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ORIGINAL RESEARCH

Efficacy of an HIV/STI Prevention Intervention for Black Men Who Have Sex with Men: Findings from the *Many Men, Many Voices* (*3MV*) Project

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Abstract Black men who have sex with men (MSM) in the United States experience disproportionately high rates of HIV and other sexually transmitted infections (STIs); however, the number of evidence-based interventions for Black MSM is limited. This study evaluated the efficacy of *Many Men*, *Many Voices* (*3MV*), a small-group HIV/STI prevention intervention developed by Black MSM-serving community-based organizations and a university-based HIV/STI prevention and training program. The study sample included 338 Black MSM of HIV-negative or unknown HIV serostatus residing in New York city. Participants were randomly assigned to the *3MV* intervention condition ($n = 164$) or wait-list comparison condition ($n = 174$). Relative to comparison participants, *3MV* participants reported significantly greater reductions in any unprotected anal intercourse with casual male partners; a trend for consistent condom use during receptive anal intercourse with casual male partners; and significantly greater reductions in the number of male sex partners and greater increases in HIV testing. This study is the first randomized trial to demonstrate the efficacy of an HIV/STI prevention intervention for Black MSM.

Keywords Black MSM · Unprotected anal intercourse · Condom use · HIV and STI testing · Behavioral intervention · Prevention

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Introduction

Black communities in the United States (US) have experienced extremely high rates of HIV infection since the onset of the AIDS epidemic (Centers for Disease Control and Prevention [CDC] 2008a; Cohen 1999; Fullilove 2006). During 2006, Blacks accounted for 45% of the estimated 56,300 new HIV infections in the US compared to 35% for Whites and 17% for Latinos (Hall et al. 2008). Of those infections that occurred among Black males, 63% occurred among Black men who have sex with men (MSM; CDC 2008a). Among young MSM aged 13–29, the estimated numbers of new infections among Blacks are 1.6 times greater than those among Whites and 2.3 times greater than those among Latinos (CDC 2008b). In a multisite epidemiological study of 1,767 MSM conducted in five US cities, 46% of Black MSM tested HIV-positive; of these men, 67% were not aware of their infection (CDC 2005). Similarly, nearly half of the estimated 4,762 new HIV cases in New York city during 2006 occurred among MSM (New York City Department of Health and Mental Hygiene [NYCDOHMH] 2008a); and for MSM under age 30, 77% occurred among Blacks and Latinos (NYCDOHMH 2008b). Moreover, surveillance data on sexually transmitted infections (STIs) in New York city during 2006

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indicate that Black men and MSM accounted for more diagnoses of primary and secondary syphilis and anorectal gonorrhea than any other group (NYCDOHMH 2007). Taken together, these data demonstrate the severe and disproportionate impact of the HIV/AIDS epidemic and STIs on Black MSM in the US (Wilton 2009).

HIV behavioral research has shown that unprotected anal intercourse (UAI) results in the greatest risk of acquiring and transmitting HIV among MSM (Vittinghoff et al. 1999). Biomedical research has indicated that the presence of STIs (i.e., gonorrhea, syphilis) facilitates HIV acquisition and transmission (Wasserheit 1992). In recent years, a growing number of research studies have sought to identify factors associated with the high rates of HIV infection among Black MSM (Mays et al. 2004). A critical review of these studies has identified high rates of STIs, infrequent HIV testing, and late diagnosis of HIV infection as key factors associated with increased HIV risk (Millett et al. 2006). A subsequent meta-analysis showed that, compared to White MSM, Black MSM report less illicit substance use, fewer sexual partners, and less frequent disclosure of same-gender sexual behaviors; and no significant racial differences were noted in the frequency of sexual risk behaviors, history of commercial sex work, HIV testing patterns, or sexual contacts with HIV-positive partners (Millett et al. 2007). Some researchers have posited that Black MSM are at disproportionate risk of HIV infection due to a higher prevalence of HIV and STIs among members of their sexual networks, are more likely to have sex with Black men than with men of other races and ethnicities, are less likely to disclose their same-sex behaviors to medical providers, and are subject to a myriad of barriers to health care (Aral et al. 2008; Bernstein et al. 2008; Berry et al. 2007; Malebranche et al. 2004). All of these findings indicate a need for HIV/STI prevention programs for Black MSM to emphasize more frequent HIV and STI testing in addition to reducing UAI.

Several HIV prevention interventions for MSM have been shown to be efficacious in reducing HIV sexual risk behaviors such as UAI and the number of sexual partners, and increasing protective sexual behaviors, such as condom use (Herbst et al. 2007; Johnson et al. 2008). To date, however, only one behavioral intervention developed specifically for Black MSM has been evaluated in a randomized controlled trial (Peterson et al. 1996). In that trial, Black MSM participating in a three-session intervention condition reported greater reductions in risky sexual behavior than participants in a single-session intervention; however, neither intervention condition differed significantly from the control condition. Research is currently underway to develop new interventions for Black MSM (Koblin et al. 2008; Williams et al. 2008), and a recent evaluation of an efficacious community-level intervention originally developed for White MSM and adapted for Black MSM reported favorable results (Jones et al. 2008). However, there is an urgent need for innovative approaches to address the paucity of efficacious and culturally appropriate HIV/STI prevention interventions that are available for Black MSM (Black Gay Research Group 2007; Mays et al. 2004; Wheeler et al. 2008; Wilton 2009). One such approach consists of identifying and supporting rigorous evaluations of interventions that have been developed by community-based organizations (CBOs) for Black MSM with considerable input from served communities (CDC 2004). This grassroots approach to intervention development is not only culturally relevant, but can also enhance community ownership and empowerment through the participation of served communities in the development of intervention programs (Minkler and Wallerstein 2003).

Beginning in 1997, two CBOs that serve Black MSM—Men of Color Health Awareness (MOCHA) in Rochester and Buffalo, NY, and People of Color in Crisis (POCC) in Brooklyn, NY—collaborated with an HIV/STI prevention and training program (Center for Health and Behavioral Training) at the University of Rochester to develop a culturally tailored behavioral intervention for Black MSM that integrated HIV and STI prevention. The group-level, peer-led intervention, *Many Men*, *Many Voices* (*3MV*), was developed based on a review of published studies of HIV and STI risks among Black MSM, and extensive ethnographic formative research in Black MSM communities (Coury-Doniger et al. 1998). The intervention was originally based on two evidence-based interventions for MSM (Kelly et al. 1989; Peterson et al. 1996); however, focus groups, key informant interviews, and pilot tests revealed a need to address the unique prevention needs of Black MSM. New intervention components were developed to address the dual identity struggle of Black MSM as men who are Black and gay; the relationship between STIs and HIV infection; the effects of familial, cultural, and religious norms; the effects of racism and homophobia on HIV risk behaviors; and sexual relationship dynamics common to Black MSM.

