Sexual Dysfunction, HIV, and AIDS in Men Who Have Sex with Men

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Abstract

HIV infection is associated with sexual dysfunction. Using validated instruments, we investigated the relationship between HIV/AIDS and sexual function in a contemporary cohort of men who have sex with men (MSM). An anonymous Internet-based survey was disseminated to MSM via organizations and social networking sites that cater to this population. Information on ethnodemographic variables, health status (including HIV status, disease stage, and other health conditions), and sexual behavior was collected. Men were categorized as HIV-negative, HIV-positive/AIDS-negative, or HIV-positive/AIDS-positive. A modified validated version of the International Index of Erectile Function (IIEF) for use in MSM and the Premature Ejaculation Diagnostic Tool (PEDT) were used to stratify risk of sexual dysfunction. The study cohort included 1361 men (236 of whom were HIV-positive) who provided complete data on HIV status, IIEF, and PEDT. There was a significant trend toward greater prevalence of erectile dysfunction (ED) in men with progressive HIV infection 40–59 years of age relative to age matched HIV-negative men ($p=0.02$). In a logistic regression model controlling for other variables, HIV infection without AIDS was not associated with greater odds of ED; however, HIV infection with AIDS was associated with greater odds of ED ($p=0.006$). In a separate logistic regression model, HIV infection with or without AIDS was not significantly associated with greater odds of premature ejaculation ($p>0.05$). Use of phosphodiesterase 5 (PDE5) inhibitor drugs was much more common in HIV-infected men. HIV infection is a risk factor for poorer sexual function primarily due to higher risk of erectile dysfunction in men with AIDS.

Introduction

INFECTION WITH HIV/AIDS has become a chronic medical condition rather than terminal diagnosis for most HIV-positive individuals in the developed world.¹ With life expectancy in newly infected individuals approaching what is expected in HIV-negative individuals, quality-of-life issues are increasingly important for people living with HIV.^{1,2}

Satisfying sexual function is an important quality-of-life issue and a human right for all people.^{2,3} Although sexual problems in men who have sex with men (MSM) have generally received less attention than similar problems in men who have sex with women, public health interest in this topic has increased secondary to the HIV epidemic.^{4,5} Although much of the attention directed toward sexuality in MSM has been motivated by the HIV epidemic, facilitation of healthy and satisfying sexual expression in MSM is an important

quality of life goal and is therefore worthy of additional research attention irrespective of questions pertaining to HIV.^{5,6}

The rate of sexual problems in HIV-positive individuals (including HIV-positive MSM) has been reported to exceed the baseline incidence in the general population.^{6–9} Furthermore, most studies have reported that advanced HIV infection and AIDS portend a greater risk of sexual concerns and decline in sexuality activity relative to less advanced HIV infection.^{1,7,10,11} This is not only an important quality-of-life issue but may have relevance to public health because sexual problems may predispose some individuals to unsafe sexual practices (i.e., failure to use condoms, etc).^{7,9,12}

Many studies on sexual function in HIV-positive men have been hampered by lack of an HIV-negative control group.^{7,13,14} In studies that have included an HIV-negative group, sexual problems such as decreased sexual desire and erectile dysfunction (ED) have been assessed primarily using a single item question.^{6,8,9,12} Crum-Cianflone et al.¹⁵ reported

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in a multivariate analysis that advanced age, lower CD4 count, and depression were independently associated with greater odds of ED in HIV-positive individuals. Ende et al.¹⁶ reported a 74% incidence of ED in a cohort of 118 HIV-positive men based on a 5-item scale erectile function scale derived from the International Index of Erectile Function (IIEF); however, the version of the IIEF used in this study had not been validated for use in MSM. The authors reported that there was no significant difference in age, CD4 count, and use of antiretroviral therapy between men with and without ED although the relatively small sample size makes this conclusion somewhat tenuous. There has been very little research on ejaculatory disorders in this population despite numerous reports indicating that ejaculatory dysfunction is prevalent and a potential source of concern for men of any sexual orientation.^{17,18}

In the current study, we investigate differences in the rate of ED and premature ejaculation (PE) between men who are HIV-negative and HIV-positive with and without AIDS using validated quantitative instruments for the assessment of sexual function. We hypothesized that HIV infection is associated with greater odds of sexual dysfunction in men and that advanced HIV infection (i.e., AIDS) is associated with progressively worse sexual function when compared to early-stage HIV infection.

Methods

Study design and cohort description

Institutional Review Board approval was obtained prior to initiating the study. We performed a cross-sectional, Internet-based survey of HIV status and sexual quality-of-life outcomes in MSM. The cohort was restricted to English-literate, Internet-using MSM who were greater than 17 years of age. International sampling was achieved by distribution of an invitation to local, national and international lesbian, gay, bisexual and transgender community centers, organizations catering to MSM, and advertisements on Facebook (www.facebook.com; Palo Alto, CA) directed toward gay men and other MSM. Potential subjects were given the opportunity to click on a link to the survey that was posted on an internet based survey site (www.surveymonkey.com, Palo Alto, CA). Respondents were informed that they would be asked to provide ethnodemographic information and answer questions about sexual and urinary wellness; subjects were given the option to decline participation or stop the survey at any time. Implied consent was assumed based on subject completion of the instrument. To minimize the potential for subjects completing the instrument multiple times, potential participants were asked whether they had previously taken the survey. Subjects who responded "yes" were informed that the survey was to be taken only once and redirected away from the website. To maintain privacy, no personally identifying information was collected and no incentive was provided for participation. The survey was available from January 19, 2010 to May 19, 2010.

