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Erectile Dysfunction Medication Prescription and Condomless Intercourse in HIV-infected Men Who have Sex with Men in the United States

Xia Lin[1,2], **Christine L. Mattson**[2], **Mark Freedman**[2], and **Jacek Skarbinski**[2] **For the Medical Monitoring Project**

[1]Epidemic Intelligence Service, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA

[2]Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC, Atlanta, Georgia, USA

Abstract

Using nationally representative data, we assessed the prevalence of erectile dysfunction medication (EDM) prescription, and its association with insertive condomless anal intercourse (CAI) with an HIV-serodiscordant partner among sexually-active HIV-infected men who have sex with men (MSM) receiving medical care in the United States. Overall, 14% (95% CI 12–16) were prescribed EDM and 21% (95% CI 19–23) engaged in serodiscordant CAI. MSM who were prescribed EDM were more likely to engage in insertive CAI with a serodiscordant casual partner than those not prescribed EDM after adjusting for illicit drug use before or during sex (adjusted prevalence ratio=1.38; 95% CI 1.01–1.88). We found no association with main partners. Only 40% (95% CI 36–44) of MSM prescribed EDM received risk-reduction counseling from healthcare professionals. Risk-reduction counseling should be provided at least annually to all HIV-infected persons as recommended, especially at the time of EDM prescription.

Keywords

Erectile dysfunction medication; HIV-infected persons; Men who have sex with men; Condomless anal intercourse

Author responsible for correspondence: Xia Lin, PhD, MSPH, Centers for Disease Control and Prevention, Immunization Services Division, 1600 Clifton Road, Mail Stop A-19, Atlanta, GA 30329, USA, T: (404) 639-5296, F: (404) 471-8318, wft4@cdc.gov.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the CDC.

Compliance with Ethical Standards

The Medical Monitoring Project (MMP) is funded by the Centers for Disease Control and Prevention. All authors declare no conflicts of interest. The National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention determined that MMP was a public health surveillance activity and not subject to federal institutional review board review. However, some jurisdictions obtained approval from local Institutional Review Boards. All participants provided informed consent to participate in the interview.

Introduction

In 2010, an estimated 47,500 persons aged 13 years and older were newly infected with HIV in the United States [1]. Of the 38,000 new infections in men, 78% were attributed to male-to-male sexual contact. With antiretroviral therapy (ART), the life expectancy of persons living with HIV has increased dramatically, approaching that of general population [2]. However, the prevalence of many chronic conditions appears to be higher in persons living with HIV, compared with the general populations [3, 4]. Erectile dysfunction (ED), the persistent inability to achieve or maintain an erection, is one such condition [5–7].

In the 1987–1989 Massachusetts Male Aging Study, 34.8% of men aged 40–70 years reported moderate to complete ED and in the 2001–2002 National Health and Nutrition Examination Survey, 18.4% of the US male population aged 20 years or older reported experiencing ED [8, 9]. More recently, the 2011 US National Health and Wellness Survey showed that 24.6% of men aged 40 years and older had ED [10]. However, the reported prevalence of ED has appeared to be higher among HIV-infected men, ranging 25%–74% in various study populations [5–7, 11–14]. Using more stringent methodological criteria including adequate sample sizes and a validated questionnaire for ED assessment, a 2014 review found an ED prevalence of 50%–60% in HIV-infected men [15]. Although the reasons for the high prevalence of ED among HIV-infected men have not been fully elucidated, studies suggest that multiple factors may play a role. Previous research suggests that the direct and psychological effects of HIV, including change of body appearance, fear of infecting a partner, stigma, anxiety about disclosure, and comorbidities such as depression, hypertension and diabetes may contribute to increased ED prevalence. In addition, there is some evidence ED might be a side effect of ART, especially protease inhibitors [5, 6, 11, 15–17].

