to the interview, followed by a set of questions on demographic and sexual risk behaviors associated with each partner. Respondents were also asked two questions relating to partner serostatus. The first question asked whether she knew if her male sex partner had ever been tested for HIV. If so, a second question asked her to provide the HIV test result. If the woman reported that her partner had been tested for HIV and that he was seropositive or seronegative, she was coded as having knowledge (code=1). If the woman reported that she did not know if her partner had been

tested for HIV or if she was aware of his receipt of a prior HIV test but was unaware of the test results, she was coded as not having knowledge (code=0).

Associated Characteristics

Several potential associated characteristics were included based on a comprehensive review of related literature and available items in the HPTN 064 questionnaire. The final set of variables was categorized into five groups: (1) women's demographic characteristics; (2) women's sexual characteristics; (3) women's economic characteristics; (4) male partner's demographic characteristics; and (5) partnership level characteristics. To assist in the replicability and interpretation of the study's ratios, we have noted each indicator's applied coding. Individual demographic characteristics for women were age in years (code=1 if > 30, code=0 if ≤ 30), Hispanic ethnicity (code=1 if yes, code=0 if no), and educational attainment (code=1 if received high school diploma or higher; otherwise code=0).

Women's sexual characteristics included total number of male sex partners, preponderance of casual partnerships, sexual orientation, and recent sexually transmitted infection (STI) diagnosis. A binary variable was used to categorize women with two or more male sex partners in the last 6 months (code=1) versus women with only one recent male sex partner (code=0). Preponderance of casual partnerships was based on the reported number of casual male sex partners out of the total number of male sex partners in the last 6 months. The term ‘casual’ referred to men the respondent indicated that she did not know very well as compared to ‘main’ partners to whom she felt especially committed. Women reporting that more than half of their male sex partners in the prior 6 months were casual were coded as 1, and women reporting that less than or equal to half of their male sex partners were casual were coded as 0. Sexual orientation was dichotomized among women who self-identified as straight or heterosexual (code=1) and those who reported they were gay, lesbian, homosexual, bisexual, other, or unsure (code=0). Prior STI diagnosis was categorized based on the respondent answering “yes” at least once to whether she had been diagnosed with having gonorrhea, syphilis, or chlamydia (code=1) in the last 6 months as compared to women responding “no” for all three infections (code=0.).

Women's economic characteristics included paid employment, access to financial support, housing stability, prior food insecurity, and household income. The ACASI asked each respondent to identify her main source of income during the last 12 months. Responses choices were a job (code=1) and several non-employment income options (code=0), including government-sponsored assistance programs, money from a spouse, sexual partners, family or friends, alimony, income from sex or drug exchange, or hustling. Women also indicated how many close friends or relatives would likely help them financially if needed, such as getting food or paying for housing or utilities: one or more individuals she could rely on for financial help (code=1) was compared to women who reported none or not sure (code=0). Housing stability was measured as women who reported living in a home or apartment that they or a parent, partner, or spouse rented or owned (code=1) versus those living at a friend's house or apartment, a halfway house or treatment center, a homeless shelter, a motel/hotel, or on the street (code=0). Food insecurity was assessed by asking if the respondent had been concerned about not having enough food for herself and/or her

family in the past 6 months, where responses included “yes” (code=1) and “no” (code=0). Household income was dichotomized for women with gross annual household earnings > $10,000 (code=1) and ≤ $10,000 (code=0).

Male partner characteristics were based on women's survey responses. These variables consisted of: men's age (code=1 if > 35 years, otherwise code=0); prior illicit drug injection (code=1 if “yes”, code=0 if “no”), and prior imprisonment for more than 24 hours (code=1 if “yes”, code=0 if “no”). Partnership level characteristics included duration, coresidence status, place where initially met, partner's concurrency, coital frequency, and condom use at last vaginal sex. Partnership duration was measured in months based on women's report of the time period from the first and most recent sexual encounter. Two categories were created: > 6 months (code=1) and ≤6 months (code=0). Coresidence represented couples who reportedly lived together (code=1) compared to those who lived separately (code=0). The ACASI also asked each respondent where she first met the referenced partner, which was divided among virtual venues (code=1), such as the Internet, including online dating sites and mobile- or web-based social media versus in-person or physical venues (code=0), such as at work, school, friend's house, night club, etc. The survey additionally asked the respondent whether her partner had sex with other individuals (women and/or men) while the two of them were sexually active. Responses “definitely did” and “probably did” were coded as 1, whereas responses “probably did not” or “definitely did not” were coded as 0. Coital frequency of more than 10 times in the last 6 months was coded as 1, otherwise 0. Condom use at last vaginal sex included “yes” (code=1) and “no” (code=0).

