HIV Acquisition and Transmission Potential among African American Men Who have Sex with Men and Women in Three U.S. Cities
Abstract

Black men who have sex with men and women (BMSMW) are at increased HIV risk, but few efficacious interventions meet their unique needs. Three HIV prevention interventions were evaluated with a common protocol. Baseline data were pooled to describe sexual behavior involving transmission risk with male, female, and male-to-female transgender partners and identify factors associated with transmission risk. BMSMW from Los Angeles, Philadelphia, and Chicago who reported sexual risk and bisexual behavior in the past year were recruited via modified chain referral sampling and community recruitment. Baseline assessments were conducted via audio computer-assisted interview and sexual behaviors assessed over the past 3 months. From December 2010 to November 2012, 584 BMSMW were enrolled across the three cities. More than half (55%) were recruited by other participants. Overall, the mean age was 43. Seventy-five percent reported an annual income < $10,000 and selling sex was prevalent (31%). Three-quarters identified as bisexual. Thirty-nine percent were HIV-positive. Among HIV-positive participants, 46% reported sex without condoms with HIV-negative or unknown male partners and 45% with HIV-negative or unknown female partners. Overall, factors associated with sex without condoms included network size, education, income, sexual orientation identification, HIV status, exchange sex, homonegativity, and social support. Findings support the need for enhanced HIV prevention efforts for this population. Future studies should examine contextual factors in addition to individual risk behaviors to inform the development and implementation of promising strategies to prevent HIV and promote the overall health and wellness of BMSMW and their sexual partners.
Introduction

African Americans have the most severe burden of HIV of all racial/ethnic groups in the United States. This group accounted for 44% of all new HIV diagnoses among adults and adolescents in 2015, despite comprising only 12% of the U.S. population. That year, black men who have sex with men (MSM) represented 39% of new diagnoses among all MSMO (men who have sex with men only) and MSMW (men who have sex with men and women) (Centers for Disease Control and Prevention, 2015).

Some have proposed that MSMW may increase the range and diversity of social and sexual networks, facilitating transmission across communities (Gorbach, Murphy, Weiss, Hucks Ortiz, & Shoptaw, 2009; Zule, Bobashev, Wechsberg, Costenbader, & Coomes, 2009). While there is consensus that some transmission to women does occur via MSMW, the scale and impact of the “bisexual bridge” has been called into question (M. R. Friedman et al., 2016; Jeffries, 2014). Friedman et al’s meta-analysis which included 22 studies measuring behavior over a period of a year or less, suggests that a woman is just as likely to encounter an HIV-positive male partner who acquired HIV either through injection drug use or sex with a female as through sex with a male (M.R. Friedman, Wei, et al., 2014). The potentially unjustified media focus on the relationship between black MSMW and black women’s HIV risk may divert attention from the acute, specific, and unmet needs of this population (Saleh & Operario, 2009).

Developing a more complete understanding of the sexual behavior and HIV prevention needs of black MSMW has been challenging due to limitations in the research to date. Many studies do not differentiate between MSMO and MSMW. Studies enrolling both groups often pool data in statistical analysis. Estimates of HIV diagnoses among MSMW have only recently
been available through national surveillance (Singh, Hu, Wheeler, & Hall, 2014). While data consistently have shown that HIV burden varies by race/ethnicity, most MSMW-focused studies lack sufficient sample sizes to conduct analyses comparing or isolating determinants of risk for specific racial/ethnic groups. An additional challenge lies in interpreting the growing body of research involving MSMW, where there is variability in how bisexual behavior is operationalized (by act and period of time measured). Self-reported bisexual orientation and bisexual behavior are also sometimes conflated. In our reporting of other research, we have indicated where participants were defined as bisexual based on orientation rather than behavior. Unless otherwise stated, MSMW behavior was reported from the past three months to one year.