ED can be successfully treated. Phosphodiesterase type 5 inhibitors including sildenafil citrate, vardenafil hydrochloride, and tadalafil are effective peripheral vasodilator drugs for ED. They are legally available in the United States by prescription only; however, in an online survey of 603 US participants, 20.4% EDM users obtained the medications without a prescription, through pharmacies and online stores [18]. These drugs have been shown to alleviate the symptoms of ED and improve quality of life among those with ED. However, some studies suggest HIV-infected MSM are more likely to use EDM, and are more likely to engage in CAI compared with those who are not HIV-infected [19, 20]. MSM who use EDM are also more likely to engage in CAI [21, 22]. Thus, EDM use among HIV-infected MSM might contribute to HIV transmission, especially when the HIV-infected partner is in the insertive role. [23]. Most previous studies that document an association between EDM and CAI have relied on self-reported EDM use [24, 25]. If no health-care professionals are involved in the process of acquiring EDM, professional risk-reduction counseling is unlikely offered. Therefore, the association between self-reported EDM use and CAI does not necessarily mean the association between EDM prescription and CAI. Additionally, most previous investigations have employed convenience or geographically limited samples [22, 24–28], which may not be generalizable.

In this report, we present the prevalence of EDM prescription and HIV-serodiscordant CAI among sexually active HIV-infected MSM receiving medical care in the United States. We also assessed the association between EDM prescription and insertive CAI with a serodiscordant partner stratified by partner type (main and casual partners).

Methods

The Medical Monitoring Project (MMP) is a surveillance system designed to produce nationally representative, cross-sectional estimates of behavioral and clinical characteristics of HIV-infected adults in the United States [29–32]. For the data used in this analysis, MMP utilized a three-stage, complex sampling design in which US states and territories are sampled, followed by facilities providing outpatient HIV medical care in those jurisdictions, then HIV-infected adults (aged 18 years and older) receiving care in those facilities. The probability of being sampled at each of the three stages, states/territories, facilities, and patients, is proportional to the estimated HIV-infected population size at each sampling stage. This allows the data collected from sampled individuals to be representative of the HIV-infected population receiving medical care in the United States. Interview and medical record data were collected from HIV-infected persons receiving medical care during January – April of each year from 2009 through 2012. All sampled states and territories participated and the facility response rates ranged from 76%–85% across all years. Approximately 50% (ranging from 47% to 53% across all years) of eligible persons sampled from these facilities completed an interview and had their medical records abstracted. Data were weighted to account for unequal probabilities of selection and both facility and patient nonresponse [33, 34]. We analyzed data on 4,465 sexually active MSM who had been diagnosed with HIV for at least 12 months before interview, which were weighted to represent sexually active HIV-infected MSM receiving medical care in the United States during January to April each year 2009 through 2012. The National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention determined that MMP was a public health surveillance activity and not subject to federal institutional review board review [35, 36]. However, some jurisdictions obtained approval from local Institutional Review Boards. All participants provided informed consent to participate in the interview.

Measures

All self-reported information reflects behaviors and experiences during the 12 months prior to interview unless otherwise noted. Sexually active MSM were classified as men reporting any anal intercourse with a man. Serodiscordant CAI was defined as at least one episode of anal intercourse without a condom with a partner of unknown or negative HIV status. “Main partner” was defined as “a man you have sex with and whom you feel committed to above anyone else. This is a partner that you would call boyfriend, husband, significant other, or life partner.” “Casual partner” was defined as “a man you have sex with, but do not feel committed to or don’t know very well.” Depression was based on self-reported symptoms in the two weeks prior to interview using the Patient Health Questionnaire (PHQ-8) [37]. If the total depression score was >=5, it was classified as “major depression”; if the total depression score was between 2 and 4, it was classified as “other depression”. Self-reported socio-demographic characteristics included age, race and ethnicity, education, poverty

status, homeless status, in-jail status, and healthcare coverage. Self-reported behaviors included number of sex partners, binge drinking (defined as 5 or more alcohol drinks in one sitting in the past 30 days), any alcohol use before or during sex, any illicit drug use (both general use and use before or during sex, including heroin, cocaine, methamphetamine, other amphetamines or stimulants, steroids or hormones, painkillers, hallucinogens, methylenedioxymethamphetamine, ketamine, gamma-hydroxybutyrate, marijuana, and amyl nitrite), any CAI, any serodiscordant CAI, any serodiscordant CAI with a main partner, and any serodiscordant CAI with a casual partner. The calculated drug use variables were coded "yes" if the participant reported daily, weekly, monthly, or less than monthly use of any of the aforementioned substances. Other self-reported variables included time since HIV diagnosis, testing for STIs other than HIV, and whether risk-reduction counseling from a healthcare professional was received.