Analysis

Data were analyzed using SAS Version 9.2 (SAS Inc., Cary, NC). The analytical sample was restricted to African-American women (86% of total enrollment) who reported at least one male sexual partner in the 6 months prior to study enrollment. While each woman had the potential to report partner serostatus knowledge on up to three recent partners, data were analyzed only for the most recent partner. This enabled the study to minimize recall biases among less recent relationships and remain comparable to similar analyses in the literature [22]. Bivariate comparisons of serostatus knowledge and individual, partner, and partnership level characteristics were assessed using bivariate logistic regressions and chi-squared (χ^2) descriptive statistics.

A series of multivariable logistic regressions were used to examine which characteristics independently increased the odds of having partner HIV serostatus knowledge or not, controlling for other characteristics. The analysis also aimed to understand the contribution of different types of characteristics. Therefore, each of the five variable groups was sequentially added to the model to determine whether the group's inclusion improved the overall fit to the data. The sequence in which each variable group was added was based on the inherent hierarchy of individual, partner, and partnership domains, as well as proximate and distal characteristics related to demographic, sexual behavioral, and economic determinants. Based on this sequence, the subsequent expanded model was then compared to the preceding reduced model to test the null hypothesis (H_0) that all the regression coefficients in the added group were equal to zero. If $p<.05$, we rejected the H_0 and

concluded that the inclusion of the additional set better fit the data. Following the model comparison tests, individual coefficients were tested. While all examined characteristics are presented, adjusted odds ratios (aOR) were considered statistically significant when the null value of 1.0 was not included in the corresponding 95% confidence interval.

Results

Sample Demographic and Associated Characteristics

The final analytical sample included 1,768 women (Table 1). Three hundred thirty-one women were excluded as a result of non-African-American reported race (n=297); absence of a male sexual partner within the last 6 months (n=28); and missing partner serostatus knowledge data (n=6). Participants who self-reported African-American race in combination with Hispanic ethnicity were maintained in the study. Of the 1,768 women included in the analysis, 57.2% (n=1,012) knew about their most recent male partner's serostatus compared to 42.8% (n=756) who did not. Among women who were aware of their partner's serostatus, 0.9% (n=9) reported that he was HIV-positive. The majority of women (55.2%, n=976) were aged 30 years or younger, heterosexual (79.5%, n=1405), of non-Hispanic origin (95.3%, n=1,685), and had a high school diploma (64.2%, n=1,135). Most women were also HIV-negative (98.5%, n=1,741) and had not had a recent STI diagnosis (86.8%, n=1,534). Approximately half (59.6%, n=1,053) reported having two or more male sex partners in the 6 months prior to the survey, and 37.2% (n=658) had more casual partners than partners who they knew well.

Forty-one percent (n=724) of participants' most recent male partners were aged greater than 35 years. Reported illicit drug use among partners was low (5.1%, n=91), although 58.8% of women (n=1,039) stated that their most recent partner had ever been imprisoned. The duration of sexual relationships was greater than 6 months for 52.3% of women (n=924), and 53.1% of women (n=938) reported concurrent partnerships among male partners. Coital frequency in the prior 6 months was greater than 10 times for 57.6% of women (n=1,018), although condom use at last vaginal sex was low (17.5%, n=309). In most cases, women lived separately from their most recent male sex partner (70.9%, n=1,254), the majority of whom they met in-person (95.8%, n=1,694) as compared to via online outlets (2.4%, n=42). Approximately one third (34.8%, n=615) lived in households earning less than $10,000 annually, and only 36.3% (n=641) listed a job as the main source of income. However, the proportion of women who had access to financial support was considerably higher (76.2%, n=1,347). Nonetheless, 50.0% of women (n=884) were not stably housed and 44.3% (n=783) mentioned being concerned about having enough food in the 6 months before the survey.