The *3MV* intervention has been delivered by various CBOs since 1997, and because of an urgent need for interventions for Black MSM, CDC included *3MV* in its Diffusion of Effective Behavioral Interventions (DEBI) program beginning in 2004 (Academy for Educational Development 2008). However, the efficacy of the intervention had never been rigorously evaluated in a randomized controlled trial. The purpose of this study is to report the results of an outcome evaluation of the *3MV* intervention as delivered to Black MSM by POCC, a Brooklyn-based CBO that had been providing HIV prevention services to Black MSM in New York city since

1988. In delivering *3MV*, POCC sought to lower HIV and STI transmission risks among Black MSM by reducing unprotected insertive and receptive anal intercourse with main and casual sex partners and the number of sex partners, and by increasing protective behaviors including consistent condom use during anal intercourse and testing for HIV and other STIs. The evaluation of *3MV* was supported by the Innovative Interventions project of the CDC that aimed to support CBO efforts to rigorously evaluate their locally-developed HIV prevention interventions for high-risk minority populations (CDC 2004).

Methods

Participants

From August 2005 through November 2006, POCC evaluation project staff recruited potential participants from venues throughout New York City. Contacts with potential participants were established through active recruitment methods that included street outreach, displays at New York City Black gay pride festivals, referrals from friends of participants, community-based gatekeepers and POCC clients, and distribution of palm cards in nightclubs and other venues frequented by Black MSM. Passive recruitment methods were also used, including advertisements in gay newspapers or magazines. All potential participants were screened twice to determine eligibility. Initial eligibility was determined by telephone screening. Individuals who called POCC, or who were called by POCC staff based on the contact information they provided, were required to self-identify as a Black MSM (i.e., self-identify as gay, bisexual or same gender-loving, or as being sexually active with other men, or sexually or emotionally attracted to other men), be 18 years of age or older, willing to attend and participate in an HIV/STI prevention intervention retreat delivered outside New York City, and could not have previously participated in the *3MV* intervention. Of the 720 potential participants who were contacted during the initial screening process, 601 (83.5%) were eligible and were invited to visit the POCC offices in Brooklyn, NY for a second, in-person screening interview.

During the second screening session, project staff met with potential participants to verify the information provided during the initial telephone screening and to further assess their eligibility. Eligible participants were required to report their HIV serostatus as HIV-negative or unknown, be willing to attend an intervention retreat without their primary partner or boyfriend, be willing to discuss male-to-male sexual behavior in a group setting, reside in New York City, and have no plans to relocate within 6 months. Of the 490 individuals who completed the second screening, 338 (69%) met all of the eligibility criteria and were enrolled in the evaluation (see Fig. 1). Participants who were ineligible because of their HIV-positive serostatus or for other reasons were referred to appropriate primary care, social services, or other HIV prevention programs offered at POCC or elsewhere in the community.

Study Procedures

The evaluation design was a randomized controlled trial, and the evaluation protocol was approved by the Human Subjects Research Review Committee at Binghamton University. All eligible participants completed a baseline assessment using audio computer-assisted self-interview (ACASI) technology. Participants were then randomly assigned to the *3MV* intervention condition ($n = 164$) or the wait-list comparison condition ($n = 174$) using a computer software program developed for the project. Those individuals who were assigned to the intervention condition were given dates for the weekend intervention retreats they would attend (comprising half-day Friday and all day Saturday and Sunday) at temporarily rented facilities in upstate New York. Individuals who were assigned to the comparison condition were scheduled to receive the *3MV* intervention 6 months following completion of their baseline assessment.

Prior to attending the intervention retreat, participants were requested to attend an orientation meeting at POCC to obtain information about the logistics and format of the retreat, and to establish ground rules for appropriate behavior. The groups of participants met at POCC offices on Friday before their retreat, and were transported by bus to the retreat venue. Once participants arrived at the retreat location, they received the *3MV* intervention during six consecutive 2- to 3-h sessions. All facilitators delivered the intervention in accordance to the *3MV* curriculum.

Two trained Black MSM peers co-facilitated the sessions. During each retreat, two quality assurance experts rated the facilitators' skills using a standardized assessment instrument. The ratings demonstrated that the facilitators delivered the intervention components with fidelity to the *3MV* curriculum. Participants were not compensated for their participation in the intervention. However, they were provided with roundtrip bus transportation to the retreat location, lodging and meals, and were remunerated for completing follow-up assessments after receiving the intervention (see details below). Participants were invited to return to POCC 2 weeks following the retreat to receive information about services for Black MSM in the community, including HIV/STI testing and treatment, mental health and substance use treatment, and access to health care; however, this was not an intrinsic part of the *3MV* intervention.

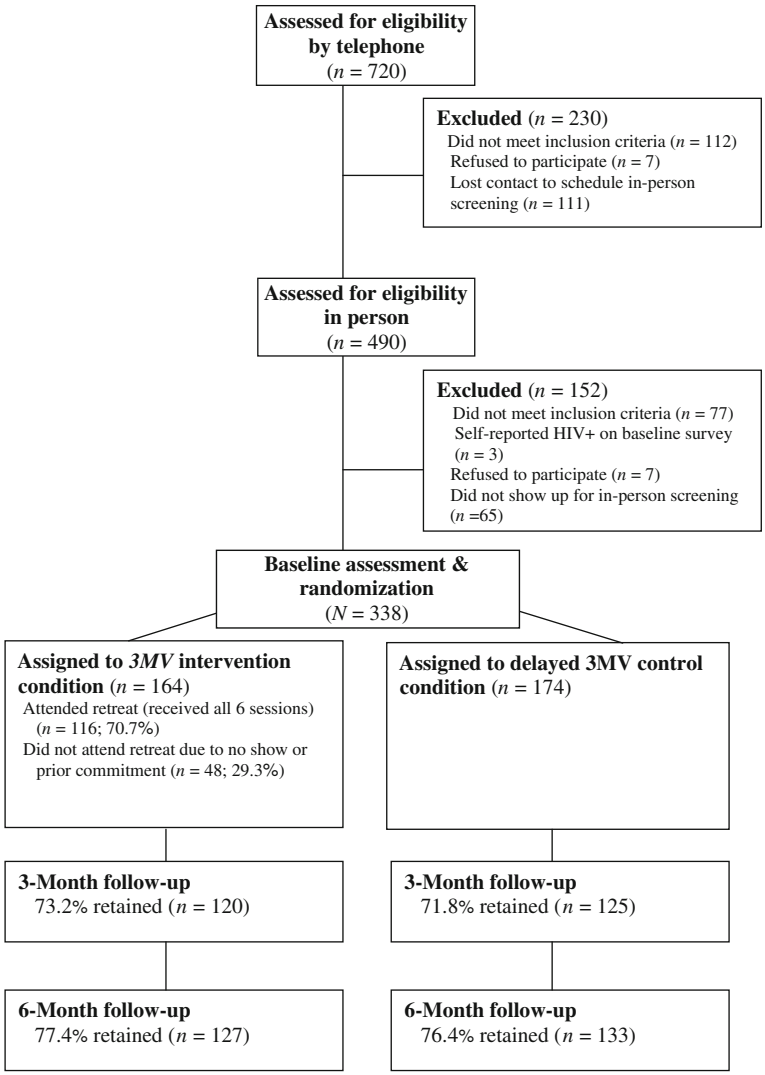

Fig. 1 Flow diagram of study participant recruitment, allocation, and retention, New York City, 2005–2007