Information on ART and EDM prescriptions, viral load tests, and clinical HIV status was abstracted from medical records and was also restricted to the 12 months prior to interview unless otherwise noted. EDM prescription was defined as documentation of at least one prescription of sildenafil citrate, vardenafil hydrochloride, or tadalafil; durable viral suppression was defined as all viral load results in the medical record were less than 200 copies/ml or undetectable.

Data analysis

For population characteristics and risk behaviors, and prevalence of serodiscordant CAI, we generated weighted percentages and 95% confidence intervals (CIs) for all sexually active MSM whose HIV diagnosis had been made at least 12 months before interview (June 2008–May 2009 for the 2009 data cycle; June 2009–May 2010 for the 2010 cycle; June 2011–May 2012 for the 2011 cycle; June 2012–May 2013 for the 2012 cycle). We performed Rao-Scott chi-square tests to assess differences between sexually active MSM who were prescribed EDM and those who were not. We used Wald F tests and crude prevalence ratios (PRs) generated from univariate logistic regression models to assess the crude associations between socio-demographic characteristics/risk factors and CAI.

We used multivariable logistic regression models to examine whether EDM prescription was independently associated with serodiscordant insertive CAI among sexually active MSM. We developed separate models for two outcome variables, insertive CAI with a serodiscordant main partner, and insertive CAI with a serodiscordant casual partner. The two outcomes were not mutually exclusive and were derived from two separate questions. For the first outcome measure, all sexually active MSM whose HIV diagnosis had been made at least 12 months before interview were grouped into two categories, "yes" if they had at least one insertive CAI with a serodiscordant main partner in the past 12 months and "no" if they did not have any insertive CAI with a serodiscordant main partner in the past 12 months, including those who did not have serodiscordant CAI at all, those who only had receptive serodiscordant CAI, and those who only had serodiscordant CAI with a casual partner, etc. The second outcome measure was defined similarly for insertive CAI with a serodiscordant casual partner. Using the statistical significance of an interaction term in a logistic regression model between EDM prescription and serodiscordant CAI, we assessed potential effect

modification caused by durable viral suppression because theoretically viral suppression status could modify the association between sexual risk behaviors and use of EDM. If the interaction term was significant ($p<0.10$), it was entered in the multivariable model containing potential confounders for reassessment. The interaction term stayed in the final model if it was significant ($p<0.05$) in the multivariable model. Similar to previous studies [24, 26, 27], we considered the following factors as potential confounders: race, age, education, depression, binge drinking, illicit drug use before or during sex. Durable viral suppression was only considered as a potential confounder if it was not a significant effect modifier. Our criteria for a potential confounder to be included in a final model were any factor that: 1) was associated with EDM prescription ($p<0.10$), 2) was associated with serodiscordant insertive CAI ($p<0.10$), and 3) caused 10% or more change on the association (measured by PR) between EDM and serodiscordant insertive CAI. All potential confounders that met these criteria were included in the final model. Because illicit drug use before or during sex has been established as a particularly important confounder in the literature [24, 26, 27], illicit drug use before or during sex was forced into the final models as an a priori covariate, regardless of whether it caused 10% or more change on the association between EDM and serodiscordant insertive CAI.

All analyses accounted for the complex sample design and unequal selection probabilities by using the survey procedures in SAS 9.3 [38] and SUDAAN 10.0.1 [39].

Results

Population characteristics

In total, 18,095 adults had both interview data and medical record data in the combined dataset from four collection cycles (June 2009–May 2013). Among the 5,821 MSM, 5,686 had been diagnosed with HIV for at least 12 months. Of them, 4,465 MSM had at least one act of anal intercourse in the 12 months before interview and therefore considered sexually active. Among these sexually active MSM, an estimated 34% were under 40 years old, 51% were non-Hispanic whites, and 73% had more than high school education (Table 1). During the 12 months prior to interview, 91% were prescribed ART, 69% were durably virally suppressed, and 59% had ever been diagnosed with AIDS. Overall, 23% reported a positive STI test, 40% reported a negative STI test, and 36% reported not having been tested for STIs. In addition, 22% reported binge drinking and 40% reported illicit drug use. Forty-seven percent drank alcohol and 27% used illicit drugs before or during sex (Table 1).