Though MSMW are a small proportion of the U.S. male population (0.3-1.6%) (Jeffries & Dodge, 2007; Rogers & Turner, 1991), Friedman’s meta-analysis estimates that 39% of MSM are MSMW (M.R. Friedman, Wei, et al., 2014). Several studies have indicated that this percentage may be higher among black MSM (Montgomery, Mokotoff, Gentry, & Blair, 2003; Sanchez et al., 2006). In general, MSMW are less likely to be HIV-positive than MSMO, but more likely to be HIV-positive than men who have sex with only women (Levin, Koopman, Aral, Holmes, & Foxman, 2009; Zule et al., 2009). Surveillance data from 2011 indicate that 16% of adults diagnosed with HIV were MSMW, compared to 45% who were MSMO (Singh, 2014). Friedman’s meta-analysis estimated the weighted mean HIV prevalence among MSMW (past year) as a whole to be 21% (M.R. Friedman, Wei, et al., 2014). Studies incorporating HIV testing have reported rates as high as 30-50% among black MSMW (Latkin et al., 2011; Tieu et al., 2012). Black MSMW may also be more likely than MSM of other race/ethnicities to have undiagnosed infection (Maulsby, Sifakis, German, Flynn, & Holtgrave, 2012; Young, Shoptaw,
A concurrent diagnosis of HIV and AIDS has been shown to be more common among MSMW than MSM (33% vs 24%) (Singh et al., 2014). Apart from HIV prevalence estimates, the lived experiences of MSMW may be quite different from MSMO, with implications for HIV prevention. Specific organizations, gathering places, and residential areas may be less common for bisexual than for either heterosexual or homosexual identified groups (Miller, Serner, & Wagner, 2005), resulting in fewer targeted messaging opportunities. Furthermore, HIV prevention messages tend to reach MSM populations by using norms, images, and language that largely appeal to gay-identified men. Some research suggests that Black MSMW also may experience higher levels of homonegativity than MSMO (Dyer et al., 2013; Jeffries, 2014). Among MSMW and MSMO of all races and ethnicities, anti-gay attitudes and gay-related stigma have been found to be associated with HIV-positive status and HIV-related risk behaviors (Jeffries & Johnson, 2015; Shoptaw et al., 2009). Additionally, depression and lack of social support appear to more common among MSMW compared to MSMO. Related to these psychosocial factors, economic marginalization may be particularly acute for MSMW, who are at greater risk for poverty, unemployment, unstable housing, and incarceration compared to men who have sex with women and MSMO (Dyer et al., 2013; Jeffries, 2014). This translates into HIV risk; compared to Black MSMO, Black MSMW may be more likely to receive money or drugs for sex (Dyer et al., 2013; Wheeler, Lauby, Liu, Van Sluytman, & Murrill, 2008). Occupational health risks among male sex workers include sex with multiple partners, sexual role versatility, sex with male, female, and transgender partners, sex with older male partners, and reciprocal sex exchange, i.e., purchasing sex from other sex workers who are themselves at high risk for HIV (Baral et al., 2015; M.R. Friedman, Kurtz, et al., 2014; Millett et al., 2012).
It is likely that sexual behaviors differ between male, female, and transgender partners of MSMW (Harawa et al., 2014). Some research suggests that MSMW practice more unprotected sex with their female partners than with their male partners (Dodge, Jeffries, & Sandfort, 2008; Mimiaga et al., 2009) and with primary partners compared to non-primary partners (Sanchez et al., 2006; Sullivan, Salazar, Buchbinder, & Sanchez, 2009). Harawa et al noted that Black MSMW who had only primary female partners had fewer male partners and were also more likely to have only primary partners (Harawa et al., 2014).

Despite what is known about the elevated risks among this group and their distinct prevention needs, few interventions have been rigorously evaluated and demonstrated to be effective for reducing risk among black MSMW (Fernandez et al., 2016; Harawa et al., 2013; Williams et al., 2013). We undertook a study to better understand the sexual and HIV risk behaviors of black MSMW. The overall aim of the research was to support three specific intervention trials specifically developed for black MSMW. The pooled baseline data collected for these trials also provided an opportunity to learn more about black MSMW sexual behavior related to transmission and acquisition risk with multiple types of partners as well as proximal intersectional risk factors related to the social and economic context in which many MSMW live.

