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Clinically Significant Depressive Symptoms as a Risk Factor for HIV Infection Among Black MSM in Massachusetts

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Abstract

High rates of depression have been observed among men who have sex with men (MSM) relative to the general adult male population; however, a dearth of research has explored depression among Black MSM. Black MSM ($n = 197$) recruited via modified respondent-driven sampling between January and July 2008 completed an interviewer-administered quantitative assessment and voluntary HIV counseling and testing. Bivariate and multivariable logistic regression procedures examined the associations of demographics, behavioral HIV risk factors, and psychosocial variables with depressive symptoms by severity, using the 20-item Center for Epidemiologic Studies Depression Scale (CES-D). Adjusting for demographic and behavioral variables, significant factors associated with (1) clinically significant depressive symptoms (33%; CES-D score ≥ 16): being publicly insured by Medicaid, having serodiscordant anal sex with a casual male partner, and being diagnosed with an STD in the prior 12 months; (2) moderate depressive symptoms (19%; CES-D score 16–26): having serodiscordant unprotected anal sex with a casual

male partner and being diagnosed with an STD in the prior 12 months; (3) severe depressive symptoms (14%; CES-D score 27+); being publicly insured by Medicaid and reporting difficulty accessing healthcare in the past 12 months. Moderately depressed Black MSM may be more likely to engage in behaviors that place them at increased risk for HIV and other STDs. HIV prevention interventions for Black MSM may benefit from incorporating screening and/or treatment for depression, allowing MSM who are depressed to respond more effectively to behavioral change approaches.

Keywords

MSM; Depression; African American; HIV; STD

Introduction

Rates of depression among men who have sex with men (MSM) are consistently higher than those among the general adult male population, ranging from 15–26% (Cochran and Mays 2000; Meyer 2003; Meyer et al. 2008; Salomon et al. 2008) as compared to 5–12%, respectively, (American Psychiatric Association 2000; Kessler et al. 1994, 1996). Mental health and other psychosocial problems have been identified as a major contributor to sexual risk behavior and HIV infection across studies (Kelly et al. 1993; Koblin et al. 2006; Meade and Sikkema 2005; Parsons et al. 2003; Salomon et al. 2008; Semple et al. 2000; Strathdee et al. 1998). Given the disproportionate HIV and sexually transmitted disease (STD) burden among MSM, who according to the Centers for Disease Control and Prevention (CDC) in 2006 constituted 53% of new HIV/ AIDS infections in the US and 72% of all men living with HIV (CDC 2008), and among whom rates of STDs have steadily risen in recent years (CDC 2007; Massachusetts Department of Public Health 2007), the high rates of depression observed among MSM are concerning.

The relationship between clinically significant depressive symptoms and sexual risk behavior has been somewhat inconsistent in the scientific literature. While some studies report greater sexual risk behavior in states of depression (Koblin et al. 2006; Rogers et al. 2003; Stall et al. 2003), other studies have found no association (Bradley et al. 2008; Dilley et al. 1998; Dolezal et al. 2000; Robins et al. 1994; Rubb et al. 1993) or decreased sexual interest and activity (Kennedy et al. 1999; Mathew and Weinman 1982). In studies where associations were found, depression has been consistently associated with increased sexual risk behavior in both HIV-infected and uninfected MSM (Beck et al. 2003; Bradley et al. 2008; Kelly et al. 1993; Koblin et al. 2006; Parsons et al. 2003; Perdue et al. 2003; Rogers et al. 2003; Semple et al. 2000; Stall et al. 2003; Strathdee et al. 1998). A study by Rogers and colleagues (2003) suggests variation in the patterns of association between depressive disorders and sexual behavior among MSM, which may help to explain prior inconsistencies on the relationship between depression and sexual risk-taking. While major depression was related to less sexual activity, dysthymic disorder (a milder, persistent depressive disorder) was associated with an increased likelihood of unprotected sex (Rogers et al. 2003). Further research is warranted to investigate the association between depression and sexual risk among MSM, as well as how severity of depression impedes or facilitates risk for HIV and other STDs.

Prior research has examined clinically significant depressive symptoms among Black MSM (Cochran and Mays 1994; Peterson et al. 1996; Richardosn et al. 1997). Rates of depression among Black MSM have been shown to be as high as 33% (Cochran and Mays 1994; Peterson et al. 1996) and elevated compared to heterosexual Black men and other MSM (Richardosn et al. 1997). More recently, empirical studies have begun to explore the

relationship between depression and sexual risk in Black MSM (Crawford et al. 2002; Myers et al. 2003). For example, Crawford et al. (2002) reported that among a sample of 174 gay and bisexual Black men, psychological distress, including depression, was associated with greater levels of sexual risk behavior. Likewise, Myers et al. (2003) found that among a sample of 502 mixed HIV serostatus Black men, half of whom identified as MSM or MSMW, psychological distress and depression were among the strongest predictors of sexual risk-taking. Given that Black individuals represent only 13% of the total population (US Census Bureau 2006), but account for 49% of all HIV/AIDS cases diagnosed annually in the United States (CDC 2008) and that sexual contact with other men is the primary HIV transmission category among all Black men (CDC 2008), studies of Black MSM need to address more adequately psychological factors contributing to HIV risk (Mays et al. 2004; Millett et al. 2007). In particular, the severity of clinically significant depressive symptoms may be an important risk factor to consider in designing effective HIV primary and secondary prevention interventions with Black MSM.

Using a modified respondent-driven sampling method to recruit exclusively Black MSM in Massachusetts, this study sought to: (1) examine the frequency of clinically significant depressive symptoms, including the severity of symptoms, and (2) investigate the association of demographic, behavioral HIV risk factors, and other psychosocial variables with clinically significant depressive symptoms. In accordance with prior research (Rogers et al. 2003), we hypothesized that severe depressive symptoms would not be significantly associated with sexual risk and that Black MSM with moderate depressive symptoms would be more likely to report sexual risk behavior (i.e., unprotected sex) than MSM without depressive symptoms.

Methods

Design and Setting

One hundred and ninety seven Black MSM were recruited via modified respondent-driven sampling between January and July 2008. Following an informed consent process with trained study staff, participants completed: (1) a quantitative assessment with a trained interviewer, and (2) optional voluntary pre- and post-test HIV counseling and testing. This study was a collaboration between Fenway Health (FH), a freestanding health care and research facility specializing in HIV/AIDS care and lesbian, gay, bisexual, and transgender health in the greater Boston area (Mayer et al. 2007); the Multicultural AIDS Coalition (MAC), a community-based organization working within communities of color to end the HIV/AIDS epidemic; Justice Resource Institute (JRI), one of the largest human service providers in Massachusetts; and the Massachusetts Department of Public Health (MDPH) HIV/AIDS Bureau. The study was approved by the FH and JRI Institutional Review Boards and all study activities took place at MAC and JRI, the two participating study sites in Boston, Massachusetts.