Of sexually active HIV-infected MSM receiving medical care in the United States, 14% (95% CI 12–16) were prescribed EDM. Statistically significant differences were seen in all socio-demographic and clinical characteristics between those who were prescribed EDM and those who were not prescribed EDM except depression status and self-reported STI testing (Table 1). Regarding self-reported sexual and drug-use behaviors, compared with MSM who were not prescribed EDM, those who were prescribed EDM were significantly less likely to be binge drinkers, but more likely to have more than 1 sex partner or use illicit drug before or during sex (Table 1).

Of note, only 45% of all sexually active MSM received risk-reduction counseling from a healthcare professional in the 12 months before interview. MSM prescribed EDM were significantly less likely than MSM not prescribed EDM to have received such counseling (40% vs 46% respectively, p=0.035, Rao-Scott chi-square statistic = 4.43, Table 1).

Prevalence of CAI

Of all sexually active HIV-infected MSM receiving medical care (n=4,465), an estimated 55% engaged in CAI, and 21% engaged in serodiscordant CAI; 77% (95% CI 75–78) had at least one main partner in the past 12 months, and 57% (95% CI 55–59) had at least one casual partner in the past 12 months; 6% engaged in insertive CAI with a serodiscordant main partner, and 7% did so with a serodiscordant casual partner (Table 1).

Relationship between EDM prescription and CAI

Durable viral suppression was not a statistically significant effect modifier in the logistic regression models. All potential confounders that met our criteria were assessed, but only age was identified in the model of insertive CAI with a serodiscordant main partner. Illicit drug use before or during sex did not meet our criteria for a confounder but was forced in both models as previously explained.

As shown in Table 2, the multivariable logistic regression models revealed that while the association between EDM prescription and insertive CAI with a serodiscordant main partner was not statistically significant, the association between EDM prescription and insertive CAI with a serodiscordant casual partner was statistically significant ($p<0.05$). Sexually active MSM who were prescribed EDM were significantly more likely to engage in insertive CAI with a serodiscordant casual partner than those who were not prescribed EDM (adjusted PR, 1.38; 95% CI 1.01–1.88).

Discussion

To our knowledge, this analysis provides the first national prevalence estimates of EDM prescription among HIV-infected MSM receiving medical care in the United States. Our estimate that 14% of sexually active HIV-infected MSM were prescribed EDM in the past 12 months is close to a previously published estimate that 12% of HIV-infected gay and bisexual men were prescribed sildenafil citrate from the Seropositive Urban Men's Intervention Trial [40].

Our analysis is the first to confirm the association between EDM prescription and insertive CAI with a serodiscordant casual partner using nationally representative data. Our finding that HIV-infected MSM prescribed EDM were more likely to engage in insertive CAI with a serodiscordant casual partner is consistent with literature in terms of the general association between EDM use and sexual risk behavior [20, 22, 24–28, 41, 42]. However, we did not find a statistically significant association between EDM prescription and insertive CAI with a serodiscordant main partner, contrary to previous studies that suggested that MSM were more likely to have CAI with their main partners due to perceived low risk of HIV transmission, and most HIV transmissions among MSM were from main partners [43–45]. Many factors, such as HIV status of a sex partner, partner type, and sexual positioning, are

involved in the decision-making process but the majority of previous studies have only been able to consider a subset of these factors. We used a specific definition of sexual risk behavior (i.e., insertive CAI with a serodiscordant main partner or casual partner) to try to disentangle the relationship between EDM use and sexual risk behavior, and the differential associations between EDM prescription and CAI by partner type may suggest that HIV-infected MSMs engage in different behaviors with their main partners. Future analysis at the event level (i.e. the occurrence of EDM use that precedes a given sexual act) is needed to further understand these differences.