Our research questions were: What are the frequencies of vaginal and anal sex, sex without condoms, and sex without condoms involving transmission risk with male, female, and male-to-female transgender partners? What factors are associated with number of episodes of sex without condoms with male, female, and male-to-female transgender partners? Finally, what factors are associated with the number of episodes of sex without condoms involving transmission risk with male, female, and male-to-female transgender partners?
Methods

Study Sample and Procedures

From December 2010 to November 2012, we conducted three behavioral intervention trials for black MSMW in three U.S. cities: Philadelphia, PA, Chicago, IL, and Los Angeles, CA. The study sites developed and evaluated novel interventions specifically designed for this population; each aimed to reduce the risk of acquisition and transmission of HIV with male, female, and male-to-female transgender partners. To be eligible, participants had to be cisgendered male, black or African American, 18 years of age or older, report sex (oral, anal, or vaginal) with a man and a woman in the past 12 months, report vaginal or anal sex without condoms, and two or more vaginal/anal sex partners in the past three months. Also, because the planned interventions were developed specifically to address sexual risk reduction, those who reported injection drug use in the past 12 months were ineligible. Since the intervention tested in Los Angeles was tailored to meet the needs of recently released bisexually active men, participants in that city must have experienced incarceration in the last 12 months (defined as any time incarcerated, even less than 24 hours).

To recruit participants, study sites used outreach methods and a modified chain referral sampling strategy. Community recruitment involved engaging initial or index participants via print advertisements (e.g., commuter papers), Craigslist.org, and health and community agencies serving black MSMW, including AIDS service organizations. As index participants were enrolled and completed the baseline interview, they were invited to recruit up to five potentially eligible black MSMW from their social networks. Men recruited by index participants were invited to recruit up to five additional men (who were considered the second wave of participants). In
Philadelphia and Los Angeles, the number of chain referral waves was restricted; Chicago did not limit the number of waves. At the end of the baseline visit, each participant (who was eligible to recruit) was offered the opportunity to recruit others into the study. Interested men were given a brief training on how to approach and describe the study to potential participants. Recruiters received $10 for each individual successfully referred and enrolled into the study. Referral coupons were tracked so that participants could be linked to their recruiters in the study data.

After a confirmatory screening for eligibility and informed consent, participants completed an audio computer-assisted self interview (ACASI) that took on average 115 minutes (site average ranged from 110-125 minutes). Participants received $30-$50 for completing the baseline assessment (amount varied by site).

Measures

The comprehensive ACASI covered demographics, drug and alcohol use, STI/HIV testing and diagnoses, psychosocial factors, and sexual behavior. Items were chosen based on their theoretical relevance (as moderators and mediators) to the behavioral interventions and suspected associations with transmission risk behavior.

Sociodemographic characteristics included age, education, annual income, history of homelessness in the past 12 months, employment status, sexual orientation identification, and incarceration history (defined as ever spending more than one day in jail, prison or detention facility). We asked about any use of the following substances in the past three months: powdered or rock cocaine, marijuana, methamphetamine, poppers, erectile medications, club drugs, heroin (unspecified if injection or non-injection), or any other opiates, depressants, or stimulants that
were not prescribed. Alcohol was measured using the 4-item RAPS measure (Cherpitel, 2000); scores ranged from 0-4 and > 1 was considered to indicate dependence. We measured social networks by asking participants how many men they personally knew in the following non-mutually exclusive categories: MSM, black MSM, and black MSMW. In addition, participants were asked if they had ever disclosed their same sex behavior to anyone else (labeled as being “out”). Lack of social support was measured using a 5-item scale developed for the Brothers y Hermanos study (Ayala, Bingham, Kim, Wheeler, & Millett, 2012; J. L. Lauby et al., 2012)).

Internalized homonegativity was assessed through an 8-item scale adapted from two different scales (Ross, Rosser, & Neumaier, 2008; Wagner, 2013). This scale was previously used with MSMW (LaPollo, Bond, & Lauby, 2013). STI diagnoses in the past year, as well as HIV testing history and most recent result were assessed. Men who were HIV-positive were asked if they are “receiving regular and ongoing medical care” for their HIV infection and their last viral load.