Intervention Methods

3MV is a small group intervention that addresses behavioral and social determinants and other factors influencing the HIV/STI risk and protective behaviors of Black MSM. These other factors include cultural, social and religious norms, identity of Black MSM and their degree of connectedness to Black and gay communities, HIV/STI interactions, sexual relationship dynamics, and the social influences of racism and homophobia. Behavior change theories and models guiding the development of *3MV* included social cognitive theory (Bandura 1977), the behavioral skills acquisition model (Kelly 1995), the transtheoretical model of behavior change (Prochaska et al. 1992), and the decisional balance model (Janis and Mann 1977). A unique component of *3MV* is the development of menus of behavior change options for HIV/STI prevention rather than a singular emphasis on condom use that is common in other HIV prevention interventions for MSM (Coury-Doniger et al. 2001). Session 1 (*The Culture of Black MSM*) helped participants recognize how racism and homophobia are related to sexual and substance use risk behaviors. Session 2 (*STI/HIV Prevention for Black MSM*) described the roles of "Tops" and "Bottoms" as they relate to sexual relationship dynamics and the risk of STI and HIV transmission. Session 3 (*STI/HIV Risk Assessment and Prevention Options*) helped participants personalize their own risk by building a menu of behavioral options (e.g., abstinence, mutual monogamy between two HIV seronegative partners, consistent condom use) to reduce HIV/STI transmission risk. Session 4 (*Intentions to Act & Capacity for Change*) enhanced participants' intentions to change their own risky behaviors, and guided them toward safer sex behaviors. During Session 5 (*Relationship issues*: *Partner selection*, *Communication & Negotiation*), participants recognized power and control dynamics in their relationships, and were encouraged to select and implement a relationship-focused risk reduction behavior change

option with their partner(s). Session 6 (*Social Support & Problem Solving to Maintain Change*) involved participants role-playing communication and negotiation strategies, provided peer support to promote problem solving, and identified effective risk-reduction strategies if relapse should occur. Information about the *3MV* intervention is available from the Center for Health and Behavioral Training (http://www.urmc.rochester.edu/chbt/).

Data Collection

Evaluation data were collected from all participants at baseline, at 3 and 6 months following the intervention retreat for *3MV* participants, and at 3 and 6 months after collection of baseline data for comparison participants. At each assessment, participants completed behavioral risk interviews using ACASI that assessed demographics, drug use, and sexual risk behaviors. Participants received no remuneration for the baseline assessment, $50 for the 3-month assessment, and $75 for the 6-month assessment.

Outcome Measures

Based on the *3MV* menu of options, several outcomes were used to assess the efficacy of the intervention in reducing sexual risk behaviors, increasing protective behaviors, and increasing HIV and STI testing. Because these measures were based on self-reports, steps were taken to enhance the validity of participants' responses: ACASI was used to minimize interviewer bias and socially desirable responses (Metzger et al. 2000); 3-month recall periods were used to optimize recall of behaviors; and facilitators who delivered the intervention were not involved in baseline and follow-up assessment activities.

Sexual Risk Behavior Outcomes

Items regarding sexual risk behaviors were adapted from a previous study (Wolitski et al. 2005). Participants were asked to report the number of anal intercourse acts occurring during the past 3 months with their main and casual male sex partners. Questions were further stratified according to respondents' insertive or receptive role during anal sex, with and without ejaculation, and with and without condoms. Questions about unprotected and protected anal intercourse acts with casual partners were asked separately according to partners' HIV serostatus. Allowable responses to these sex behavior questions ranged from 0 to 999 acts. To reduce the effects of responses with extreme values and possible overestimates, responses that reported 100–999 acts for any item were Winsorized or recoded to the highest value for that item that was <100 (Lix and Keselman 1998). When a small proportion of values are extreme, substituting the next largest observation yields a more stable variance and an optimum estimate of the mean (Dixon 1960). The largest number of responses affected on any one item by these adjustments was four, representing 1.2% of the 338 participants.

Sexual risk behavior outcomes during the past 3 months were computed by adding responses to summarize the number of episodes of unprotected insertive anal intercourse (UIAI) and unprotected receptive anal intercourse (URAI) with main partners, and UIAI and URAI with casual partners. Dichotomous variables were also constructed to represent whether participants reported any UAI, UIAI, and URAI with main or casual male partners. Following Wolitski et al. (2005), condom use during anal intercourse was categorized as having used condoms always (100% of acts), sometimes (1–99% of acts), or never (0% of acts) among respondents who reported anal intercourse with main and casual partners in the past 3 months.

Additional self-reported sexual risk behaviors during the past 3 months included the total number of male sex partners and the number of episodes of unprotected and protected vaginal and anal sex with women. However, too few participants (9%; $n = 31$) reported having sex with a woman to perform statistical tests on these sex outcomes.

HIV and STI Testing Outcomes

Participants were asked if they had been tested for HIV, and if tested, if they had received their test results. The baseline assessment included lifetime HIV testing history and HIV testing during the past 3 months. Those participants who reported that they had received their test results were asked to describe their HIV serostatus. Identical questions were asked about testing for STIs, including gonorrhea, syphilis, and Chlamydia. HIV and STI testing questions at the 3- and 6-month follow-ups used a 3-month recall period.

Statistical Analyses

The evaluation outcomes were assessed using a rigorous intention-to-treat approach where participants were included in the analysis as originally assigned, regardless of whether they actually attended the intervention retreat (Lyles et al. 2006). Sub-analyses of intervention participants who did attend the intervention were also conducted. The results of the as-treated analyses were similar to the results of the intention-to-treat analyses although slightly more favorable. Baseline descriptive statistics were calculated to summarize sociodemographic variables, drug and sexual behaviors, and HIV and STI testing among men in the two evaluation conditions. Differences between

conditions were assessed using Student *t* tests for continuous variables and chi-square analyses for categorical variables. An alpha level of 0.05 was used for all statistical tests.

All analyses of results at the 3- and 6-month assessments included the baseline measure for the corresponding outcome as a covariate. These analyses used logistic regression to compute the adjusted odds ratio (OR) and 95% confidence interval (CI) for dichotomous outcomes (HIV and STI testing) and logistic regression with the assumption of proportional odds for the three-level ordinal outcome (condom use). Count outcomes (number of UAI acts) were modeled using SAS Proc GENMOD (SAS Institute, Cary, NC) to compute a negative binomial fit with a log link function. The results were used to calculate rate ratios (RR) and 95% CI. To clarify whether the use of negative binomial models were adequate for our outcome analysis, analyses were also conducted that modeled each count outcome (episodes of unprotected sex or number of sex partners) as a zero-inflated negative binomial distribution (Rose et al. 2006). The results were very similar to those described below for the negative binomial model, and are not presented here.

Intervention efficacy was also analyzed over the entire study period (from baseline to the 6-month assessment). To assess intervention effects for the entire follow-up period, logistic and linear generalized estimating equation (GEE) regression models were constructed to control for repeated within-subject measurements (Liang and Zeger 1986). These models included a time-independent variable (study condition) and time-dependent variables (covariates and outcomes). Fitted GEE parameters represent log odds ratios in logistic models of dichotomous outcomes and log rate ratios in negative binomial models of count outcomes over the entire 6-month period for an "average" participant. The 95% CI around the adjusted odds ratios or rate ratios and the corresponding *P* value were also computed.