Sample

Eligibility Criteria—Prior to study enrollment, each potential participant was screened for study eligibility on the telephone or in-person by trained study staff. Eligible participants were individuals who: (1) were Black, (2) identified as male, (3) were 18 years of age or older, (4) self-reported living in Massachusetts, and (5) self-reported oral or anal sex with a man in the preceding 12 months.

Recruitment—A modified respondent-driven sampling (RDS) method (Heckathorn 1997), implemented successfully with prior studies of MSM in Massachusetts (Mimiaga et al. 2007, 2008), was used to recruit participants. RDS was modified to terminate recruitment

when the a priori desired sample size had been met, prior to equilibrium. As such, we did not weight the final sample, as in traditional RDS. Another modification included adding many seeds from diverse backgrounds to expedite the recruitment process.

Initially eight study participants were selected to function as recruiter seeds, four at each of the participating study sites (MAC and JRI). Seeds were evaluated by study staff prior to enrollment for their commitment to the goals of the study and motivation to recruit eligible peers within their social network. Because the original four seeds at JRI did not produce enough referrals to reach the targeted sample size in the necessary timeframe, an additional 13 seeds were added, consistent with RDS methodology (Heckathorn 1997, 2002), resulting in 17 seeds at JRI and four at MAC. All seeds met the study eligibility criteria outlined above. Seeds also had to be motivated and able to recruit a maximum of five of their social/sexual network members into the study. At screening, study staff assessed individuals' ability to recruit their social/sexual network members by querying men on the total number of study eligible men they had in their personal social/sexual network.

Each seed was asked to recruit up to five individuals in their sexual/social network, who in turn recruited a wave of no more than five respondent group members, and so on until the target sample size was reached. Each participant was given cards with study information to hand to potential recruits. Tracking networks was accomplished using cards with a number code on each card that connected participants back to recruits and initial seeds. A dual incentive system was used, where participants were compensated \$25 for the survey, \$25 for the optional HIV testing, and \$10 for each eligible peer they recruited (up to five peers). Hence, each study participant could earn up to \$100 for their participation.

Quantitative Assessment and Measures

Participants completed an interviewer-administered quantitative assessment that lasted approximately 1 hour. The survey instrument was piloted with 10 participants who met seed eligibility requirements for the study, and revised based on pilot participant feedback. Pilot data were not analyzed for the current study.

Demographics, Sexual Behavior, Substance Use, STD History, and HIV Status

—Demographic characteristics (i.e., age, education, housing status, health insurance), sexual behavior/sexual partner history (most recent sexual encounter and past 12 months), and questions about substance use during sex were adapted from the Centers for Disease Control and Prevention's National HIV Behavioral Surveillance Study, MSM cycle (Sanchez et al. 2006). Also adapted were questions about reasons for using the Internet to meet sexual partners in the past 12 months. Participants were asked to self-report STD history (syphilis, gonorrhea, Chlamydia, herpes) recent (past 12 months) and lifetime, as well as current HIV status. HIV status was confirmed via rapid HIV antibody testing at study enrollment for those who agreed to be tested.

Alcohol Use—The CAGE questionnaire, a 4-item validated clinical screening instrument for alcoholism (Cronbach's $\alpha = 0.69$; Ewing 1984; Knowlton et al. 1994; Mayfield et al. 1974), was used to assess probable alcohol dependence. Although some research suggests performance-related differences by gender, race, or ethnicity on the CAGE instrument, the CAGE remains a validated brief screener for alcohol use disorders, particularly among primary care and emergency room populations (Cherpitel 1998, 2002; Cook et al. 2005; Ewing 1984; Knowlton et al. 1994; Mayfield et al. 1974; Steinbauer et al. 1998). The four items were: "Have you ever felt you should cut down on your drinking?", "Have people ever annoyed you by criticizing your drinking?", "Have you ever felt bad or guilty about your drinking?", and "Have you ever had a drink first thing in the morning (as an "eye opener")"

to steady your nerves?” A “yes” indicated a positive response and was scored as 1; a “no” was scored as 0. A score of two or more indicated a likely problem with alcohol (i.e., positive screen for probable alcohol dependence). In previous research, a score of three on the CAGE has been associated with an 72% probability of alcohol abuse or dependence (Buchsbbaum et al. 1991).

Depression—Clinically significant depressive symptoms were assessed with the Center for Epidemiologic Studies Depression scale (CES-D), a 20-item validated screening measure of clinically significant distress as a marker for clinical depression (coefficient alpha = 0.90; Cronbach’s alpha = 0.89; Radloff 1977; US DHHS 2004). The CES-D has been validated in Black populations (Naughton and Wiklund 1993), and no differences in internal consistency have been found between Black and White individuals (Roberts and Vernon 1983). Studies of Black MSM have also demonstrated high internal consistency reliability for the CES-D (Kalichman et al. 2005; Peterson et al. 1996). Representative items from the CES-D include: “I was bothered by things that usually don’t bother me”, “I did not feel like eating; my appetite was poor”, “I felt that I could not shake off the blues even with help from my family and friends”, and “I had trouble keeping my mind on what I was doing.” Respondents indicated the frequency of occurrence of each symptom over the past week on a 4-point Likert scale, where 0 = *rarely or none of the time (less than 1 day)*, 1 = *some or a little of the time (1–2 days)*, 2 = *occasionally or a moderate amount of time (3–4 days)*, and 3 = *most or all of the time (5–7 days)*.

Healthcare Access—To assess healthcare accessibility, a question was adapted from a prior MSM study (Mimiaga et al. 2007). Participants were asked to self-report whether they had difficulty obtaining needed healthcare services in the past 12 months.

History of Incarceration and Drug and/or Alcohol Treatment—Participants were asked to self-report whether they had ever spent time in jail or prison and whether they had ever been in treatment for drug and/or alcohol use at any time in their life.

HIV Testing

Each participant had the option to take a voluntary anonymous rapid HIV antibody test (fingerstick). The FDA approved OraQuick® ADVANCE™ HIV-1/2 Antibody Test was used for HIV testing [sensitivity: 99.6% (98.5–99.9); specificity: 100% (99.7–100)]. Rapid reactive HIV test study participants (preliminary positive) were offered Western Blot confirmatory testing by blood draw. Each participant received standard-of-care, pre- and post-test HIV counseling. Clients were referred to appropriate medical and psychosocial support services, including referrals for depression, at the discretion of the counselor. All HIV test counselors completed the appropriate trainings and were certified to conduct HIV testing in Massachusetts prior to meeting with participants. Only one participant was newly diagnosed with HIV in the study as a result of HIV testing procedures (categorized as HIV-infected in the bivariate/multivariate analyses). All other participants’ self-reported HIV status was consistent with their HIV test results.

Data Analysis

SAS® version 9.1.3 (SAS Institute Inc 2003) statistical software was used to perform analyses, where statistical significance was determined at the $P < 0.05$ level.