Knowledge Correlates in Bivariate Analyses

In bivariate analyses, demographic characteristics associated with the likelihood of knowing a partner's HIV status included Hispanic ethnicity (OR=2.14, 95%CI: 1.3-3.52) and having a high school diploma (OR=1.23, 95%CI: 1.01-1.49) (Table 2). Among sexual characteristics, women with two or more sex partners (OR=0.42, 95%CI: 0.34-0.51), majority casual sex partners (OR=0.66, 95%CI: 0.54-0.8), seropositivity (OR=0.31, 95%CI: 0.13-0.71), or

recent STI diagnosis (OR=0.74, 95%CI: 0.55-0.99) had significantly lower odds of knowledge of partner serostatus in bivariate analyses. Women who self-identified as heterosexual (OR=1.33, 95%CI: 1.05-1.69) and those with reportedly higher economic outcomes: access to financial support (OR=1.40, 95%CI: 1.12-1.76), stable housing (OR=1.32, 95%CI: 1.06-1.6), and household annual earnings >$10K (OR=1.45, 95%CI: 1.12-1.87) had significantly higher odds of being aware of their partner's serostatus. Women who had experienced food insecurity with the past 6 months had 42% significantly lower odds (OR=0.58, 95%CI: 0.48-0.71) of knowing whether their most recent mate's serostatus.

At the partnership level, women with sexual relationships lasting longer than 6 months (OR=2.07, 95%CI: 1.66-2.58), those with higher coital frequency (OR=1.79, 95% CI: 1.48-2.17), and those who were currently cohabitating (OR=2.95, 95% CI: 2.35-3.71) had two to three times significantly greater odds of knowledge of partner HIV status. Meeting one's partner virtually (OR=0.45, 95%CI: 0.24-0.84) or partner's concurrency (OR=0.35, 95%CI: 0.28-0.42) were both significantly inversely associated with knowledge of partner serostatus. No differences in knowledge status were observed in bivariate analyses for women's age (OR=0.88, 95%CI: 0.73-1.07), employment status (OR=1.10, 95% CI: 0.9-1.33), or condom use at last vaginal sex (OR=1.02, 95%CI: 0.8-1.31). Knowledge status also did not vary in bivariate analyses by any of the male partner individual characteristics: partner's age (OR=0.89, 95%CI: 0.74-1.08), prior drug use (OR=0.77, 95%CI: 0.5-1.18), or prior imprisonment (OR=0.92, 95%CI: 0.74-1.13).

Knowledge Correlates in Sequential Adjusted Analyses

Table 3 presents results from the series of multivariable logistic regression models. Three of the four characteristics sets were found to significantly contribute to the model fit during the block modeling process. The addition of women's sexual characteristics (model 2) to the initial demographic characteristics (model 1) significantly improved the fit (model 2 vs. model 1: χ^2=89.22, p<.0001), as did the subsequent additions of women's economic characteristics (model 3 vs. model 2: χ^2=27.42, p=0.0001), and partnership level characteristics (model 5 vs. model 4: χ^2=57.15, p<.0001). No significant additional contribution was observed for the set of male partner characteristics (model 4 vs. model 3: χ^2=0.60, p=0.897).

At the item-level, in the full multivariable model, six independent variables were found to be significantly associated with women's knowledge of partner serostatus. Women with two or more sex partners were had 51% significantly fewer odds (OR=0.49, 95%CI: 0.37-0.65) of being aware of their partner's HIV status compared to women who reported having one partner, after controlling for all other covariates. No other sexual or demographic characteristics were found to be statistically significant in the full model. For women's economic characteristics, access to financial support was independently associated with a 1.42 greater odds (OR=1.42, 95%CI: 1.05-1.92) of knowledge of partner serostatus as compared to those with no financial help, and women who were food insecure had 32% significantly lower odds (OR=0.68, 95%CI: 0.49-0.94) of knowing of their partner's infection status as compared to those who were food secure, when holding the remaining characteristics constant. In adjusted analyses, women's knowledge did not statistically vary

by employment status (OR=0.81, 95%CI: 0.62-1.07), housing stability (OR=0.95, 95%CI: 0.73-1.24), or annual household earnings (OR=1.05, 95%CI: 0.75-1.47).