Results

Sample Characteristics

The characteristics of the 338 participants who completed a baseline assessment and enrolled in the study are shown in Table 1. There were no statistically significant differences between the two study conditions on baseline sociodemographic characteristics, drug use, and sexual risk behaviors. The majority of the sample identified themselves as male (99.1%; $n = 335$) and three participants self-identified as transgender (0.9%). Participants had a mean age of 29.6 years (SD = 9.3; range 18–72). Two-thirds of participants (67.6%; $n = 228$) reported their race/ethnicity as African American, while the remaining participants reported their race/ethnicity as Caribbean/West Indian (16.7%; $n = 56$), Afro-Latino (11.3%; $n = 38$), African (1.5%, $n = 5$), or mixed ancestry (3.0%; $n = 11$). The majority of participants had attended college (41.7%; $n = 141$) or had a college degree (29.9%; $n = 101$), whereas 21.6% ($n = 73$) had only a high school degree or general educational development certificate (GED) and 6.8% ($n = 23$) had dropped out of high school.

The majority of participants (78.1%; $n = 264$) identified as gay or homosexual, 18.3% ($n = 62$) bisexual, 1.2% ($n = 4$) heterosexual or straight, and 2.4% ($n = 8$) were unsure of their sexual orientation. About half of the participants (51.2%; $n = 173$) reported assuming both insertive and receptive sex roles during anal intercourse, 26.3% ($n = 89$) took the insertive role only, and 17.1% ($n = 58$) the receptive role only. At baseline, about one-third (34.0%; $n = 115$) of the participants reported that they were in a relationship with a main male partner. Among these men, 59.1% ($n = 68$) had been in that relationship more than 6 months. Nearly three-quarters of the respondents ($n = 240$) reported having had anal intercourse with a non-main or casual male sex partner; and 66 (19.5% of the total sample) reported that they had had sex with both main and casual male partners during the 3 months prior to the baseline assessment.

Analysis of Attrition

Overall, 299 participants (88.5%) returned for at least one follow-up assessment and were included in the main outcome analyses; 245 (72.5%) were retained at 3 months and 260 (76.9%) at 6 months (Fig. 1). Retention rates were >70% for both the intervention and comparison groups at each of the two follow-up assessments. Compared to the 299 participants returning for at least one follow-up, the 39 lost to follow-up were less likely to self-identify as gay or homosexual ($\chi^2[1, N = 338] = 7.08$, $P = 0.008$) or report having a main male sex partner ($\chi^2[1, N = 338] = 5.08$, $P = 0.024$), and more likely to report having sex with a woman ($\chi^2[1, N = 338] = 5.64$, $P = 0.018$). No differences in attrition were observed between study conditions at the 3- or 6-month assessments (*P*'s equal 0.78 and 0.83, respectively). Participants in the *3MV* intervention who were lost to follow-up were less likely to report having a main male sex partner ($\chi^2[1, N = 164] = 8.81$, $P = 0.003$) and were more likely to report having been tested for an STI ($\chi^2[1, N = 164] = 5.76$, $P = 0.016$). Among participants in the comparison condition, those who were lost to follow-up were less likely to identify as gay or homosexual ($\chi^2[1, N = 174] = 4.21$, $P = 0.04$) and more likely to report having sex with a woman ($\chi^2[1, N = 142] = 5.76$, $P = 0.016$).

Table 1 Baseline comparability of the *Many Men*, *Many Voices* (*3MV*) intervention and wait list comparison groups of Black MSM, New York city, 2005–2007

Characteristic	*3MV* intervention ($N = 164$)		Wait list comparison ($N = 174$)		t-test/χ^2 (P value)[a]
	Mean (SD)	*N* (%)	Mean (SD)	*N* (%)	
Sociodemographics					
Age at baseline visit (years)	29.5 (9.1)		29.7 (9.5)		0.15 (0.88)
Latino ethnicity		17 (10.4)		21 (12.2)	0.28 (0.59)
Born outside United States		19 (11.6)		23 (13.2)	0.46 (0.65)
Self-identified gay or homosexual		131 (79.9)		133 (76.4)	0.59 (0.44)
High school graduate		40 (24.4)		56 (32.2)	2.52 (0.11)
Income <$20,000 per year		81 (50.0)		76 (44.2)	1.13 (0.29)
Unemployed		38 (23.2)		41 (23.6)	0.01 (0.93)
Attended prior HIV workshop		28 (17.3)		44 (25.6)	3.40 (0.07)
Drug use behaviors (*past 3 months*)					
Had 5 or more alcoholic drinks at single occasion		88 (62.9)		83 (53.0)	0.69 (0.41)
Any use of marijuana		140 (85.9)		143 (83.1)	0.48 (0.49)
Any use of crack or cocaine		19 (11.7)		14 (8.1)	1.21 (0.27)
Any use of crystal methamphetamine		4 (2.5)		2 (1.2)	0.81 (0.37)
Any use of ecstasy		15 (9.3)		22 (12.8)	1.06 (0.30)
Any use of ketamine		2 (1.2)		4 (2.3)	0.56 (0.45)
Any use of other street drugs		13 (8.0)		12 (7.0)	0.13 (0.72)
Any injection drug use		1 (0.6)		3 (1.7)	0.90 (0.34)
Sex behaviors (*past 3 months*)					
Number of male sex partners	3.0 (3.7)		3.3 (5.6)		0.46 (0.64)
Have main male sex partner		52 (31.7)		63 (36.2)	0.76 (0.38)
Have casual male sex partner(s)		121 (73.8)		119 (68.4)	1.19 (0.28)
UAI with sex worker		30 (18.3)		37 (21.3)	0.47 (0.49)
UAI while using drugs		28 (17.1)		28 (16.1)	0.06 (0.81)
UAI while using alcohol		38 (23.3)		35 (20.6)	0.36 (0.55)
Attended sex party for men		18 (11.0)		27 (15.5)	0.10 (0.22)
Any vaginal sex with a woman		16 (11.6)		15 (10.6)	0.08 (0.78)
Number episodes UAI with male sex partners (past 3 months)					
Main partner					
Any UAI	4.4 (19.6)		5.9 (18.4)		0.76 (0.47)
Insertive UAI	2.4 (12.4)		4.9 (17.4)		1.50 (0.13)
Receptive UAI	2.0 (9.7)		1.0 (4.1)		−1.24 (0.22)
Casual partners					
Any UAI	4.4 (13.1)		4.7 (20.9)		0.15 (0.88)
Insertive UAI	2.6 (8.1)		2.8 (11.9)		0.16 (0.87)
Receptive UAI	1.7 (7.0)		1.9 (9.5)		0.16 (0.87)
HIV testing[b]					
Ever tested		156 (95.1)		169 (97.1)	0.92 (0.34)
Tested past 3 months		63 (38.4)		77 (44.3)	1.19 (0.28)
Received test results[c]		58 (92.1)		74 (96.1)	1.05 (0.31)
STI testing[b,d]					
Tested past 3 months		54 (32.9)		67 (39.0)	1.32 (0.25)
Received STI diagnosis[c]		5 (3.0)		10 (5.7)	1.45 (0.23)

UAI, unprotected anal intercourse

[a] Statistics are t-tests for means and standard deviations, and Chi-square tests for percentages

[b] Based on self-report

[c] Among those who tested in past 3 months

[d] Includes syphilis, gonorrhea and chlamydia

Participation in Intervention Retreats

As indicated in Fig. 1, 116 (70.7%) of the 164 individuals who were assigned to the *3MV* intervention condition attended the intervention retreats after providing baseline information. Compared to intervention participants who attended their retreats as scheduled, those who did not attend retreats were more likely to report that they had taken part in a prior HIV prevention group or workshop (27.1 vs. 13.2%; $\chi^2[1, N = 162] = 4.58$, $P = 0.032$). No other baseline differences were observed between retreat attendees and non-attendees.