Primary Outcomes—Three outcomes were dichotomously assessed at the time of study enrollment: (1) clinically significant depressive symptoms: CES-D score of 16 or higher; (2) moderate depression: CES-D score of 16–26; participants scoring 27 or higher ($N = 27$) were excluded from the analysis for this outcome; (3) severe depressive symptoms: CES-D

score of 27 or higher; participants who scored 16–26 ($N = 38$) were excluded from the analysis for this outcome. These moderate and severe cutoffs have been used previously to detect clinically depressive symptoms across a wide range of studies (Blumenthal et al. 2003; Ensel 1986; Geisser et al. 1997; Schulberg 1985; Zich et al. 1990).

Independent Variables of Interest—Independent variables of interest included the following dichotomous indicators: demographics (Medicaid, private health insurance), sexual behavior (unprotected anal or vaginal sex with a female partner in the past 12 months, serodiscordant unprotected anal sex with a non-monogamous casual male during most recent sexual encounter), current alcohol use (positive screen for probable alcohol dependence CAGE score 2+; drug use during sex), HIV status (HIV-infected), recent STD diagnosis (history of any recent STD in the past 12 months: syphilis, gonorrhea, Chlamydia, herpes), psychosocial factors (history of incarceration, history of alcohol/drug treatment), Internet use (use Internet to meet sexual partners in the prior 12 months because they “felt lonely”), and access to healthcare (difficulty getting healthcare in past 12 months).

Bivariate and Multivariable Logistic Regression Models—For all variables, bivariate logistic regression analyses were conducted to establish statistically significant parameter estimates with the three outcomes of interest. A separate multivariable logistic regression model was constructed for each of the three outcomes. We a priori determined to adjust for: age, education, sexual identity (heterosexual/ homosexual/gay), HIV status, and recruitment site in all multivariable models. Variables with a $P < 0.10$ in bivariate regression analyses were retained in the multivariable logistic regression model.

For significant bivariate predictors that were multicollinear (intercorrelation among the independent variables above 0.80), the variable thought to be theoretically most important in the analysis was chosen and retained in the final multivariable model, whereas, the others were dropped (Afifi et al. 2004). Due to multicollinearity, we chose to include current alcohol problem (CAGE) rather than history of drug/alcohol treatment in the final models.

Results

Demographics (Table 1)

Participants had a mean age of 38.65 ($SD = 11.32$). Most participants (87%) identified as African American; others (16%) identified as Haitian, Jamaican, Cape Verdean, African, or Caribbean, and Hispanic/Latino (8%). The majority of the sample had less than a college degree (87%), and had public health insurance (84%; i.e., Medicaid). Although all participants reported oral or anal sex with another male in the prior 12 months, less than half (45%) self-identified as gay and 20% reported having never disclosed their MSM sexual behavior to anyone (i.e., were not “out”).

Overall, 33% of the sample (65/197) screened positive for clinically significant depressive symptoms (CES-D score ≥ 16), with a mean CES-D score of 27.6 ($SD = 10.9$). Nineteen percent (38/197) had moderate (CES-D score 16–26) and 14% (27/197) had severe (CES-D score 27 or higher) depressive symptoms. Demographic characteristics of the sample comparing MSM with clinically significant depressive symptoms to those without are presented in Table 1.

Outcome 1: Clinically Significant Depressive Symptoms (CES-D score ≥ 16) (Table 2)

Bivariate Associations of Demographic and Behavioral Risk Factors for Clinically Significant Depressive Symptoms (CES-D score ≥ 16)

Demographics: Men who reported being publicly insured via Medicaid compared to those without public insurance were more likely to have clinically significant depressive symptoms (OR = 2.37; $P = 0.02$). However, men who reported having private health insurance/HMO compared to those without private insurance were less likely to have clinically significant depressive symptoms (OR = 0.35; $P = 0.05$).

Sexual Risk: Unprotected anal sex with a female partner in the prior 12 months was significantly associated with an increased risk for clinically significant depressive symptoms (OR = 2.50; $P = 0.03$), as was reporting having used the Internet to meet sexual partners in the prior 12 months due to loneliness (OR = 2.64; $P = 0.01$).

Psychosocial Factors: Having a current problem with alcohol was significantly associated with increased odds of clinically significant depressive symptoms (OR = 2.37; $P = 0.006$). Furthermore, participants who reported a history of incarceration (OR = 2.26; $P = 0.009$) had a higher odds of having clinically significant depressive symptoms, as did those who reported a history of drug/alcohol treatment (OR = 3.20; $P = 0.01$).

Multivariable Logistic Regression Model of Risk Factors for Clinically Significant Depressive Symptoms (CES-D score ≥ 16)—In a multivariable model adjusting for participants' age, education, sexual orientation, HIV status, and recruitment site (Table 2), participants who were publicly insured via Medicaid (AOR = 7.31; $P = 0.007$), reported engaging in serodiscordant unprotected anal sex with a casual male partner during last sexual encounter (AOR = 2.90; $P = 0.002$), and were diagnosed with an STD in the prior 12 months (AOR = 8.33; $P = 0.02$) were at increased odds of having clinically significant depressive symptoms.

Outcome 2: Moderate Depressive Symptoms (CES-D score 16–26) (Table 3)

Bivariate Associations of Demographic and Behavioral Risk Factors for Moderate Depressive Symptoms (CES-D score 16–26)

Sexual Risk: Serodiscordant unprotected anal sex with a casual male sex partner was significantly associated with moderate depressive symptoms, such that those who had serodiscordant unprotected anal sex with a casual male partner during their most recent sexual encounter were more than eight times more likely to have moderate depressive symptoms than MSM who did not engage in this level of sexual risk taking (OR = 8.29; $P = 0.02$).

Psychosocial Factors: Compared to participants without a history of incarceration or drug/alcohol treatment, men who had been incarcerated were more likely to report moderate depressive symptoms (OR = 2.38; $P < 0.02$), as were men who had been in drug/alcohol treatment history (OR = 3.07; $P = 0.003$).

Multivariable Logistic Regression Model of Risk Factors for Moderate Depressive Symptoms (CES-D score 16–26)—In a multivariable model adjusting for participants' age, education, sexual orientation, HIV status, and recruitment site (Table 3), MSM who reported serodiscordant unprotected anal sex with a casual male partner during last sex (AOR = 9.86; $P = 0.02$) and those who reported being diagnosed with an STD in the prior 12 months (AOR = 6.40; $P = 0.04$) were significantly more likely to have moderate depressive symptoms compared to the referent groups.

Outcome 3: Severe Depressive Symptoms (CES-D score 27 or higher) (Table 4)

Bivariate Associations of Demographic and Behavioral Risk Factors for Severe Depressive Symptoms (CES-D score 27 or higher)

Demographics: Participants publicly insured with Medicaid were more likely to have severe depressive symptoms compared to men with private insurance (OR = 3.87; $P = 0.03$).

Sexual Risk: Unprotected anal sex with a female partner in the prior 12 months (OR = 4.21; $P = 0.006$) and using the Internet to meet sexual partners in the prior 12 months because they “felt lonely” (OR = 3.84; $P = 0.002$) were significantly associated with increased odds of having severe clinically significant depressive symptoms.