Sexual behavior was measured for the prior three months. We asked participants to indicate their number of male, female, and male-to-female transgender vaginal and anal sex partners. Transgender partners were defined as those who were born male but now identify as female or transgender/transsexual. For each partner gender, we asked participants to report the number of episodes with and without condoms for the last two main and all non-main partners. A main partner was defined as “someone you are both emotionally and sexually involved with.” Non-main partners were all others, including sexual exchange partners. Sexual exchange was defined as reporting any episode of giving or receiving “any type of payment (for example, money, drugs, or a place to stay) in exchange for any type of sex.” The three separate variables include: any selling of sex, any buying of sex, and both buying and selling sex. We also measured disclosure of same sex behavior to female main or non-main partners. Finally, we
report on partner HIV status; in this analysis, all participants and their partners are categorized as either HIV-positive or HIV-negative/unknown. We grouped HIV-negative and unknown status together because of the challenges associated with valid self-report of HIV-negative status, which depends on risk behavior of the respondent and the respondent’s partners since the last negative test. Additionally, from a behavioral perspective, both groups may experience perceived risk for HIV acquisition which may affect behavior.

Analysis

The primary outcomes of interest were number of episodes of sex without condoms with male, female, transgender, and all partners combined. We also conducted secondary analyses to examine these behaviors in the context of transmission risk. For HIV-positive men, we examined number of episodes of sex without condoms with HIV-negative and unknown male, female, transgender, and all partners combined. For HIV-negative/unknown men, we examined number of episodes of sex without condoms with male, female, transgender, and all partners combined – we considered any unprotected sex among this subset as involving risk of infection. We investigated associations between these outcomes and sociodemographic variables, lack of social support, internalized homonegativity, and being “out” to at least one person.

Generalized estimating equations, with a negative binomial distribution and a log link and assuming a robust variance estimator, were used to model the data. The negative binomial distribution was used due to the over-dispersion in count outcomes, typically observed using a Poisson process. We considered several other distributions that could account for over-dispersion (i.e., zero-inflated Poisson, Hurdle-Poisson, zero-inflated negative binomial, and
Hurdle negative binomial). The negative binomial distribution best fit our data, as evidenced by graphical display, goodness of fit statistics, and allowance of over-dispersion. Compound symmetry covariance structure was used to describe the correlation between individuals within the same network (i.e., those referred by the same index participant or in the second wave instigated by the index), indicating the correlations were presumed to be the same for individuals within the same network. We first conducted a series of bivariate analyses to examine individual relationships with the outcome variables. All candidate variables that had p-values ≤ 0.2 in the bivariate model were entered into the multivariable selection. In developing a final multivariable model, a backward selection was applied with a p-value less than .05 as the selection criterion. Study site and HIV-status (when applicable) were retained in all models. The models produced a means ratio for one or more pairs of subgroups within each independent variable, that is, the ratio of the estimated average number of episodes of sex without condoms for the two subgroups being compared. The analysis was conducted using the SAS GENMOD procedure in SAS software, Version 9.3 of the SAS System for Windows (SAS Institute Inc., Cary, NC).

Results

Data were collected from 584 black MSMW across the three sites; 161 from Philadelphia, 211 from Chicago, and 212 from Los Angeles. The sample of black MSMW was selected through a combination of community recruitment (45%) and chain referral (55%). Referrals were made via friends (59%), acquaintances (23%), current sex partners (6%), and former sex partners (6%). As displayed in Table 1, the mean age of the participants was 43 (SD=10). Approximately 75% reported their sexual orientation as “bisexual.” The sample was economically vulnerable; only 20% were employed full time, 75% had incomes of less than
$10,000 annually, and 49% reported considering themselves homeless at some point in the past year. Generally, the sample from Los Angeles was more economically marginalized than the other two cities. Drug use was common and also somewhat more common in Los Angeles. Across the cities, 50% reported marijuana and 34% cocaine or crack use. Heroin, opiates, depressants were reported by 16%. As mentioned previously, those reporting injection drug use in the past year were excluded from the study. However, in the baseline assessment, we did not ascertain if heroin was snorted, smoked or injected; those reporting use of this drug may have only used it non-intravenously or may not have disclosed it during the screening. About 36% of the sample was classified as having alcohol dependence. Most (96%) had been tested for HIV in their lifetimes; 76% in the past year. Approximately 39% of the sample had been diagnosed with HIV, though prevalence varied across cities and was highest in Chicago (63%). A high percentage of those diagnosed reported receiving HIV medical care (93%). Sixty-nine percent of those in care reported having an undetectable viral load.