The receptive anal sex partners of HIV-infected men are at high risk for HIV transmission if no HIV prevention strategy is used. A systematic review on onward transmission risks from an HIV-infected partner to an uninfected partner revealed that among all sexual behaviors, when the HIV-uninfected partner is the receptive partner, the risk for HIV transmission is highest [23]. In the current analysis, we found a significant association between EDM and insertive CAI with a serodiscordant casual partner. Although viral suppression may reduce HIV transmission [46], it does not modify the association between EDM prescription and serodiscordant CAI in our analysis. In other words, sexually active MSM who were prescribed EDM were more likely to engage in serodiscordant insertive CAI with a casual partner regardless of their viral suppression status. Since our analysis indicated that sexually active MSM were more likely to engage in insertive CAI with a serodiscordant casual partner when prescribed EDM, and the provision of risk-reduction counseling by medical providers can significantly reduce the prevalence of sexual risk behavior [47], we believe this has important prevention implications for HIV care providers. In addition to following recommended guidelines [48] to provide risk reduction counseling at least once a year for sexually active patients, when prescribing EDM to patients, providers may consider discussing the role of HIV treatment in preventing HIV transmission to partners [49] and assess whether their partners may be eligible for pre-exposure prophylaxis [50].

There are several limitations to this analysis and interpretation of these data. First, MMP participants are HIV-infected adults receiving medical care in the United States, so the findings based on these data cannot be generalized to US persons unaware of their HIV infection or those not receiving medical care, nor to populations outside the United States. Second, MMP data are cross sectional and the time frame for which we assessed EDM prescription and sexual acts without a condom was the 12 months before interview. Whether EDM prescription occurred before or after the CAI is unknown. Therefore, the association between EDM prescription and insertive CAI with a serodiscordant casual partner may mean that EDM facilitates risk behavior, or that MSM who are more likely to engage in risk behaviors are more likely to use EDM to enhance their sexual performance [27]. Nonetheless, targeted risk-reduction counseling provided at the time of EDM prescription should be beneficial. Third, our measure of durable viral suppression does not take into account fluctuation or unmeasured results, and risk behaviors and durable viral suppression of respondents may be different from non-respondents. However, MMP collected information on sampled patients and facilities including sex, age, race, length of time since diagnosis, and facility's HIV patient load and was able to compare respondents and non-respondents. Data were then weighted according to these analyses to minimize non-response bias. Fourth, patients may not take the prescribed EDM; alternatively, some patients may

take EDM that was obtained without prescription [18]. We were unable to account for non-prescribed EDM use in the current analysis. Fifth, pre-exposure and post-exposure prophylaxis information were not captured in the analytic dataset so we were unable to assess whether the participants used these strategies for HIV prevention. Finally, the self-reported information was collected by face-to-face or telephone interviews. Therefore, sexual risk behavior may be underreported due to social desirability bias.

Conclusions

Among sexually active HIV-infected MSM receiving medical care in the United States from 2009 to 2012, those who were prescribed EDM were more likely to engage in insertive CAI with a serodiscordant casual partner than those not prescribed EDM. Only 40% of HIV-infected MSM prescribed EDM received risk-reduction counseling despite recommendations that such counseling be provided at least once a year. Healthcare providers should assess risk behaviors and provide risk-reduction counseling to all HIV-infected persons as recommended by guidelines, especially at the time of EDM prescription.

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http://www.cdc.gov/hiv/pdf/research_mmp_studygroupmembers_2009.pdf; http://www.cdc.gov/hiv/pdf/research_mmp_studygroupmembers_2010.pdf; http://www.cdc.gov/hiv/pdf/research_mmp_studygroupmembers_2011.pdf; http://www.cdc.gov/hiv/pdf/research_mmp_studygroupmembers_2012.pdf.

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Table 1

Socio-demographic and clinical characteristics, and self-reported sexual and drug-use behaviors of sexually active MSM with an HIV diagnosis for at least 12 months and receiving medical care in the United States and Puerto Rico, Medical Monitoring Project, 2009–2012