Psychosocial Factors: Men with a current problem with alcohol (OR = 2.88; $P = 0.01$) and those with a history of drug/alcohol treatment (OR = 3.40; $P = 0.005$) were significantly more likely to have severe depressive symptoms relative to men without a drinking problem and with no history of drug/alcohol treatment.

Multivariable Logistic Regression Model of Risk Factors for Severe

Depressive Symptoms (CES-D score 27 or higher)—In a multivariable model adjusting for participants’ age, education, sexual orientation, HIV status, and recruitment site (Table 4), participants insured via Medicaid compared to those with private health insurance (AOR = 4.46; $P = 0.05$) and those reporting difficulty accessing healthcare in the past 12 months (AOR = 5.19; $P = 0.04$), compared to those reporting no difficulty accessing care, were at higher odds for severe depressive symptoms.

Discussion

With one-third of Black MSM screening positive for clinically significant depressive symptoms in the present study, results suggest that depression represents a pervasive psychosocial issue among Black MSM, as it does among MSM in general (Cochran and Mays 1994, 2000; Hirshfield et al. 2008; Meyer et al. 2008; Salomon et al. 2008). More than half of depressed men in the sample (58% or 38/65) had moderate depressive symptoms and, consistent with our hypothesis and prior research (Rogers et al. 2003), increased sexual risk behavior was associated with moderate depressive symptoms. Specifically, men reporting serodiscordant unprotected anal sex with a casual male partner had a nine-fold greater risk and those diagnosed with an STD had a six-fold greater risk for having moderate depressive symptoms. Results suggest that moderately depressed Black MSM in particular may be at increased risk for HIV and other STDs. HIV prevention interventions for Black MSM may benefit from incorporating screening and/or treatment for depression, thus allowing MSM who are depressed to respond more effectively to behavioral change approaches to HIV prevention.

Whereas, increased sexual risk was associated with moderate depressive symptoms, socioeconomic disadvantage was associated with severe depressive symptoms in the current study (i.e., being publicly insured via Medicaid and having had difficulty accessing healthcare in the past 12 months), consistent with prior research on socioeconomic status and depression among Black men (Gilmer et al. 2005; Watkins et al. 2006). Prior research has suggested that Black individuals may have increased vulnerability to mental health disorders (Kessler et al. 1994; US Department of Health and Human Services 2001) because they are overrepresented in high-need populations due to homelessness, incarceration, and other psychosocial factors (Bureau of Justice Statistics 1998, 1999; Jencks 1994; US Department of Health and Human Services 2001). In the current study, participants with a history of incarceration and/or drug/alcohol treatment were more likely to have clinically

significant depressive symptoms, which supports this explanation of the overrepresentation of Blacks in high-need populations. Furthermore, many Black men are disproportionately exposed to everyday psychological stressors (e.g., racism and discrimination, poverty, unemployment, violence) that may adversely affect mental health and place them at greater risk for depression (Kessler et al. 1994; Watkins et al. 2006; Williams 2003). Future research would benefit from examining the role of additional contributing factors to depression among Black MSM, such as psychosocial coping (Strathdee et al. 1998), racism/discrimination (Watkins et al. 2006), or internalized homophobia (Johnson et al. 2008).

In the current study, having used the Internet to meet sexual partners in the prior 12 months because of loneliness was associated with clinically significant depressive symptoms. It has been suggested that depression may play a role in fueling sexual risk in the online sex-seeking environment (Kalichman et al. 2005). In this study, Black MSM with depressive symptoms may be at risk of feeling isolated and use the Internet to find sexual partners with whom they may practice unsafe sex. This is not surprising given that feelings of loneliness themselves are commonly associated with depression. Incorporating coping skills into HIV prevention interventions may be an effective means of helping MSM to learn how to more effectively deal with their loneliness while protecting their sexual health. Findings support recent research suggesting that the Internet may represent a viable medium to reach and screen MSM at risk for depression (Hirshfield et al. 2008).

Consistent with our hypotheses, in bivariate analyses screening positive for an alcohol problem increased the odds of having clinically significant depressive symptoms. This is aligned with prior research suggesting high rates of alcohol abuse among Black men (Caetano and Clark 1998; Grant et al. 2004; SAMHSA 2007), as well as among MSM in general (Cochran et al. 2000; Drabble et al. 2005; Irwin and Morgenstern 2005; Stall et al. 2001), which may contribute to increased sexual risk taking. However, drug use was not significantly associated with clinically significant depressive symptoms among the current sample. The association between history of incarceration and alcohol/drug treatment and depression further suggests that understanding the complex relationships between psychosocial factors and sexual risk (e.g., “intertwined syndemics”; Stall et al. 2003) may yield the most productive new insights for addressing and improving sexual health among Black MSM.

Limitations pertaining to recruitment methodology and data collection bear mention. First, we used a screener to assess depression and did not use a diagnostic tool (e.g., clinical interview). However, the CES-D is a widely accepted screening instrument with well-established reliability and validity (Radloff 1977; Schulberg 1985), and its scores have been shown to correlate highly with clinicians’ ratings and with other self-report depression measures (Blumenthal et al. 2003; Ensel 1986). Similarly, the use of the CES-D with a single cutoff to measure depression and no measure of duration made it impossible to differentiate between types of depressive disorders (i.e., dysthymic disorder vs. major depression) which have been shown to be differentially associated with rates of risk taking among MSM (Rogers et al. 2003). Future research would benefit from utilizing a clinical diagnostic interview, especially among men with moderate CES-D scores (16–26), to differentiate types of depressive disorders and examine sexual risk behavior. A similar limitation applies to the use of the CAGE instrument for likely alcohol dependence, which is a screener and not a diagnostic tool. An additional related limitation is that most measures used in the study utilized a 12 months assessment timeframe (e.g., in the “12 months prior to study enrollment”), whereas, the CES-D assessed depressive symptoms across a 1 week timeframe (e.g., in the “past week, including today”).

Second, as a cross-sectional study, data are subject to the limitations of a study design which descriptively measures exposure and disease status at the same point in time, not allowing for inferences in causality to be made. Third, since the survey was interviewer-administered, responses could have been biased towards social desirability, which would underestimate the results. Fourth, in contrast to traditional RDS, this study did not weight the final sample according to the population being studied. Modifications to the traditional RDS technique included adding many seeds to expedite the recruitment process and ending recruitment prior to the achievement of equilibrium. We did this to harness the in-group recruitment tendencies of seeds, making the study similar to a non-probability convenience sample. Hence, the non-random selection of initial recruits potentially informed the characteristics of subsequent recruits. Furthermore, the use and level of incentives may have contributed to a sample of more socially marginalized Black MSM, limiting generalizability of findings.