Effects of the *3MV* Intervention on Unprotected Anal Intercourse

The occurrences of UAI reported during the past 3 months were analyzed separately for participants' main and casual male sex partners (Table 2). There were no significant intervention effects on the number of any, insertive, or receptive UAI episodes with main partners at the 3- or 6-month assessments; however, the direction of all changes was protective and more favorable in the intervention condition. Analyses of reported UAI episodes with casual male sex partners indicated that, relative to comparison participants, *3MV* intervention participants reported significantly greater reductions in the total number of UAI episodes at the 6-month assessment (RR = 0.34, 95% CI = 0.14–0.83, $P = 0.012$). There was a significant intervention effect on reductions in insertive UAI episodes with casual male sex partners at the 6-month assessment (RR = 0.24, 95% CI = 0.09–0.65, $P = 0.005$). Examination of linear trends across the entire study period indicated that *3MV* participants reported a 51% greater reduction than comparison participants in the total number of insertive UAI episodes with casual sex partners (RR = 0.49, 95% CI = 0.28–0.87, $P = 0.015$; see Fig. 2). There were no statistically significant intervention effects on receptive UAI with casual male partners, but the effects favored the intervention group at the 6-month assessment and across the entire study period.

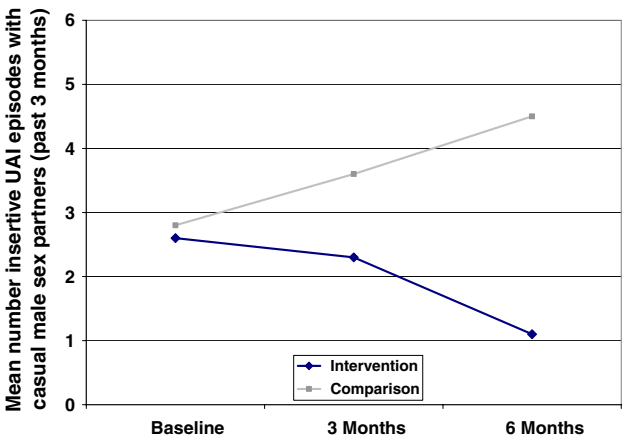

Fig. 2 Effects of the *Many Men*, *Many Voices* (*3MV*) intervention on insertive unprotected anal intercourse (UAI) with casual male sex partners, New York city, 2005–2007

Table 2 Effects of the *Many Men*, *Many Voices* (*3MV*) intervention on reported unprotected anal intercourse and number of male sex partners among Black MSM, New York city, 2005–2007

Outcome	3-Month assessment			6-Month assessment			GEE model—Baseline to 6 months
	3MV M (SD)	Comparison M (SD)	RR[a] (95% CI)	*3MV* M (SD)	Comparison M (SD)	RR[a] (95% CI)	RR[a] (95% CI)
Number episodes UAI with male sex partners (past 3 months)							
With main partner							
Any UAI	3.9 (16.5)	6.5 (23.0)	0.55 (0.20, 1.48)	2.1 (11.1)	4.7 (20.1)	0.40 (0.13, 1.25)	0.72 (0.38, 1.35)
Insertive UAI	2.5 (14.2)	5.2 (20.4)	0.48 (0.14, 1.68)	1.6 (10.1)	4.2 (19.7)	0.37 (0.10, 1.35)	0.85 (0.41, 1.74)
Receptive UAI	1.3 (6.0)	1.3 (6.4)	0.56 (0.16, 1.98)	0.5 (2.9)	0.5 (2.1)	0.65 (0.23, 1.86)	0.58 (0.30, 1.10)
With casual partners							
Any UAI	3.5 (14.7)	5.1 (20.6)	1.10 (0.41, 2.99)	2.0 (5.6)	6.2 (22.7)	0.34 (0.14, 0.83)*	0.58 (0.33, 1.01)
Insertive UAI	2.3 (12.0)	3.6 (14.6)	0.99 (0.33, 3.00)	1.1 (3.4)	4.5 (18.6)	0.24 (0.09, 0.65)**	0.49 (0.28, 0.87)*
Receptive UAI	1.2 (3.7)	1.5 (8.5)	1.51 (0.62, 3.69)	0.9 (3.3)	1.7 (6.8)	0.58 (0.20, 1.67)	0.80 (0.42, 1.53)
Number male sex partners (past 3 months)	2.2 (3.3)	3.2 (5.8)	0.75 (0.57, 0.98)*	2.0 (3.0)	2.6 (4.9)	0.81 (0.58, 1.12)	0.95 (0.80, 1.13)

CI confidence interval; *RR* rate ratio; *UAI* unprotected anal intercourse

[a] Estimates result from negative binomial regression models that include the baseline value as a covariate and consider the wait list comparison condition as the referent

* $P < 0.05$; ** $P < 0.01$

When the outcome variables were dichotomized into any reduction versus no reduction in insertive or receptive UAI with main or casual partners, no statistically significant intervention effects were observed (results not shown). However, changes across time were generally protective and more favorable in the intervention condition.

Effects of the *3MV* Intervention on Number of Male Sex Partners

At the 3-month assessment, *3MV* participants reported a 25% greater reduction in the number of main or casual male sex partners during the past 3 months than comparison participants (RR = 0.75, 95% CI = 0.57–0.98, $P = 0.04$; see Table 2). Changes in number of male sex partners at the 6-month assessment and across the entire study period also favored the intervention group but were not statistically significant.

Effects of the *3MV* Intervention on Condom Use During Anal Intercourse

Condom use categorized as always, sometimes, or never during insertive or receptive anal intercourse was evaluated for participants who engaged in this behavior at the 3- and 6-month assessments. Analyses of change in the percentage of condom-protected insertive or receptive anal intercourse acts with main sex partners indicated greater consistent condom use among *3MV* participants at both follow-up assessments, but these findings were not statistically significant. The percentage of condom-protected insertive and receptive anal intercourse acts with casual male partners also did not differ between *3MV* and comparison participants at the 3- and 6-month assessments. However, *3MV* participants reported a trend for greater consistent condom use during receptive anal intercourse with casual partners across the entire study period than comparison participants (OR = 1.55, 95% CI = 0.99–2.43, $P = 0.056$).

Effects of the *3MV* Intervention on Testing for HIV and STIs

There were no statistically significant intervention effects on self-reported HIV testing at the 3-month follow-up; however, at the 6-month follow-up *3MV* participants had an 81% greater odds of testing for HIV than comparison participants (OR = 1.81, 95% CI = 1.08–3.01, $P = 0.023$; Table 3). Four participants in each of the study conditions reported that they were HIV-positive at the 6-month assessment. Examination of linear trends across the entire study period indicated that *3MV* participants had a 33% greater odds of testing for HIV than comparison participants (OR = 1.33, 95% CI = 1.05–1.68, $P = 0.016$). There were no statistically significant intervention effects on testing for STIs at the 3- or 6-month follow-up assessments, but the direction of changes was protective and favored the intervention group at all assessments (Table 3).