Characteristic	Total (n=4,465) Weighted % (95% CI)	Prescribed EDM (n=601) Weighted % (95% CI)	Not prescribed EDM (n=3822) Weighted % (95% CI)	Rao-Scott chi-square statistic	*P* for Rao-Scott chi-square test
Age (years)					
18–39	34 (32–36)	10 (7–13)	37 (35–39)	199.93	<.001
40–49	39 (37–40)	44 (40–47)	38 (36–39)		
≥50	28 (26–30)	46 (42–50)	25 (23–27)		
Race and ethnicity					
White, non-Hispanic	51 (46–56)	67 (61–73)	48 (43–53)	65.61	<.001
Black, non-Hispanic	24 (19–29)	13 (9–18)	26 (20–31)		
Hispanic or Latino[a]	20 (18–23)	16 (11–20)	21 (18–24)		
Other	5 (4–6)	4 (3–6)	5 (4–7)		
Education					
<High school	7 (6–8)	5 (3–7)	7 (6–8)	16.83	<.001
High school	20 (18–22)	14 (11–17)	21 (19–23)		
>High school	73 (70–75)	81 (78–84)	72 (69–75)		
At or below poverty level[b,c]	25 (22–27)	13 (9–17)	26 (24–29)	34.53	<.001
Experienced homelessness[b]	6 (5–7)	3 (1–4)	6 (5–7)	11.59	0.001
In jail >24h[b]	4 (3–4)	—	4 (3–5)	—	—
Healthcare coverage[b]					
Any Private	47 (43–51)	59 (51–66)	45 (42–48)	38.49	<.001
Public only	35 (32–38)	33 (26–40)	35 (32–38)		
Ryan White only	18 (15–22)	8 (6–11)	20 (17–24)		
HIV diagnosed ≥5 years earlier	74 (72–76)	88 (84–91)	72 (70–74)	35.72	<.001
Prescribed antiretroviral therapy	91 (90–92)	95 (93–97)	90 (89–91)	11.53	0.001
All viral loads < 200 copies/ml[b]	69 (67–70)	78 (74–81)	67 (66–69)	23.66	<0.001
Clinical HIV status					
AIDS or CD4+ cell count 0–199 cells/μl (nadir)	59 (58–61)	66 (61–71)	58 (57–60)	9.69	0.008

Characteristic	Total (n=4,465) Weighted % (95% CI)	Prescribed EDM (n=601) Weighted % (95% CI)	Not prescribed EDM (n=3822) Weighted % (95% CI)	Rao-Scott chi-square statistic	*P* for Rao-Scott chi-square test
No AIDS, CD4+ cell count 200–499 cells/μl (nadir)	32 (30–34)	28 (23–32)	33 (31–34)		
No AIDS, CD4+ cell count ≥500 cells/μl (nadir)	9 (8–10)	7 (5–8)	9 (8–10)		
Depression[d]					
No depression	80 (79–82)	82 (78–85)	80 (78–82)	0.93	0.628
Other depression	10 (9–11)	9 (6–12)	10 (9–11)		
Major depression	10 (8–11)	9 (7–11)	10 (8–12)		
Self-reported sexually transmitted infection[b]					
Yes	23 (21–26)	25 (19–31)	23 (21–25)	0.90	0.637
No	40 (38–42)	41 (36–46)	40 (38–43)		
Not tested	36 (34–39)	34 (27–40)	37 (34–39)		
Risk-reduction counseling[b,e]	45 (42–49)	40 (36–44)	46 (42–50)	4.43	0.035
Total number of sex partners[b]					
1	44 (42–47)	39 (35–43)	45 (43–48)	12.66	<.001
2–4	31 (29–32)	26 (22–31)	32 (30–33)		
≥5	25 (22–27)	35 (31–39)	23 (21–25)		
Binge drinking[f]	22 (21–23)	17 (14–21)	23 (21–24)	5.87	0.015
Drank any alcohol before/during sex[b]	47 (46–49)	49 (45–54)	47 (45–49)	0.77	0.381
Any illicit drug use[b,g]	40 (37–42)	39 (34–44)	40 (37–42)	0.05	0.822
Methamphetamine	10 (8–11)	12 (9–15)	9 (7–11)	5.12	0.024
Gamma-hydroxybutyrate	5 (4–6)	6 (5–8)	4 (3–5)	7.37	0.007
Ketamine	2 (1–2)	3 (2–4)	1 (1–2)	8.99	0.003
Methylenedioxymethamphetamine	5 (4–6)	6 (4–8)	5 (4–6)	0.58	0.445
Any illicit drug use before/during sex[b,g]	27 (25–29)	30 (27–34)	27 (24–29)	4.20	0.040
Methamphetamine[h]	94 (92–97)	97 (94–100)	94 (91–97)	1.37	0.243
Gamma-hydroxybutyrate[h]	92 (88–96)	89 (78–100)	90 (88–92)	0.35	0.552
Ketamine[h]	63 (45–81)	—	69 (53–58)	—	—
Methylenedioxymethamphetamine[h]	73 (66–79)	76 (64–87)	72 (64–80)	—	—
Exchanged sex for money/goods[b]	3 (3–4)	3 (2–4)	3 (3–4)	0.35	0.554