Limitations notwithstanding, this is the first study of which we are aware to document clinically significant depressive symptoms among an exclusively Black MSM sample in Massachusetts, and to examine differences by severity of depressive symptoms. Findings suggest that moderately depressed Black MSM are more likely to engage in behaviors that place them at increased risk for HIV and other STDs. HIV primary and secondary prevention interventions may benefit from incorporating screening and/or treatment for depression to more effectively address unsafe sexual behavior among Black MSM. Organizations and programs serving Black MSM, in Massachusetts in particular, should be aware of the high rates of depression among this population and proactively respond to address the psychosocial and HIV prevention needs of Black MSM. Further investigation of depression within the context of sexual risk taking among Black MSM is warranted, especially as related to the benefit of treatment or screening in future HIV prevention interventions.

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References

- Afifi, AA.; Clark, V.; May, S. Computer-aided multivariate analysis. 4. New York: Chapman and Hall/CRC; 2004.
- American Psychiatric Association. Diagnostics and statistical manual of mental disorders. 4. Washington, DC: American Psychiatric Association; 2000. text revision, DSM-IV-TR
- Beck A, McNally I, Petrak J. Psychosocial predictors of HIV/STI risk behaviours in a sample of homosexual men. Sexually Transmitted Infections. 2003; 79:142–146. 10.1136/sti. 79.2.142. [PubMed: 12690138]
- Blumenthal JA, Lett HS, Babyak MA, et al. Depression as a risk factor for mortality after coronary artery bypass surgery. Lancet. 2003; 362:604–609. 10.1016/S0140-6736 (03)14190-6. [PubMed: 12944059]
- Bradley MV, Remien RH, Dolezal C. Depression symptoms and sexual HIV risk behavior among serodiscordant couples. Psychosomatic Medicine. 2008; 70(2):186–191. 10.1097/PSY. 0b013e3181642a1c. [PubMed: 18256344]
- Buchsbaum DG, Buchanan RG, Centor RM, Schnoll SH, Lawton MJ. Screening for alcohol abuse using CAGE scores and likelihood ratios. Annals of Internal Medicine. 1991; 115:774–777. [PubMed: 1929025]

- Bureau of Justice Statistics. Probation and parole populations, 1997. Washington, DC: US Department of Justice; 1998.
- Bureau of Justice Statistics. The sourcebook of criminal justice statistics. Washington, DC: US Department of Justice; 1999.
- Caetano R, Clark CL. Trends in alcohol consumption patterns among Whites, Blacks and Hispanics: 1984 and 1995. *Journal of Studies on Alcohol*. 1998; 59:659–668. [PubMed: 9811087]
- Centers for Disease Control and Prevention. National surveillance data for Chlamydia, gonorrhea, and syphilis. Atlanta, GA: US Department of Health and Human Services; 2007. Trends in reportable sexually transmitted diseases in the United States, 2006.
- Centers for Disease Control Prevention. HIV/AIDS surveillance report, 2006. Vol. 18. Atlanta, GA: U.S. Department of Health and Human Services; 2008.
- Cherpitel CJ. Differences in performance of screening instruments for problem drinking among blacks, whites, and Hispanics in an emergency room population. *Journal of Studies on Alcohol*. 1998; 59:420–426. [PubMed: 9647424]
- Cherpitel CJ. Screening for alcohol problems in the U.S. general populations: Comparison of the CAGE, RAPS4, and RAPS4-QF by gender, ethnicity, and service utilization. *Alcoholism, Clinical and Experimental Research*. 2002; 26:1686–1691.
- Cochran SD, Keenan C, Schober C, Mays VM. Estimates of alcohol use and clinical treatment needs among homosexually active men and women in the US population. *Journal of Consulting and Clinical Psychology*. 2000; 68:1062–1071. 10.1037/0022-006X.68.6.1062. [PubMed: 11142540]
- Cochran SD, Mays VM. Depressive distress among homosexually active African American men and women. *The American Journal of Psychiatry*. 1994; 151:524–529. [PubMed: 8147449]
- Cochran SD, Mays VM. Lifetime prevalence of suicidal symptoms and affective disorders among men reporting same-sex sexual partners: Results from the NHANES III. *American Journal of Public Health*. 2000; 90:573–578. 10.2105/AJPH.90.4.573. [PubMed: 10754972]
- Cook RL, Chung T, Kelly TM, Clark DB. Alcohol screening in young persons attending a sexually transmitted disease clinic: Comparison on AUDIT, CRAFFT, and CAGE instruments. *Journal of General Internal Medicine*. 2005; 20:1–6. [PubMed: 15693920]
- Crawford I, Allison KW, Zamboni BD, Soto T. The influence of dual-identity development on the psychosocial functioning of African-American gay and bisexual men. *Journal of Sex Research*. 2002; 39(3):179–189. [PubMed: 12476265]
- Dilley JW, McFarland W, Sullivan P, Discepolo M. Psychosocial correlates of unprotected anal sex in a cohort of gay men attending and HIV-negative support group. *AIDS Education and Prevention*. 1998; 10(4):317–326. [PubMed: 9721384]
- Dolezal C, Carballo-Dieuez A, Nieves-Rosa L, Diaz F. Substance use and sexual risk behavior: Understanding their association among four ethnic groups of Latino men who have sex with men. *Journal of Substance Abuse*. 2000; 11(4):323–336. 10.1016/S0899-3289(00)00030-4. [PubMed: 11147230]
- Drabble L, Midanik LT, Trocki K. Reports of alcohol consumption and alcohol-related problems among homosexual, bisexual and heterosexual respondents: Results from the 2000 national alcohol survey. *Journal of Studies on Alcohol*. 2005; 66:111–120. [PubMed: 15830911]
- Ensel, W. Measuring depression: The CES-D scale. In: Lin, N.; Dean, A.; Ensle, WM., editors. *Social support, life events and depression*. New York: Academic Press; 1986. p. 51-70.
- Ewing JA. Detecting alcoholism. The CAGE questionnaire. *Journal of the American Medical Association*. 1984; 252:1905–1907. 10.1001/jama.252.14.1905. [PubMed: 6471323]
- Geisser ME, Roth RS, Robinson ME. Assessing depression among persons with chronic pain using the center for epidemiological studies-depression scale and the beck depression inventory: A comparative analysis. *The Clinical Journal of Pain*. 1997; 13:163–170. 10.1097/00002508-199706000-00011. [PubMed: 9186024]
- Gilmer WS, Trivedi MH, Rush AJ, et al. Factors associated with chronic depressive episodes: A preliminary report from the STAR-D project. *Acta Psychiatrica Scandinavica*. 2005; 112:425–433. 10.1111/j.1600-0447.2005.00633.x. [PubMed: 16279871]
- Grant BF, Dawson DA, Stinson FS, Chou SP, Dufour MC, Pickering RP. The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991–1992 and 2001–2002.