Among partner characteristics, the odds of partner serostatus knowledge was 32% lower (OR=0.68, 95%CI: 0.49-0.94) among women with male partners older than 35 years, all other variables held constant. No associations were found with partner's prior drug use (OR=1.04, 95%CI: 0.55, 1.97) or prior imprisonment (OR=0.78, 95%CI: 0.59-1.02). At the partnership level, coresidence among couples was associated with a 1.43 significantly greater odds (OR=1.43, 95%CI: 1.05-1.95) of knowledge among women as compared to those who lived separately from their mate; and partner's concurrency was associated with a 37% significant decrease (OR=0.63, 95%CI: 0.49-0.83) in the odds of women's knowledge. Partnership duration (OR=1.18, 95%CI: 0.89-1.58), having met virtually (OR=1.32, 95%CI: 0.29-1.31), coital frequency (OR=1.14, 95%CI: 0.86-1.49), and condom use at last vaginal sex (OR=1.32, 95%CI: 0.93-1.88) had no significant independent association with knowledge of partner serostatus.

Discussion

Current U.S. HIV prevention programs have been criticized for inadequately addressing the range of vulnerabilities experienced by African-American women, resulting in insufficient reductions in HIV transmission [18]. While knowledge of a partner's HIV status can lead to reductions in risky sexual behaviors [3-12], there is little evidence on how informed African-American women are regarding their male partners' serostatus and which characteristics are associated with awareness or not. African-American women are disproportionately affected by HIV, and information on predictive characteristics associated with knowledge may assist in channeling sexual communication interventions towards areas of greatest vulnerability [19, 20].

This study found that slightly less than half (43%) of African-American women living in high poverty and high HIV prevalence areas were unaware of their most recent male partner's HIV status. In multivariable analyses, women's demographic characteristics alone did not account for the variation in knowledge of male partner serostatus. Rather, serostatus awareness was associated with number of sex partners, access to financial support, recent food insecurity, male partner age, coresidence status, and partner's concurrency. The negative association of two or more sexual partners and partner's concurrency with serostatus knowledge has been shown in other populations [1, 3, 7], and suggests that women with the riskiest behaviors are least likely to know of their infection risk. This may reflect fewer opportunities or expectations to discuss personal matters such as serostatus with increasing numbers of partners, particularly among those who are less well known [11, 23]. Prior research has suggested as well that intimacy, trust, and shared responsibility are often present among main and longer-term partners, and can reduce serostatus communication barriers due to fear or embarrassment [11, 24]. This may explain why women who were living with their most recent male sex partner were more likely to be aware of his HIV status, given the potential greater intimacy and stability of cohabitation. It is also plausible that women perceive co-resident sex partners to more substantially impact their HIV risk over time, thus warranting serostatus awareness.

One explanation for women with greater economic resources being more likely to know about their most recent sex partner's HIV status may be that such women are less reliant on male sexual partners for financial support and are thus more confident in initiating serostatus discussions or less likely to tolerate unknown HIV status, even if such inquiries intensify distrust or uncertainty within relationships [2, 12, 25]. In addition, individuals with more economic assets may be more knowledgeable of partner serostatus due to higher levels of risk avoidance, better communication skills, or greater access to HIV preventive information [11, 12, 25]. Other reasons may explain why women whose partners were older than 35 years were significantly less likely to know of his infection status. It is possible that older partners were considered to have fewer HIV risk characteristics, and women were therefore less likely to ask about serostatus [26]. In addition, in some settings, older men are less likely to have been tested for HIV as compared to younger men [27, 28]. Therefore, a woman's lack of knowledge may reflect her partner's equally being unaware of his status [3].