Discussion

This study evaluated the efficacy of an innovative HIV/STI prevention intervention for Black MSM that had been developed by two CBOs and a university-based HIV/STI prevention and training program with substantial involvement of the Black MSM community. Relative to comparison participants, those in the *3MV* intervention reported a 25% greater reduction in number of male sex partners at the 3-month assessment, and a 66% greater reduction in any UAI and a 51% greater reduction in insertive UAI with casual male partners at the 6-month assessment. Over the entire study period, *3MV* participants

Table 3 Effects of the *Many Men*, *Many Voices* (*3MV*) intervention on self-reported testing for HIV and other STIs among Black MSM, New York city, 2005–2007

Outcome[b]	3-Month assessment			6-Month assessment			GEE model—Baseline to 6 months
	3MV % (no.)	Comparison % (no.)	OR[a] (95% CI)	*3MV* % (no.)	Comparison % (no.)	OR[a] (95% CI)	OR[a] (95% CI)
HIV testing	52.0 (64/123)	46.3 (56/121)	1.41 (0.83, 2.39)	54.8 (69/126)	43.3 (58/134)	1.81 (1.08, 3.01)*	1.33 (1.05, 1.68)*
STI testing[c]	42.5 (51/120)	35.5 (44/124)	1.47 (0.86, 2.51)	33.9 (43/127)	32.3 (43/133)	1.17 (0.69, 1.98)	1.16 (0.90, 1.49)

CI confidence interval; *OR* odds ratio

[a] All ORs adjusted for baseline level and wait list comparison condition as the referent. Generalized estimating equation (GEE) models include all three assessments

[b] Recall period is past 3 months

[c] Includes testing for chlamydia, gonorrhea, or syphilis

* $P < 0.05$

reported a nearly significant trend for greater consistent condom use during receptive anal intercourse with casual partners, the behavior that confers the greatest risk of HIV infection for seronegative MSM (Vittinghoff et al. 1999). Moreover, intervention participants were 81% more likely to report being tested for HIV than comparison participants at the 6-month assessment. The magnitude of intervention effects for the aforementioned sex risk behaviors exceed those reported in meta-analyses of behavioral interventions for MSM (Herbst et al. 2007; Johnson et al. 2008). Additional reductions were observed for insertive and receptive UAI with main partners at 3 and 6 months, with point estimates ranging from 35 to 68%, and for receptive UAI with casual partners at 6 months, with a point estimate of 42%. Although these results were not statistically significant, they exceeded the average reduction of 30% reported from a meta-analysis of 18 small group interventions for MSM (Johnson et al. 2008). Thus, compared to the state of the science in HIV prevention research for MSM, these are strong intervention effects.

The significant findings may be attributed in part to the intervention's unique feature of engaging participants in the development of menus of options for HIV/STI risk reduction. The *3MV* menus, based on known determinants of communicable disease transmission (Cohen 2005), include options for reducing risky sexual and increasing protective health behaviors for men and their partners (Coury-Doniger et al. 1998). Throughout the intervention, participants were encouraged to select and implement at least two strategies that were most relevant for their personal situation and most likely to succeed. This approach differs from other HIV prevention interventions for MSM that primarily emphasize consistent condom use with all sex partners. By encouraging participants to choose an individualized strategy, the group-level *3MV* intervention became tailored to each participant's unique circumstances thereby increasing the likelihood of behavior change (CDC 2001).

The *3MV* intervention had a protective, but not statistically significant, effect on UAI and condom use outcomes among participants with main sex partners. It is possible that we were unable to detect statistically significant intervention effects on these outcomes because too few men enrolled in the study had long-term primary partners. Indeed, only one-third of enrolled participants reported having a main male sex partner at baseline, and of these, only 59% (68 participants) had been in that relationship longer than 6 months. It may also be the case that men in a primary relationship chose to be mutually monogamous and obtain HIV testing for themselves and their partner to ensure mutual knowledge of their HIV-negative serostatus. If that was the case, those men would not necessarily choose to reduce UAI with their uninfected partner. Nonetheless, the overall pattern of intervention effects in reducing risky sex behaviors with main partners was in the protective direction, and these findings are promising, considering the many challenges that MSM face when negotiating sexual safety with their intimate primary sex partners (Guzman et al. 2005).

Studies have shown that compared to White MSM, Black MSM have higher rates of unrecognized HIV infection, lower rates of routine HIV testing, and more frequently delay HIV testing, thereby increasing the likelihood of an AIDS diagnosis when first tested (Hall et al. 2007). The *3MV* intervention demonstrated a statistically significant effect on self-reported HIV testing behaviors at the 6-month follow-up at which point intervention participants reported an 81% greater odds of testing for HIV compared to comparison participants. This suggests that *3MV* can increase HIV testing and the chances of early diagnosis for Black MSM.

In contrast, there were no statistically significant intervention effects for increased STI testing. This difference may reflect barriers that many Black MSM face when accessing testing for STIs. Although HIV testing is readily available free of charge in a variety of CBO settings, STI testing requires a clinical visit during which fees may be charged. Nearly one-fourth of the Black MSM in this study were unemployed, and nearly half reported having an income of <$20,000 per year, which may have been a barrier to accessing STI testing. The need to disclose one's male-to-male sexual behavior to a medical provider may also be a barrier to STI testing. In an analysis of MSM residing in New York city, 39% did not disclose their MSM status to their medical provider, and Black MSM were much less likely to disclose than White MSM (60 and 19%, respectively; Bernstein et al. 2008). Lack of disclosure to a medical provider may result in lack of identification and treatment of STIs since MSM need to disclose their same sex behavior before STI testing of the throat and rectum could occur. In a recent study of MSM, one-third of the total number of gonorrhea infections detected would have remained undiagnosed and untreated if only urethral specimens were obtained (Gunn et al. 2008). Lastly, while prevention efforts have contributed to reducing the stigma of HIV, STIs are still associated with high levels of stigma and shame, providing another barrier to STI testing (Eng and Butler 1997).

Findings of our study should be viewed within the context of several limitations. According to the *3MV* curriculum, the intervention sessions can be delivered over the course of 6 weekly sessions or during a single weekend-long retreat. In this study, we chose to evaluate *3MV* as a 3-day weekend retreat. The benefits of the retreat format include ensuring that participants receive the full dose of the intervention, and can focus their attention on the

intervention activities by reducing the distractions of everyday life. A limitation of the retreat format as evaluated is the cost associated with renting facilities and providing meals and transportation. However, many CBOs have devised more economical ways to deliver interventions using a weekend retreat format in or near their agency (Knights et al. 2008). We recommend that *3MV* should also be rigorously evaluated when delivered over 6 weekly sessions. An additional limitation involves the use of a wait list comparison condition to evaluate the intervention. While time-matched attention controls provide greater scientific rigor for addressing potential changes caused by factors other than the intervention, use of a wait list comparison receiving no attention at all may introduce a bias toward finding significant results (Johnson et al. 2008).