As shown in Table 2, most participants reported both male (94%) and female (93%) partners in the past three months. About 42% reported having a transgender partner. Selling sex (31%) was slightly more common than buying sex (24%), whereas an additional 17.4% reported both. All participants reported sex without condoms, as this was a requirement for study participation. Participants were slightly more likely to report anal sex without condoms with male partners (89%) than anal or vaginal sex without condoms with female partners (83%). Participants reported a mean of 3.5 male partners and 3.6 female partners. Participants also reported transmission risks; 46%, 46%, and 11% of HIV-diagnosed men reported sex without condoms with HIV-negative or unknown status male, female, and transgender partners,
respectively. Among HIV-negative/unknown status men, the corresponding frequencies were 86%, 88%, and 36%.

Table 3 presents findings from the multivariable analysis among all participants for number of episodes of sex without condoms with all, male, and female partners. Compared to straight identified men, those who identified as “other” reported 47% fewer episodes with all partners. Compared to men who identified as straight, those who identified as gay reported 2.1 times the number of episodes with male partners and those who identified as bisexual reported 2.3 times such episodes. For female partners, patterns were in the opposite direction, but were not statistically significant. Compared to men who identified as straight, those who identified as other reported 61% fewer episodes with female partners. Compared to HIV-negative/unknown men, those who were HIV-positive reported 21% fewer episodes of sex without condoms with all partners. Compared to men who did not exchange any sex, men who reported both buying and selling reported 81% more episodes with all partners and 124% more episodes with female partners. Finally, compared to men who reported high social support, those with low social support reported 35% more episodes of sex without condoms with all partners and 44% more episodes with male partners.

We next conducted analyses stratified by participant’s HIV status. For participants who were HIV-positive, no variables remained at the .05 significance level in models for the number of episodes of sex without condoms with all partners and male partners who were HIV-negative/unknown. Several variables, however, were retained when examining number of episodes of sex without condoms with female partners who were HIV-negative/unknown (data not shown). HIV-positive men aged 50 and older reported 41% fewer episodes with HIV-negative/unknown females than men aged 18-39. Compared to straight men, those who identified
as bisexual reported 2.8 times as many episodes of sex without condoms with female partners.

Compared to straight men, those who identified as “other” reported 77% fewer episodes of sex without condoms with female partners. HIV-positive men who had disclosed same sex behavior to anyone reported 87% fewer episodes with female partners than men who had not disclosed. Finally, compared to men who did not exchange any sex, men who bought sex reported 12% more episodes of sex without condoms with female partners.

Table 4 presents results among HIV-negative/unknown participants for number of episodes of sex without condoms with all, male, and female partners. For all partners, men who did not have a high school diploma reported 1.48 times the number of episodes as men with at least some college; men who had only a high school diploma reported 1.28 times the number of episodes as men with at least some college. A similar pattern was observed among female partners. Compared to straight men, those who identified as “other” reported 49% fewer episodes with all partners. Compared to straight men, those who identified as gay reported 2.5 times as many episodes of sex without condoms with male partners and those who identified as bisexual reported 2.1 times as many episodes with male partners. The direction differed for female partners. Compared to straight men, those who identified as bisexual reported 33% fewer episodes of sex without condoms with female partners and those who identified as other reported 62% fewer episodes with female partners. Compared to men who did not exchange any sex, those who bought (and did not sell) sex reported 47% more episodes and those who both bought and sold reported 70% more episodes with all partners. Compared to men who did not exchange any sex, men who reported both buying and selling reported 58% more episodes of sex without condoms with male partners. Compared to men who reported low internalized homonegativity, those with high homonegativity reported 23% fewer episodes of sex without condoms with all
partners. Finally, compared to men who reported high social support, those with low social support reported 53% more episodes of sex without condoms with male partners.

Discussion

These findings underscore the urgent need to address HIV among black MSMW. Results should be considered in light of the enrollment criteria, intentionally designed to recruit men with at least some behavioral risk for intervention studies. However, the resulting sample reflected significant risk over and above the behavioral criteria. The study population reported a high HIV prevalence as well as high prevalence of sex without condoms and multiple partners within a short time frame. We also noted sex without condoms involving transmission and infection risk among both men who were HIV-positive and HIV-negative/unknown. Most men who knew they were HIV-positive were in care; however, only about two-thirds reported an undetectable viral load, which would significantly reduce transmission potential (Montaner et al., 2010). Unrecognized infection may be more prevalent among black MSMW than other groups, suggesting that both HIV-positive and HIV-negative/unknown partners represent a significant source of acquisition risk (Jeffries, 2014). Most men in this sample had been tested in the prior 12 months; however, annual testing may not be frequent enough; some research suggests that some sexually active MSM may benefit from HIV testing every 3-6 months (Finlayson et al., 2011).