While this study provides important insights on determinants of women's partner serostatus knowledge, the findings also have implications for the design and implementation of HIV prevention strategies for African-American women living in high poverty and high HIV prevalence communities. One implication is that limited financial resources, including low access to food and housing, may further weaken women's ability to negotiate safe sexual and social environments. Thus, HIV prevention efforts for women in high poverty communities must necessarily address economic factors which influence sexual behaviors. A second implication relates to women's awareness of HIV risk and perceived importance of knowing a partner's serostatus. The fact that 43% of women had incomplete or no knowledge of partner's prior HIV test and result is worrisome given the relatively higher prevalence of HIV in predominately African-American communities [14]. While some findings suggest that African-American women understand the heightened HIV risk within their communities, others have suggested that a lack of reliable prevalence estimates among sex partner populations contributes to low risk perceptions in this group [29]. Such findings highlight a need for prevention programs that integrate serostatus communication approaches with efforts to increase women's awareness of HIV risk, including targeted and enabling support for women most likely to be uninformed. Serostatus approaches may also provide women with a range of communication strategies to discuss serostatus with potential sex partners, and negotiate seroadaptive and self-protective behaviors as well [2, 11].

A third implication relates to the promotion of safer sex strategies which some argue, if practiced indiscriminately, would reduce HIV transmission risk regardless of knowledge of partner serostatus [10]. It has been hypothesized as well that programmatic emphasis on serostatus discussions rather than safer sex practices can result in greater use of unsafe sexual practices among confirmed and perceived seroconcordant couples, which may lead to increased rates of HIV super-infection or other STIs [30]. Despite evidence that knowledge of partner serostatus decreases sexual risk practices, it is plausible that knowledge of partner serostatus alone may be inadequate to shift sexual behaviors for all women [11, 31, 32]. In our study, partner serostatus knowledge did not significantly vary with women's reported consistent condom use, which implies that a combination of serostatus and safer sex approaches, including those which address economic and structural factors, will likely be needed among similar women. At the same time, safer sex practices may not have been

influenced by knowledge status in our study's cohort given that the majority (99%) of women who reported knowing their partner's HIV status indicated that he was uninfected. Thus, integrated strategies are needed that enable African-American women living in high poverty and high HIV prevalence communities both to make informed sexual decisions with partners, and recognize the importance of preventive practices for current and future risks.

Limitations

The study's limitations should be considered. These included use of self-reported data, which may have been influenced by social desirability and recall biases, especially for sexual behavioral questions. To reduce the potential for such biases, interviews were conducted using anonymous ACASI-formatted questionnaires with nonjudgmental language. In addition, although the study aimed to assess risk characteristics among U.S. minority women living in high poverty and high HIV prevalence communities, the methodology was not designed to recruit a representative sample of lower-income African-American or more broadly lower-income U.S. minority women.

Interpretation of the study's results should also consider that the knowledge indicator measured “ever” HIV testing and subsequent results which may not have corresponded with the exposure period of the participant's sexual relationship or her perceptions regarding her partner's current serostatus. The measurement was also unable to distinguish whether knowledge was acquired due to the participant's own inquiry or as a result of the partner's direct or indirect notification. Women's unawareness of partner serostatus may also have resulted from partner refusal to disclose. Associated knowledge characteristics may thus reflect broader contextual risks among lower-income African-American women and their male sex partners rather than current relational interactions. However, the strengths of the study include the large and geographically diverse sample, the assessment of a variety of characteristics, and the emphasis on high-risk, lower-income African-American women who are underrepresented in the current evidence base.

Conclusion

Serostatus and safer-sex communication strategies are urgently needed to reduce HIV risk disparities among African-American women living in high poverty and high HIV prevalence communities. Our findings suggest that women were often unaware of their male partner's serostatus, despite that the majority of HIV infections in this group occur through heterosexual transmission. Comprehensive prevention efforts should target not only high-risk sexual behaviors related to unknown partner serostatus, but also underlying economic characteristics such as access to financial support and the need to empower women in making informed sexual decisions. A combination of behavioral, economic, and empowerment approaches are likely to be more effective in addressing the multiplicity of vulnerabilities of this population.