This evaluation of *3MV* has revealed several areas that require future investigation. First, more formative or operational research should be conducted to inform changes to the *3MV* intervention that will result in greater reductions in sex risk behaviors, particularly receptive UAI, and increased STI testing. For example, the extent to which the intervention focuses on the reduction of receptive UAI could be revisited and receive greater emphasis, and access to STI testing after the intervention could be facilitated through a collaboration with a clinical provider. Second, given the high HIV prevalence among Black MSM, future studies should adapt *3MV* and rigorously evaluate its efficacy in reducing HIV transmission risk behaviors among HIV-positive Black MSM. Third, future *3MV* evaluations should include biological markers of incident HIV and STIs. Fourth, POCC staff noted that some participants that had attended a *3MV* retreat together continued to meet on their own accord for ongoing support. Future studies should examine the degree to which *3MV* facilitates a sense of community among Black MSM, and whether these social networks help reinforce HIV/STI risk reduction. Finally, the effectiveness and generalizability of *3MV* should be evaluated among diverse Black MSM populations, and in diverse delivery settings and geographic areas.

This study is the first to demonstrate the efficacy of an integrated HIV/STI prevention intervention developed with and for Black MSM. The findings of this study support the continued diffusion of *3MV* to prevention programs serving Black MSM in the US. There is also an urgent need to increase the number of evidence-based interventions for Black MSM, like *3MV*, that focus on the role of STIs in acquiring and transmitting HIV infection (Aral et al. 2008). Moreover, given that disparities in STIs have been cited as a reason for the disproportionately high rates of HIV among Black MSM (Millett et al. 2006), greater resources are needed for more effective STI testing and treatment programs. The highest priority should be afforded to funding innovative models of HIV/STI prevention for Black MSM that involves collaboration between CBOs and experts in behavioral interventions and STI prevention.

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References

Academy for Educational Development. (2008). *Diffusion of effective behavioral interventions website*, *Many Men*, *Many Voices*. Retrieved 19 October 2008, from http://www.effectiveinterventions.org/go/interventions/many-men-many-voices.

Aral, S. O., Adimora, A. A., & Fenton, K. A. (2008). Understanding and responding to disparities in HIV and other sexually transmitted infections in African Americans. *Lancet, 372*(9635), 337–340. doi:10.1016/S0140-6736(08)61118-6.

Bandura, A. (1977). *Social learning theory*. New York: General Learning Press.

Bernstein, K. T., Liu, K., Begier, E. M., Koblin, B., Karpati, A., & Murrill, C. (2008). Same-sex attraction disclosure to health care providers among New York city men who have sex with men: Implications for HIV testing approaches. *Archives of Internal Medicine, 168*, 1458–1464. doi:10.1001/archinte.168.13.1458.

Berry, M., Raymond, H. F., & McFarland, W. (2007). Same race and older partner selection may explain higher HIV prevalence among Black men who have sex with men. *AIDS (London, England), 21*, 249–350.

Black Gay Men's Research Group. (2007). *Black gay research agenda*. New York: Black Gay Men's Research Group and National Black Gay Men's Advocacy Coalition.

Centers for Disease Control and Prevention. (2001). Revised guidelines for HIV counseling, testing, and referral. *Morbidity and Mortality Weekly Report, 50*(RR-19), 1–62.

Centers for Disease Control and Prevention. (2004). Evaluation of innovative human immunodeficiency virus (HIV) prevention interventions for high-risk minority populations. *Federal Register, 69*(134), 42183–42190.

Centers for Disease Control and Prevention. (2005). HIV prevalence, unrecognized infection, and HIV testing among men who have

sex with men—Five US cities, June 2004–April 2005. *Morbidity and Mortality Weekly Report, 54*, 597–601.

Centers for Disease Control and Prevention. (2008a). Subpopulation estimates from the HIV incidence surveillance system—United States, 2006. *Morbidity and Mortality Weekly Report, 57*, 985–989.

Centers for Disease Control and Prevention. (2008b). Trends in HIV/AIDS diagnoses among men who have sex with men-33 states, 2001–2006. *Morbidity and Mortality Weekly Report, 57*, 681–686.

Cohen, C. (1999). *The boundaries of blackness: AIDS and the breakdown of Black politics*. Chicago: University of Chicago Press.

Cohen, M. S. (2005). Amplified HIV transmission and new approaches to HIV prevention. *The Journal of Infectious Diseases, 191*, 1391–1393. doi:10.1086/429414.

Coury-Doniger, P., English, G., Jenersen, E., McGrath, P., & Scahill, M. (1998). *Many men, many voices (3MV): A STD/HIV prevention intervention for Black gay men*. Rochester, NY: Center for Health and Behavioral Training, University of Rochester.

Coury-Doniger, P., Knox, K., Morgan, J., Jenersen, E., McGrath, P., Scahill, M., et al. (2001). The development of a science-based HIV prevention intervention for gay men of color. Poster session presented at the National HIV Prevention Conference, Atlanta, GA.

Dixon, W. J. (1960). Simplified estimation from censored normal samples. *Annals of Mathematical Statistics, 31*, 385–391. doi:10.1214/aoms/1177705900.

Eng, T. R., & Butler, W. T. (1997). *The hidden epidemic: Confronting sexually transmitted diseases*. Washington, DC: National Academies Press.

Fullilove, R. (2006). *African Americans, health disparities and HIV/AIDS: Recommendations for confronting the epidemic in Black America*. Washington, DC: National Minority AIDS Council.

Gunn, R. A., O'Brien, C. J., Lee, M. A., & Gilchick, R. A. (2008). Gonorrhea screening among men who have sex with men of multiple anatomic site testing, San Diego, California, 1997–2003. *Sexually Transmitted Diseases, 35*, 845–848. doi:10.1097/OLQ.0b013e318177ec70.

Guzman, R., Colfax, G. N., Wheeler, S., Mansergh, G., Marks, G., Rader, M., et al. (2005). Negotiated safety relationships and sexual behavior among a diverse sample of HIV-negative men who have sex with men. *Journal of Acquired Immune Deficiency Syndromes, 38*, 82–86. doi:10.1097/00126334-200501010-00015.

Hall, H. I., Byers, R. H., Ling, Q., & Espinoza, L. (2007). Racial/ethnic and age disparities in HIV prevalence and disease progression among men who have sex with men in the United States. *American Journal of Public Health, 97*, 1060–1066. doi:10.2105/AJPH.2006.087551.

Hall, H. I., Song, R., Rhodes, J., An, Q., Lee, L. M., Karon, J., et al. (2008). Estimation of HIV in the United States. *Journal of the American Medical Association, 300*, 520–529. doi:10.1001/jama.300.5.520.

Herbst, J. H., Beeker, C., Matthew, A., McNally, T., Passin, W. F., Kay, L. S., et al. (2007). The effectiveness of individual-, group-, and community-level HIV behavioral risk-reduction interventions for adult men who have sex with men: A systematic review. *American Journal of Preventive Medicine, 32*, S38–S67. doi:10.1016/j.amepre.2006.12.006.

Janis, I., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice and commitment*. New York: Free Press.