- Drug and Alcohol Dependence. 2004; 74:223–234. 10.1016/j.drugalcdep.2004.02.004. [PubMed: 15194200]
- Heckathorn DD. Respondent-driven sampling: A new approach to the study of hidden populations. *Social Problems*. 1997; 44:174–199. 10.1525/sp.1997.44.2.03x0221m.
- Heckathorn DD. Respondent-driven sampling II: Deriving valid population estimates from chain-referral samples of hidden populations. *Social Problems*. 2002; 49:11–34. 10.1525/sp.2002.49.1.11.
- Hirshfield S, Wolitski RJ, Chiasson MA, Remien RH, Humberstone M, Wong T. Screening for depressive symptoms in an online sample of men who have sex with men. *AIDS Care*. 2008; 20:904–910. 10.1080/09540120701796892. [PubMed: 18720088]
- Irwin TW, Morgenstern J. Drug-use patterns among men who have sex with men presenting for alcohol treatment: Differences in ethnic and sexual identity. *Journal of Urban Health*. 2005; 82:127–133.
- Jencks, C. *The homeless*. Cambridge, MA: Harvard University Press; 1994.
- Johnson MO, Carrico AW, Chesney MA, Morin SF. Internalized heterosexism among HIV-positive, gay-identified men: Implications for HIV prevention and care. *Journal of Consulting and Clinical Psychology*. 2008; 76(5):829–839. 10.1037/0022-006X.76.5.829. [PubMed: 18837600]
- Kalichman SC, Cherry C, Cain D, Pope H, Kalichman M. Psychosocial and behavioral correlates of seeking sex partners on the Internet among HIV-positive men. *Annals of Behavioral Medicine*. 2005; 30:243–250. 10.1207/s15324796abm.3003_8. [PubMed: 16336075]
- Kelly JA, Murphy DA, Bahr GR, et al. Factors associated with severity of depression and high-risk sexual behavior among persons diagnosed with human immunodeficiency virus (HIV) infection. *Health Psychology*. 1993; 12:215–219. 10.1037/0278-6133.12.3.215. [PubMed: 8500451]
- Kennedy SH, Dickens SE, Eisfeld BS, Bagby RM. Sexual dysfunction before antidepressant therapy in major depression. *Journal of Affective Disorders*. 1999; 56:201–208. 10.1016/S0165-0327(99)00050-6. [PubMed: 10701478]
- Kessler, RC.; Berglund, PA.; Zhao, S. The 12-month prevalence and correlates of serious mental illness (SMI). In: Manderscheid, RW.; Sonnenschein, MA., et al., editors. *Mental health, United States*. Rockville, MD: Center for Mental Health Services; 1996.
- Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of DSM–III–R disorders in the United States. *Archives of General Psychiatry*. 1994; 51:8–19. [PubMed: 8279933]
- Knowlton R, McCusker J, Stoddard A, et al. The use of the CAGE questionnaire in a cohort of homosexually active men. *Journal of Studies on Alcohol*. 1994; 55:692–694. [PubMed: 7861797]
- Koblin BA, Husnik MJ, Colfax G, Huang Y, Madison M, Mayer K. Risk factors for HIV infection among men who have sex with men. *AIDS (London, England)*. 2006; 20:731–739. 10.1097/01.aids.0000216374.61442.55.
- Massachusetts Department of Public Health HIV/AIDS Bureau. *An Added Burden: The Impact of the HIV/AIDS Epidemic in Communities of Color in Massachusetts*. 2007. Retrieved October 1, 2008, from http://www.mass.gov/EeoHhs2/docs/dph/aids/aids_report07.pdf
- Mathew RJ, Weinman ML. Sexual dysfunctions in depression. *Archives of Sexual Behavior*. 1982; 11:323–328. 10.1007/BF01541593. [PubMed: 7149967]
- Mayer, KH.; Mimiaga, MJ.; VanDerwarker, R.; Goldhammer, H.; Bradford, JB., et al. Fenway community health's model of integrated community-based LGBT care, education, and research. In: Meyer, IH.; Northridge, ME., editors. *The health of sexual minorities: Public health perspectives on lesbian, gay, bisexual, and transgender populations*. New York: Springer Science & Business Media, LLC; 2007. p. 693-715.
- Mayfield D, McLeod G, Hall P. The CAGE questionnaire: Validation of a new alcoholism screening instrument. *The American Journal of Psychiatry*. 1974; 131:1121–1123. [PubMed: 4416585]
- Mays VM, Cochran SD, Zamudio A. HIV prevention research: Are we meeting the needs of African American men who have sex with men+ *The Journal of Black Psychology*. 2004; 30:78–105. 10.1177/0095798403260265. [PubMed: 20041036]

- Meade CS, Sikkema KJ. HIV risk behavior among adults with severe mental illness: A systematic review. *Clinical Psychology Review*. 2005; 25:433–457. 10.1016/j.cpr.2005.02.001. [PubMed: 15914265]
- Meyer I. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological Bulletin*. 2003; 129(5):674–697. 10.1037/0033-2909.129.5.674. [PubMed: 12956539]
- Meyer IH, Dietrich J, Schwartz S. Lifetime prevalence of mental disorders and suicide attempts in diverse lesbian, gay, and bisexual populations. *American Journal of Public Health, LGBTQ PUBLIC HEALTH*. 2008; 98(6):1004–1006. 10.2105/AJPH.2006.096826.
- Millett, GA.; Malebranche, D.; Peterson, JL. HIV/AIDS prevention research among black men who have sex with men: Current progress and future directions. In: Meyer, IH.; Northridge, ME., editors. *The health of sexual minorities: Public health perspectives on lesbian, gay, bisexual, and transgender populations*. New York, NY: Springer Science; 2007. p. 539–565.
- Mimiaga MJ, Goldhammer H, Belanoff C, Tetu AM, Mayer KH. Men who have sex with men: Perceptions about sexual risk, HIV and sexually transmitted disease testing, and provider communication. *Sexually Transmitted Diseases*. 2007; 34:113–119. 10.1097/01.olq.0000225327.13214.bf. [PubMed: 16810121]
- Mimiaga MJ, Reisner SL, Tetu AM, et al. Psychosocial and behavioral predictors of partner notification after HIV and STI exposure and infection among MSM. *AIDS and Behavior*. 2008 (in press).
- Myers HF, Javanbakht M, Martinez M, Obediah S. Psychosocial predictors of risky sexual behaviors in African American Men: Implications for prevention. *AIDS Education and Prevention*. 2003; 15(Suppl A):66–79. [PubMed: 12630600]
- Naughton MJ, Wiklund I. A critical review of dimension-specific measures of health-related quality of life in cross-cultural research. *Quality of Life Research*. 1993; 2:397–432. 10.1007/BF00422216. [PubMed: 8161976]
- Parsons JT, Halkitis PN, Wolitski RJ, Gomez CA. Correlates of sexual risk behaviors among HIV-positive men who have sex with men. *AIDS Education and Prevention*. 2003; 15:383–400. 10.1521/aeap.15.6.383.24043. [PubMed: 14626462]
- Perdue T, Hagan H, Thiede H, Valleroy L. Depression and HIV risk behavior among Seattle-area injection drug users and young men who have sex with men. *AIDS Education and Prevention*. 2003; 15:81–92. 10.1521/aeap.15.1.81.23842. [PubMed: 12627745]
- Peterson JL, Folkman S, Bakeman R. Stress, coping, HIV status, psychosocial resources, and depressive mood in African American gay, bisexual, and heterosexual men. *American Journal of Community Psychology*. 1996; 24:461–487. 10.1007/BF02506793. [PubMed: 8969447]
- Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1:385–401. 10.1177/014662167700100306.
- Richardson MA, Myers HF, Bing EG, Satz P. Substance use and psychopathology in African American men at risk for HIV infection. *Journal of Community Psychology*. 1997; 25(4):353–370. 10.1002/(SICI)1520-6629(199707)25:4<353::AID-JCOP4>3.0.CO;2-V.
- Roberts RE, Vernon SW. The center for epidemiologic studies depression scale: Its use in a community sample. *The American Journal of Psychiatry*. 1983; 140:41–46. [PubMed: 6847983]
- Robins AG, Dew MA, Davidson S, et al. Psychosocial factors associated with risky sexual behavior among HIV-seropositive gay men. *AIDS Education and Prevention*. 1994; 6(6):483–492. [PubMed: 7702959]
- Rogers G, Curry M, Oddy J, Pratt N, Beilby J, Wilkinson D. Depressive disorders and unprotected casual anal sex among Australian homosexually active men in primary care. *HIV Medicine*. 2003; 4:271–275. 10.1046/j.1468-1293.2003.00155.x. [PubMed: 12859327]
- Rubb, SR.; Palenicek, JG.; Hoover, D.; Selnes, OA.; Saah, AJ. Psychosocial factors related to unprotected anal intercourse in a cohort of homosexual men. *International Conference on AIDS*; Berlin, Germany. 1993.
- Salomon EA, Mimiaga MJ, Husnik MJ, et al. Depressive symptoms, utilization of mental health care, substance use and sexual risk among young men who have sex with men in EXPLORE: Implications for age-specific interventions. *AIDS and Behavior*. 2008 in press.