As with other studies with this population (Asare Bempong, Ramamurthi, McCuller, Williams, & Harawa, 2014; J. Lauby et al., 2008), we recruited a sample characterized by economic vulnerability – low employment and income, frequent substance use and exchange sex.
The monetary incentives for participation and for recruitment may have been more compelling to those with less resources and more time due to lack of formal employment. However, these characteristics have been noted in other research focused on MSMW, who appear to experience more economic marginalization than other men (Jeffries, 2014). Associated with economic vulnerability, low educational attainment may also contribute to increased frequency of condomless sex. Interventions to prevent transmission may need to acknowledge and address these difficult life circumstances and ameliorate the potential negative impact of low educational attainment on uptake of preventive behaviors. Additionally, sexual risk-reduction interventions may need to promote risk-reduction strategies that are tailored to partner types, including those involving different exchange agreements for money, drugs, and survival needs such as a place to stay. Formative research on how best to address the needs for male sex workers suggests incorporating harm reduction approaches, access to social services and medical care with community level anti-stigma campaigns to maximize effectiveness (Baral et al., 2015). In general, structural interventions, messages, and policies outside of the health sector that enhance educational opportunities, counteract racism and decrease intersectional stigma of same sex practices, commercial sex, and HIV-positive status, may be better suited to address the underlying and intersecting forces that marginalize Black MSMW. For example, interventions such Acceptance Journey’s, an anti-homophobia social marketing campaign for the black community, are promising (Hull et al., 2017).

Several studies have compared sexual risk behaviors with male and female partners. Some older studies have indicated MSMW may have unprotected sex more often with their female partners than male partners (Goldbaum et al., 1998; Kalichman, Roffman, Picciano, & Bolan, 1998; Wohl et al., 2002). In this sample, the frequency of reporting main female and male
partners was similar, as was the frequency of sex without condoms and number of such episodes. However, correlates of sex without condoms differed by the gender of the partner. Notably, compared to HIV-negative and unknown status men who identified as straight, sexual orientation identification as bisexual was associated with more risk among male partners and less risk among female partners. Collectively, these findings reinforce the importance of specifically addressing sexual risk with partners across the gender spectrum, including transgender partners. They also reinforce the need for messages and interventions that can be tailored for MSMW with a diversity of sexual partners, identities, and patterns.

We found low social support was associated with more episodes of sex without condoms with all partners, and specifically with male partners. This finding echoes other research among MSM that has associated lower levels of support with HIV risk and higher levels of support with HIV testing (Carlos et al., 2010; J. L. Lauby et al., 2012; Peterson et al., 1992) and greater viral load suppression (Blashill et al., 2015; M.R. Friedman et al., 2017). Friedman and others have explored how viral load suppression, ART adherence, and co-occurring psychosocial factors, such as depression, form a synergistic epidemic among MSM, with roots in early life adversities such as sexuality-related stigma and marginalization (Blashill et al., 2015; M.R. Friedman et al., 2017; Stall et al., 2003). Sexual minorities experience disparities in social support and connectedness, mediating the development of harmful psychosocial outcomes (Coulter, Herrick, Friedman, & Stall, 2016; Frost, Meyer, & Schwartz, 2016). However, cultivating sources of social support may be particularly difficult for some black MSMW, who often face ongoing marginalization from familial and religious institutions into adulthood (Dodge et al., 2008). Interventions that enhance social support may be particularly effective in reducing sexual risk as
well as generating other positive effects on holistic wellbeing (Jeffries, 2014; Williams, Ramamurthi, Manago, & Harawa, 2009).