Johnson, W. D., Diaz, R. M., Flanders, W. D., Goodman, M., Hill, A. N., Holtgrave, D., et al. (2008). Behavioral interventions to reduce risk for sexual transmission of HIV among men who have sex with men. *Cochrane Database of Systematic Reviews*, *16*(3). Retrieved 17 September 2008, from http://mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001230/frame.html.

Jones, K. T., Gray, P., Whiteside, O., Wang, T., Bost, D., Dunbar, E., et al. (2008). Evaluation of an HIV prevention intervention adapted for Black men who have sex with men. *American Journal of Public Health, 98*, 1043–1050. doi:10.2105/AJPH.2007.120337.

Kelly, J. A. (1995). *Changing HIV risk behavior*. New York: Guilford Press.

Kelly, J. A., St. Lawrence, J. S., Hood, H. V., & Brasfield, T. L. (1989). Behavioral intervention to reduce AIDS risk activities. *Journal of Consulting and Clinical Psychology, 57*, 60–67. doi:10.1037/0022-006X.57.1.60.

Knights, D., Cochrane, C., & Blausey, D. (2008). *Maximize client behavior change with 3MV DEBI intervention*: *Many men*, *many voices at GMHC*. Workshop presented at the 2008 HIV Prevention Leadership Summit, Detroit, MI.

Koblin, B., Mayer, K., HPTN 061 Protocol Team. (2008). *HPTN 061*: *Feasibility study of a community-level*, *multi-component intervention for Black men who have sex with men*. New York: New York Blood Center. Retrieved 17 September 2008, from http://www.hptn.org/research_studies/hptn061.asp.

Liang, K. Y., & Zeger, S. L. (1986). Longitudinal data analysis using generalized linear models. *Biometrika, 73*, 13–22. doi:10.1093/biomet/73.1.13.

Lix, L. M., & Keselman, H. J. (1998). To trim or not to trim: Tests of location equality under heteroscedasticity and nonnormality. *Educational and Psychological Measurement, 58*, 409–429. doi:10.1177/0013164498058003004.

Lyles, C. M., Crepaz, N., Herbst, J. H., & Kay, L. S. (2006). Evidence-based HIV behavioral prevention from the perspective of CDC's HIV/AIDS Prevention Research Synthesis Team. *AIDS Education and Prevention, 18*(Suppl. A), 21–31. doi:10.1521/aeap.2006.18.supp.21.

Malebranche, D. J., Peterson, J. L., Fullilove, R. E., & Stackhouse, R. W. (2004). Race and sexual identity: Perceptions about medical culture and healthcare among Black men who have sex with men. *Journal of the National Medical Association, 96*, 97–107.

Mays, V. M., Cochran, S. D., & Zamudio, A. (2004). HIV prevention research: Are we meeting the needs of African American men who have sex with men? *The Journal of Black Psychology, 30*, 78–105. doi:10.1177/0095798403260265.

Metzger, D. S., Koblin, B., Turner, C., Navaline, H., Valenti, F., Holte, S., et al. (2000). Randomized controlled trial of audio computer-assisted self-interviewing: Utility and acceptability in longitudinal studies. *American Journal of Epidemiology, 152*, 99–106. doi:10.1093/aje/152.2.99.

Millett, G. A., Flores, S. A., Peterson, J. L., & Bakeman, R. (2007). Explaining disparities in HIV infection among Black and White men who have sex with men: A meta-analysis of HIV risk behaviors. *AIDS (London, England), 21*, 2083–2091.

Millett, G. A., Peterson, J. L., Wolitski, R., & Stall, R. (2006). Greater risk for HIV infection of Black men who have sex with men: A critical literature review. *American Journal of Public Health, 96*, 1007–1019. doi:10.2105/AJPH.2005.066720.

Minkler, M., & Wallerstein, N. (Eds.). (2003). *Community based participatory research for health*. San Francisco: Jossey-Bass.

New York City Department of Health and Mental Hygiene. (2008a). *HIV epidemiology and field services semiannual report*: *Covering January 1*, *2007 through June 30*, *2007*, Vol. *3*, No. 1–4. New York, NY: New York City Department of Health and Mental Hygiene. Retrieved 17 September 2008, from http://www.nyc.gov/html/doh/downloads/pdf/dires/dires-2008-report-semi1.pdf.

New York City Department of Health and Mental Hygiene. (2008b). Health department releases estimate of yearly HIV infections.

New York, NY: New York City Department of Health and Mental Hygiene. Retrieved 26 September 2008, from http://home2.nyc.gov/html/doh/html/pr2008/pr057-08.shtml.

New York City Department of Health and Mental Hygiene, Bureau of Sexually Transmitted Disease Control. (2007). *Quarterly Report, Vol. 5, No. 1*. New York, NY: New York City Department of Health and Mental Hygiene, Bureau of Sexually Transmitted Disease Control.

Peterson, J. L., Coates, T. J., Catania, J., Hauck, W. W., Acree, M., Aigle, D., et al. (1996). Evaluation of an HIV risk reduction intervention among African-American homosexual and bisexual men. *AIDS (London, England), 10*, 319–325. doi:10.1097/00002030-199603000-00011.

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of the structure of behavior change. In J. D. Fisher, J. M. Chensky, & A. Nadler, (Eds.). *Initiating self-changes: Social psychological and clinical perspectives*. New York: Springer-Verlag.

Rose, C. E., Martin, S. W., Wannemuehler, K. A., & Plikaytis, B. D. (2006). On the use of zero-inflated and hurdle models for modeling vaccine adverse event count data. *Journal of Pharmaceutical Statistics, 16*, 463–481.

Vittinghoff, E., Douglas, J., Judon, F., McKirnan, D., MacQueen, K., & Buchbinder, S. P. (1999). Per-contact risk for human immunodeficiency virus transmission between male sexual partners. *American Journal of Epidemiology, 150*, 306–311.

Wasserheit, J. (1992). Epidemiological synergy, inter-relationships between human immunodeficiency virus infection and other sexually transmitted diseases. *Sexually Transmitted Diseases, 19*, 61–77. doi:10.1097/00007435-199219020-00001.

Wheeler, D. P., Lauby, J. L., Liu, K., Van Sluytman, L. G., & Murrill, C. (2008). A comparative analysis of sexual risk characteristics of Black men who have sex with men or with men and women. *Archives of Sexual Behavior, 37*, 697–707. doi:10.1007/s10508-008-9372-7.

Williams, J. K., Wyatt, G. E., Rivkin, I., Ramamurthi, H. C., Li, X., & Liu, H. (2008). Risk reduction for HIV-positive African American and Latino men with histories of childhood sexual abuse. *Archives of Sexual Behavior, 37*, 763–772. doi:10.1007/s10508-008-9366-5.

Wilton, L. (2009). Men who have sex with men of color in the age of AIDS: The sociocultural contexts of stigma, marginalization, and structural inequalities. In V. Stone, B. Ojikutu, K. Rawlings, & K. Smith (Eds.), *HIV/AIDS in minority communities*. New York: Springer Publications.

Wolitski, R. J., Gómez, C. A., Parsons, J. T., & SUMIT Study Group. (2005). Effects of a peer-led behavioral intervention to reduce HIV transmission and promote serostatus disclosure among HIV-seropositive gay and bisexual men. *AIDS (London, England), 19*(Suppl. 1), S99–S109.