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Table 1
Individual, Partner, and Partnership Characteristics of Surveyed Women

	Frequency	Percent (%)
Total number of study participants	2,099	-
Analytical sample of women	1,768	100.0
Women's Demographic Characteristics		
African American	1,768	100.0
Age greater than 30 years	792	44.8
Hispanic ethnicity	83	4.7
Diploma or equivalent	1,135	64.2
Women's Sexual Characteristics		
Two or more sex partners	1,053	59.6
Majority casual sex partners	658	37.2
Self-identified heterosexual	1,405	79.5
HIV-positive at baseline	27	1.5
Recent STI diagnosis	208	11.8
Women's Economic Characteristics		
Paid job as main income	641	36.3
Access to financial support	1,347	76.2
Stably housed	884	50.0
Recent food insecurity	783	44.3
Household income > $10K	363	20.5
Male Partner Characteristics		
Age greater than 35 years	724	41.0
Prior drug use	91	5.1
Prior imprisonment	1,039	58.8
Partnership Characteristics		
Duration > 6 months	924	52.3
Cohabiting	509	28.8
Met virtually (online)	42	2.4
Concurrent partners	938	53.1
Coital frequency > 10 times	1,018	57.6
Condom use at last sex	309	17.5
Knowledge of Male Partner Serostatus		
Yes[a]	1,012	57.2
No	756	42.8

[a] Nine of the 1,012 women reported he was HIV-positive (0.9%).

Table 2

Individual, Partner, and Partnership Characteristics of Women by Knowledge of Partner HIV Serostatus

	Women with knowledge of partner serostatus	Women without knowledge of partner serostatus	p-value	Unadjusted Odds Ratio[a] (95% CI)
Number of women	1,012	756	-	-
Women's Demographic Characteristics				
African American	1,012 (100%)	756 (100%)	-	-
Age greater than 30 years	440 (43.5%)	352 (46.6%)	.2089	0.88 (0.73, 1.07)
Hispanic ethnicity	61 (6.0%)	22 (2.9%)	.0021	2.14* (1.3, 3.52)
Diploma or equivalent	670 (66.2%)	465 (61.5%)	.0449	1.23* (1.01, 1.49)
Women's Sexual Characteristics				
Two or more sex partners	514 (50.8%)	539 (71.3%)	<.0001	0.42* (0.34, 0.51)
Majority casual sex partners	335 (33.1%)	323 (42.7%)	<.0001	0.66* (0.54, 0.8)
Self-identified heterosexual	825 (81.5%)	580 (76.7%)	.0203	1.33* (1.05, 1.69)
HIV-positive at baseline	8 (0.8%)	19 (2.5%)	.0051	0.31* (0.13, 0.71)
Recent STI diagnosis	106 (10.5%)	102 (13.5%)	.0437	0.74* (0.55, 0.99)
Women's Economic Characteristics				
Paid job as main income	376 (37.2%)	265 (35.1%)	.3686	1.10 (0.9, 1.33)
Access to financial support	798 (78.9%)	549 (72.6%)	.0038	1.40* (1.12, 1.76)
Stably housed	537 (53.1%)	347 (45.9%)	.0043	1.32* (1.09, 1.6)
Recent food insecurity	392 (38.7%)	391 (51.7%)	<.0001	0.58* (0.48, 0.71)
Household income >$10K	233 (23.0%)	130 (17.2%)	.0110	1.45* (1.12, 1.87)
Male Partner Characteristics				
Age greater than 35 years	403 (39.8%)	321 (42.5%)	.2608	0.89 (0.74, 1.08)
Prior drug use	51 (5.0%)	40 (5.3%)	.2658	0.77 (0.5, 1.18)
Prior imprisonment	625 (61.8%)	414 (54.8%)	.4524	0.92 (0.74, 1.13)
Partnership Characteristics				
Duration > 6 months	594 (58.7%)	330 (43.7%)	<.0001	2.07* (1.66, 2.58)
Cohabiting	381 (37.6%)	128 (16.9%)	<.0001	2.95* (2.35, 3.71)
Met virtually (online)	16 (1.6%)	26 (3.4%)	.0115	0.45* (0.24, 0.84)
Concurrent partners	426 (42.1%)	512 (67.7%)	<.0001	0.35* (0.28, 0.42)
Coital frequency > 10 times	644 (63.6%)	374 (49.5%)	<.0001	1.79* (1.48, 2.17)
Condom use at last sex	179 (17.7%)	130 (17.2%)	.8992	1.02 (0.8, 1.31)

[a] Excludes proportion of women with missing values.

* Statistically significant at p<.05.