- Sanchez T, Finlayson T, Drake A, et al. Human immunodeficiency virus (HIV) risk, prevention, testing behaviors—United States, national HIV behavioral surveillance system: Men who have sex with men, November 2003–April 2005. *Morbidity and Mortality Weekly Report (MMWR) Surveillance Summary*. 2006; 55:1–16.
- SAS Institute Inc. SAS® version 9.1.3. Cary, NC: SAS Institute Inc; 2003.
- Schulberg HC. Assessing depression in primary medical and psychiatric practices. *Archives of General Psychiatry*. 1985; 42:1164–1170. [PubMed: 4074109]
- Sample SJ, Patterson TL, Grant I. Psychosocial predictors of unprotected anal intercourse in a sample of HIV positive gay men who volunteer for a sexual risk reduction intervention. *AIDS Education and Prevention*. 2000; 12(5):416–430. [PubMed: 11063061]
- Stall R, Mills TC, Williamson J, et al. Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. *American Journal of Public Health*. 2003; 93:939–942. 10.2105/ AJPH.93.6.939. [PubMed: 12773359]
- Stall R, Paul JP, Greenwood G, et al. Alcohol use, drug use and alcohol-related problems among men who have sex with men: The urban men's health study. *Addiction (Abingdon, England)*. 2001; 96:1589–1601. 10.1046/j.1360-0443.2001.961115896.x.
- Steinbauer JR, Cantor SB, Holzer CE, Volk RJ. Ethnic and sex bias in primary care screening tests for alcohol use disorders. *Annals of Internal Medicine*. 1998; 129:353–362. [PubMed: 9735062]
- Strathdee SA, Hogg RS, Martindale SL, et al. Determinants of sexual risk-taking among young HIV-negative gay and bisexual men. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*. 1998; 19(1):61–66. [PubMed: 9732071]
- Substance Abuse and Mental Health Services Administration. (SAMHSA). Results from the 2006 National Survey on Drug Use and Health: National Findings. Rockville, MD: Office of Applied Studies; 2007. (NSDUH Series H-32, DHHS Publication No. SMA 07-4293)
- US Census Bureau. State and county quickfacts. 2006. Retrieved October 1, 2008, from <http://quickfacts.census.gov/qfd/states/00000.html>
- US Department of Health and Human Services. Mental health: culture, race, and ethnicity—A supplement to mental health: A report of the surgeon general. Rockville, MD: US Department of Health and Human Services; 2001.
- US Department of Health and Human Services. CES-D scale. Bethesda, MD: US Department of Health and Human Services and National Institute of Health; 2004.
- Watkins DC, Green BL, Rivers BM, Rowell KL. Depression and black men: Implications for future research. *Journal of Men's Health*. 2006; 3:227–235.
- Williams D. The health of men: Structured inequalities and opportunities. *American Journal of Public Health*. 2003; 93:724–731. 10.2105/AJPH.93.5.724. [PubMed: 12721133]
- Zich JM, Attkisson CC, Greenfield TK. Screening for depression in primary clinics: The CES-D and the BDI. *International Journal of Psychiatry in Medicine*. 1990; 20:259–277. [PubMed: 2265888]

Table 1

Demographic characteristics by participants with depressive symptoms (CES-D score 16+; $n = 65$) and those without (CES-D score 0–15; $n = 132$)

	Depressive symptoms ($n = 65$)	No depressive symptoms ($N = 132$)	Total sample ($n = 197$)
Mean age (SD)	38.52 (11.22)	38.72 (11.42)	38.65 (11.32)
Mean CES-D score (SD)	27.6 (10.9)	6.1 (5.0)	13.2 (12.5)
Mean number male partners (SD)	5.38 (6.12)	6.24 (11.79)	5.95 (10.26)
Mean number female partners (SD)	4.48 (4.76)	4.28 (5.18)	4.36 (4.99)
	% (N)	% (N)	% (N)
Race/ethnicity ^a			
African American	88 (57)	87 (114)	87 (171)
Other race/ethnicity (Haitian, Jamaican, Cape Verdean, African, Caribbean)	13 (8)	17 (22)	16 (30)
Hispanic/Latino	7 (4)	9 (11)	8 (15)
Education			
Some high school	10 (6)	10 (12)	10 (18)
High school degree or GED	77 (50)	78 (102)	78 (152)
College or graduate degree	14 (9)	13 (17)	14 (26)
Housing			
Unstable housing in past 12 months	13 (8)	13 (16)	13 (24)
Health insurance ^a			
No health insurance	5 (3)	5 (6)	5 (9)
Private health insurance/HMO	11 (7)	26 (34)	21 (41)
Medicaid	84 (54)	68 (89)	73 (143)
Medicare	7 (4)	7 (9)	7 (13)
Veteran's administration	4 (2)	3 (3)	3 (5)
Other	4 (2)	0 (0)	2 (2)
Sexual Identity			
Heterosexual	10 (6)	9 (11)	9 (17)
Homosexual	37 (24)	48 (63)	45 (87)
Bisexual	53 (34)	40 (52)	44 (86)
Disclosure MSM status			
Not out	19 (12)	20 (26)	20 (38)
HIV/STDs			
HIV-infected	17 (11)	19 (24)	18 (35)
History of STDs ever	28 (18)	30 (39)	29 (57)
STD in past 12 months	10 (6)	5 (6)	7 (12)
Substance use during sex past 12 months ^a			
Crystal methamphetamine	8 (5)	7 (8)	7 (13)
Crack	19 (12)	13 (16)	15 (28)
Cocaine	31 (20)	17 (22)	22 (42)