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Characteristic	Total (n=4,465) Weighted % (95% CI)	Prescribed EDM (n=601) Weighted % (95% CI)	Not prescribed EDM (n=3822) Weighted % (95% CI)	Rao-Scott chi-square statistic	*P* for Rao-Scott chi-square test
Any CAI[b]	55 (52–58)	64 (60–68)	54 (51–57)	39.65	<.001
Any serodiscordant CAI[b]	21 (19–23)	24 (21–28)	21 (19–22)	4.01	0.045
Any insertive CAI with a serodiscordant main partner[b]	6 (5–7)	6 (4–8)	6 (5–7)	0.29	0.590
Any insertive CAI with a serodiscordant casual partner[b]	7 (6–7)	9 (6–2)	6 (5–7)	4.91	0.027

MSM, men who have sex with men; CI, confidence interval; EDM, erectile dysfunction medication; CAI, condomless anal intercourse; dash, coefficient of variation was >0.30 (sample size too small to produce valid estimates or to perform the test).

[a]Regardless of race.

[b]Refers to the 12 months before interview.

[c]This measure uses the DHHS Poverty Guidelines to determine whether respondent's household is above or below the poverty level.

[d]Responses to the PHQ-8 were used to define "Major depression" and "Other depression" according to criteria from the Diagnostic and Statistical Manual of Mental Disorders, 4 Edition.

[e]Received risk-reduction counseling from a healthcare professional.

[f]Defined as 5 or more alcohol drinks in one sitting in the past 30 days.

[g]Illicit drug use includes heroin, cocaine, methamphetamine, other amphetamines or stimulants, steroids or hormones, painkillers, hallucinogens, methylenedioxymethamphetamine, ketamine, gamma-hydroxybutyrate, marijuana, and amyl nitrite.

[h]The weighted percentages of these selected drugs are among those who used drug before or during sex only (n=1235).

Missing n (including "don't know", "refused to answer", or missing): EDM prescription, 42; poverty, 107; health care coverage, 126 (including 119 uninsured); prescribed antiretroviral therapy, 44; all viral load < 200 copies/ml, 261; clinical Status, 23; depression, 21; self-reported sexually transmitted infection, 1211; binge drinking, 16; drank alcohol before/during sex, 18; illicit drug use, 8; illicit drug use before/during sex, 10; any serodiscordant condomless anal intercourse, 39; any serodiscordant condomless insertive anal intercourse with a main partner 3; any serodiscordant condomless insertive anal intercourse with a casual partner, 9.

Table 2

Association between erectile dysfunction medication and serodiscordant insertive condomless anal sex, by partner type, among sexually active MSM with HIV diagnosis for at least 12 months receiving medical care in the United Sates (n=4,465), Medical Monitoring Project, 2009–2012

EDM prescription	With a main partner (n=4462)[a]			With a casual partner (n=4456)[b]		
	Weighted % (95% CI)	Crude PR (95% CI)	Adjusted[c] PR (95% CI)	Weighted % (95% CI)	Crude PR (95% CI)	Adjusted[d] PR (95% CI)
No	6 (5–7)	referent	referent	6 (5–7)	referent	referent
Yes	6 (4–8)	0.91 (0.64–1.29)	1.04 (0.74–1.47)	9 (6–12)	1.45 (1.05–1.99)	1.38 (1.01–1.88)

MSM, men who have sex with men; CI, confidence interval; EDM, erectile dysfunction medication; PR, prevalence ratio.

[a] Missing n=3.

[b] Missing n=9.

[c] Adjusted for age and illicit drug use before or during sex.

[d] Adjusted for illicit drug use before or during sex.