Table 3

Sequential Multivariable Logistic Regression Models Predicting Adjusted Odds of Women's Knowledge of Most Recent Male Sexual Partner's HIV Serostatus

Adjusted Odds Ratios (aOR)[a]	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Women's Demographic Characteristics	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Age > 30 years	**0.69*** (0.57, 0.83)	**0.66*** (0.54, 0.8)	**0.67*** (0.55, 0.82)	0.84 (0.63, 1.11)	0.89 (0.64, 1.23)
Hispanic Ethnicity	1.36 (0.86, 2.14)	1.28 (0.8, 2.06)	1.26 (0.78, 2.03)	1.24 (0.73, 2.1)	1.25 (0.71, 2.2)
Diploma or equivalent	1.16 (0.96, 1.41)	1.11 (0.91, 1.36)	1.13 (0.92, 1.39)	1.07 (0.85, 1.36)	1.07 (0.81, 1.41)
Women's Sexual Characteristics					
Two or more sex partners	--	**0.37*** (0.3, 0.45)	**0.39*** (0.31, 0.48)	**0.40*** (0.31, 0.5)	**0.49*** (0.37, 0.65)
Majority casual sex partners	--	**0.70*** (0.58, 0.86)	**0.74*** (0.6, 0.91)	**0.76*** (0.6, 0.96)	0.89 (0.69, 1.16)
Self-identified heterosexual	--	**0.78*** (0.61, 0.99)	0.81 (0.63, 1.03)	0.92 (0.7, 1.22)	1.02 (0.74, 1.41)
HIV-positive at baseline	--	0.58 (0.27, 1.21)	0.54 (0.26, 1.15)	0.49 (0.22, 1.11)	0.53 (0.2, 1.37)
Recent STI diagnosis		0.91 (0.67, 1.22)	0.94 (0.7, 1.27)	0.91 (0.65, 1.28)	1.06 (0.72, 1.57)
Women's Economic Characteristics					
Paid job as main income	--	--	0.92 (0.74, 1.14)	**0.40*** (0.31, 0.5)	0.81 (0.62, 1.07)
Access to financial support	--	--	**1.39*** (1.1, 1.75)	**0.76*** (0.6, 0.96)	**1.42*** (1.05, 1.92)
Stably housed	--	--	1.07 (0.87, 1.31)	0.92 (0.7, 1.22)	0.95 (0.73, 1.24)
Recent food insecurity	--	--	**0.81*** (0.66, 0.99)	0.49 (0.22, 1.11)	**0.68*** (0.53, 0.88)
Household income > $10K	--	--	1.20 (0.91, 1.57)	0.91 (0.65, 1.28)	1.05 (0.75, 1.47)
Male Partner Characteristics					

Adjusted Odds Ratios (aOR)[a]	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Age > 35 years	--	--	--	0.82 (0.62, 1.09)	**0.68*** (0.49, 0.94)
Prior drug use	--	--	--	0.96 (0.58, 1.59)	1.04 (0.55, 1.97)
Prior imprisonment	--	--	--	0.80 (0.64, 1.01)	0.78 (0.59, 1.02)
Partnership Level Characteristics					
Duration > 6 months	--	--	--	--	1.18 (0.89, 1.58)
Cohabiting	--	--	--	--	**1.43*** (1.05, 1.95)
Met virtually (online)	--	--	--	--	0.62 (0.29, 1.31)
Concurrent partners	--	--	--	--	**0.63*** (0.49, 0.83)
Frequent vaginal sex	--	--	--	--	1.14 (0.86, 1.49)
Condom use at last vaginal sex	--	--	--	--	1.32 (0.93, 1.88)
χ^2: Wald Test (Full vs. Reduced)	--	χ^2, df=5 89.22	χ^2, df=6 27.42	χ^2, df=3 0.60	χ^2, df=6 57.15
p-value	--	<.0001	0.0001	0.897	<.0001

[a] Model 1=women's demographic characteristics; Model 2= women's demographic and sexual characteristics; Model 3= women's demographic, sexual, and economic characteristics; Model 4 = women's demographic, sexual, economic, and male partner characteristics; Model 5 = women's demographic, sexual, economic, male partner, and partnership level characteristics