	Depressive symptoms (<i>n</i> = 65)	No depressive symptoms (<i>N</i> = 132)	Total sample (<i>n</i> = 197)
Heroin	7 (4)	4 (4)	5 (8)
Marijuana	53 (34)	32 (42)	39 (76)
Poppers	11 (7)	15 (19)	14 (26)
Any drug during sex (crystal, crack, cocaine, heroin, marijuana)	71 (46)	47 (61)	55 (107)
Sexual risk past 12 months			
UAS non-main male	44 (28)	29 (38)	34 (66)
Serodiscordant UAS non-main male	19 (12)	10 (13)	13 (25)
UAF	20 (13)	10 (12)	13 (25)
UVF	33 (21)	27 (35)	29 (56)
Sex for money (either payer or payee)	14 (9)	7 (9)	10 (18)
Psychosocial			
Moderate depression (CES-D 16–26)	58 (38)	0 (0)	19 (38)
Severe depression (CES-D 27+)	42 (27)	0 (0)	14 (27)
Alcohol problem (CAGE)	51 (33)	31 (40)	38 (73)
History of drug or alcohol treatment	62 (40)	33 (44)	43 (84)
History of incarceration	80 (52)	45 (59)	51 (101)
Report using internet to meet sexual partners because they “feel lonely”	49 (32)	27 (36)	35 (68)

Note: Due to rounding, percentages may exceed 100%

^aParticipants were asked to “check all that apply”; thus percentages exceed 100%

UAS unprotected anal sex, *UAF* unprotected anal sex with a female partner, *UVF* unprotected vaginal sex with a female partner

Table 2

Risk factors associated with clinically significant depressive symptoms (CES-D score 16+; $N = 65$) among Black MSM ($N = 197$)

Predictors	Bivariate Odds Ratio (95% CI)	P Value	Multivariable Model Odds Ratio (adjusted) (95% CI) ^a	P value
Health insurance				
No medicaid	—	—	—	—
Medicaid	2.37 (1.13–4.99)	0.02	7.31 (1.74–14.20)	0.007
CAGE				
No current alcohol problem	—	—	—	—
Current alcohol problem	2.37 (1.29–4.37)	0.006	1.46 (0.58–3.71)	0.43
History of incarceration				
No	—	—	—	—
Yes	2.26 (1.22–4.17)	0.009	1.90 (0.70–4.12)	0.20
Sexual risk behavior in past 12 months				
No unprotected anal sex with female partner	—	—	—	—
Unprotected anal sex with female partner	2.50 (1.07–5.85)	0.03	2.21 (0.65–7.44)	0.20
No serodiscordant unprotected anal sex with non-main male partner	—	—	—	—
Serodiscordant unprotected anal sex with non-main male partner	2.09 (0.89–4.92)	0.09	2.90 (2.02–14.19)	0.002
Recent STD in past 12 months				
No	—	—	—	—
Yes	2.11 (0.65–6.93)	0.10	8.33 (1.43–48.38)	0.02

Bold values indicate the adjusted odds ratios were significant ($P < 0.05$)

^a Final multivariable logistic regression model included: serodiscordant unprotected anal sex with casual male partner, unprotected anal sex with female partner(s), CAGE, recent STD history, history of incarceration, insurance status; we also adjusted for participant's age, education, sexual orientation, HIV status, drug use, and recruitment site

Table 3Predictors of moderate depressive symptoms (CES-D score 16–26; $N = 38$) among Black MSM ($N = 170$)

Predictors	Bivariate odds ratio (95% CI)	<i>P</i> Value	Multivariable model odds ratio (adjusted) (95% CI) ^a	<i>P</i> value
CAGE				
No current alcohol problem	–	–	–	–
Current alcohol problem	2.07 (0.99–4.33)	0.06	1.50 (0.55–4.09)	0.43
Serodiscordant unprotected anal sex with non-main male partner				
No	–	–	–	–
Yes	9.29 (1.44–47.53)	0.02	9.86 (1.51–64.61)	0.02
HIV status				
Uninfected	–	–	–	–
Infected	0.81 (0.30–2.17)	0.10	0.19 (0.03–1.10)	0.06
Recent STD				
No	–	–	–	–
Yes	2.30 (0.60–8.73)	0.10	6.40 (1.10–37.28)	0.04

Participants with severe depressive symptoms ($N = 27$) were excluded from this analysisBold values indicate the adjusted odds ratios were significant ($P < 0.05$)^aFinal multivariable logistic regression model includes disclosure of CAGE, serodiscordant unprotected anal sex with casual male partner, recent STD; we also adjusted for participant's age, education, HIV status, and recruitment site

Table 4Predictors of severe depressive symptoms (CES-D score 27+; $N = 27$) among Black MSM ($N = 159$)

Predictors	Bivariate odds ratio (95% CI)	P Value	Multivariable model odds ratio (adjusted) (95% CI) ^a	P value
Health insurance				
No medicaid	—	—	—	—
Medicaid	3.97 (1.10–13.55)	0.03	4.46 (1.01–20.42)	0.05
CAGE				
No current alcohol problem	—	—	—	—
Current alcohol problem	2.88 (1.24–6.69)	0.01	1.81 (0.60–5.52)	0.29
Sexual risk behavior in past 12 months				
No unprotected anal sex with female partner	—	—	—	—
Unprotected anal sex with female partner	4.21 (1.52–11.64)	0.006	2.83 (0.88–9.17)	0.08
No serodiscordant unprotected receptive anal sex with non-main male partner	—	—	—	—
Serodiscordant unprotected anal sex with non-main male partner	2.40 (0.82–7.06)	0.10	5.79 (0.62–54.41)	0.12
Difficulty getting needed healthcare in past 12 months				
No	—	—	—	—
Yes	3.99 (1.16–13.72)	0.03	5.19 (1.07–25.21)	0.04

Participants with moderate depressive symptoms ($N = 38$) were excluded from this analysis Bold values indicate the adjusted odds ratios were significant ($P < 0.05$)

^aFinal multivariable logistic regression model includes disclosure of health insurance status, CAGE score, access to health care, health insurance status, serodiscordant unprotected anal sex with casual male partner, UAF; we also adjusted for participant's age, education, HIV status, recent STD history, and recruitment site