Other research has found that black MSM with positive gay and racial self-identification reported higher levels of self-esteem, HIV prevention self-efficacy, stronger social support networks, greater levels of life satisfaction, and lower levels of male gender role and psychological distress compared to men who reported less positive African American and gay identity development (Crawford, Allison, Zamboni, & Soto, 2002). Similarly, the psychological impact of both gender role conflict and internalized homonegativity may be low self-worth or value, which in turn may translate to less self-protective behavior. However, the relationship between risk and internalized homonegativity may not be direct nor consistent across subgroups (Halkitis et al., 2013; Mansergh et al., 2015). We found that HIV-negative and unknown status men who reported more homonegative attitudes reported fewer episodes of sex without condoms with all partners. It is possible that ambivalence about gay identity and same-sex attraction operates differently among MSMW and MSMO. As minority stress theory suggests, homonegative attitudes may promote illicit substance use and other unhealthy behaviors among MSMO (Hatzenbuehler, McLaughlin, & Nolen-Hoeksema, 2008; Newcomb & Mustanski, 2011). Among MSMO, these maladaptive behaviors may stem from a struggle to reconcile sexual behaviors with beliefs that such behaviors are morally wrong or from coping with societal stigma (Jeffries & Johnson, 2015). However, for MSMW, this relationship may be reversed. Homonegative attitudes might suppress maladaptive behaviors among MSMW because these beliefs offer some self-validation, self-worth, and social approval derived from sex with women. MSMW with internalized homophobia may also be less inclined than other MSMW to socially engage with MSMO - among whom condomless sex is common (Centers for Disease Control
and Prevention, 2013) - and, subsequently, may be less exposed to sexual risk promoting norms. Additional research elucidating the influences of homonegative attitudes and gender-role conflict among these populations is needed.

The findings from this study should be considered in the context of several limitations. The sample may not be generalizable due to the non-random chain referral method. Since these data are cross-sectional, we cannot draw any causal inference. Additionally, the eligibility criteria included sexual risk that influenced the overall profile of the sample. Although ACASI has been shown to reduce reporting bias (Langhaug, Sherr, & Cowan, 2010), we relied on self-report of sexual practices and HIV status with no biological markers. Desirability bias may have played a role and may have been particularly acute for HIV-positive participants reporting sex with HIV-negative or unknown status partners, since this was a felony in two of the states where the study was conducted. The study was originally proposed as conclusive evidence was mounting regarding the effectiveness of treatment as prevention (Das et al., 2010) Given this timing, the sample was not powered to model factors predictive of sexual transmission risk among participants who were HIV-positive and have a detectable viral load, which is a more accurate portrayal of transmission risk potential. As a matter of practice, future research should incorporate viral load status when describing transmission risk.

The average interview time was 115 minutes, which may have been onerous for some participants and led to invalid reporting to conclude the interview. Additionally, the classification of serodiscordant sex and high risk behaviors did not take into account seropositioning or other prevention strategies such as PrEP. Participants were asked to report behaviors separately for male, female, and male-to-female transgender partners. For ease of language, we used the terms male/men and female/women interchangeability and did not precisely define the terms.
However, we did define “transgender” in the assessment: “By transgender, we mean male-to-female, that is, those who were born male but now identify as female or as transgender/transsexual. No respondents reported any difficulty understanding this; however, the approach risks conflating gender and biological sex which may have led to some undetected error in reporting. Finally, the analytic sample includes respondents who may have been ineligible. Heroin use in the past three months was reported by 5% of the sample in the baseline assessment. However, injection drug use in the past year was an exclusion criterion. Since we did not ask about route of administration in the baseline assessment, we are unable to determine if it was injected, snorted, or smoked; those reporting use of this drug may have used it non-intravenously or may not have disclosed IDU during the eligibility screening.

This study contributes to the body of literature establishing that black MSMW are in need of interventions that address their high risk for HIV infection and significant social marginalization. While the overall study was primarily focused on meeting this need via the development of new individual and group interventions that focused on sexual risk, additional strategies that reach beyond individual behavior are needed. Though sexual risk behavior does contribute to these men’s risk for HIV transmission and acquisition; environmental factors also appear to contribute to increased risk (Millett et al., 2012; Millett, Peterson, Wolitski, & Stall, 2006). Future studies should examine contextual factors in addition to individual risk behaviors to help inform the development and implementation of the most promising strategies to prevent HIV and enhance the overall health and wellness of black MSMW, thereby serving to enhance the health black MSMW, their sexual partners, and wider communities.
References


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