Description of variables

Outcome variables. There were two main outcome variables. The first was Erectile Function domain score on a version of the International Index of Erection Function (IIEF)

previously validated for use in HIV-positive MSM by Coyne et al.¹⁹ The second main outcome variable was score on the Premature Ejaculation Diagnostic Tool (PEDT).²⁰ Respondents with incomplete data for the IIEF or PEDT were excluded from all subsequent analyses.

The original IIEF was developed by Rosen *et al.* for use in exclusively heterosexual men assesses five domains of male sexual function, including desire, erectile function, orgasm, intercourse satisfaction, and overall satisfaction.²¹ Validated cutoff scores for the erectile function domain of the original IIEF (IIEF-EF) have been developed to stratify severity of ED.²² There are no such cutoffs for any domains of the modified IIEF developed for MSM.¹⁹ To assess the impact of ED in this study, we selected a score of 15 or fewer points out of a possible 30 on the IIEF-EF domain as evidence of moderate to severe ED. This criterion was utilized by Coyne and colleagues¹⁹ in their initial study.

The PEDT is a validated 5 item screening survey designed to assess risk for PE.²⁰ The PEDT has not been specifically validated for use in MSM. However, the instrument does not include language that assumes heterosexual coitus so it is likely applicable to MSM. Higher scores on the PEDT imply poorer control over ejaculation, with scores of 9 or 10 suggesting "high risk" of PE and scores of 11+ indicative of likely PE.²⁰ For the purpose of this analysis we considered all men with scores of 9 or greater to be at risk for PE.

HIV-specific questions. Respondents were asked if they were HIV infected (yes/no/uncertain). HIV-positive men were asked if they ever had a CD4 cell count less than 200 cells per microliter (yes/no/uncertain), and if they had ever been told they had an AIDS-defining-illness (yes/no/uncertain). Individuals who reported an AIDS-defining-illness and/or a CD4 cell count less than 200 cells per microliter were classified as the HIV-positive/AIDS-positive cohort.²³ All other HIV-positive individuals were classified as the HIV-positive/AIDS-negative cohort. Individuals who were uncertain regarding their HIV status were not included in subsequent analyses. As there were very few respondents under the age of 30 who reported HIV infection in the completed dataset, we restricted our final analysis to subjects 30 or more years of age for the purposes of improving age parity.

Exposure variables. Respondents provided information on their age, geographic location, size of city of residence, and race/ethnicity (African, Asian, Caucasian, Latino, Native American, other). Respondents were asked if they used any of the following recreational drugs: methamphetamine, cocaine, ketamine, ecstasy, prescription pills. For each drug, participants were asked "How often do you use drugs to get high?" (never, rarely about once per year, sometimes several times a year, monthly, weekly, daily). For ease of interpretation, the variable was made binary by grouping several times a year, monthly, daily as a positive response to drug use and never, rarely about once per year as a negative response. Subjects were also asked if they had used phosphodiesterase 5 (PDE5) inhibitor drugs more than one time in the last year (yes/no).

Sexual history was assessed with the following questions: number of lifetime sexual partners, current regular partner (yes/no), sex with strangers (yes/no), use of condoms for anal insertive or receptive sex (in quartiles for frequency of usage). Subjects also were asked if they had ever consulted a health

care professional for sexual problems (yes/no) or had ever used a prescription oral drug for erections (PDE5 inhibitor; yes/no).

Respondents were asked (via a questionnaire with “yes” and “no” radio response options) “Have you been diagnosed or treated for the following medical conditions”: diabetes, coronary artery disease, hyperlipidemia, high blood pressure, neurologic dysfunction, and depression. As urinary tract symptoms have been clearly associated with sexual problems,²⁴ subjects completed the International Prostate Symptom Score (IPSS), an internationally validated metric of bothersome lower urinary tract symptoms.²⁵ IPSS is graded on a scale of 0–35 and based on 7 questions pertaining to urinary symptoms including: frequency, urgency, nocturia, intermittency, weak stream, straining, and incomplete emptying. Higher scores indicate worse urinary symptoms. Total IPSS was scored as either none/mild/moderate (IPSS=0–19) vs. severe (IPSS=20–35).

Statistical analysis

Descriptive statistics were used to characterize the study population. IIEF-EF domain scores and PEDT total scores were compared between men who were HIV-negative, HIV-positive without AIDS-defining criteria (“HIV-positive/AIDS-negative”), and HIV-positive respondents meeting AIDS-defining criteria (“HIV-positive/AIDS-positive”) divided into 10-year age cohorts (30–39, 40–49, 50–59, 60+). Wilcoxon-type test for trend was used to determine whether a statistically significant trend for increasing prevalence of sexual symptomatology (PE and ED) was present within age-matched groups of progressively more advanced HIV status (HIV-negative versus HIV-positive/AIDS-negative versus HIV-positive/AIDS-positive).

Bivariate logistic regression was performed with HIV status as the predictor and ED (IIEF-EF < 16) or PE (PEDT ≥ 9) as the outcome to measure. Separate multiple logistic regression models for odds of reporting ED or PE were developed with predictor variables selected *a priori*. These variables included HIV serostatus, AIDS status, age in 10-year increments, presence of comorbid diseases (diabetes, coronary artery disease, hyperlipidemia, high blood pressure, neurologic dysfunction, depression), condom usage during insertive anal intercourse (in quartiles; for analysis subjects using a condom for 75–100% of anal intercourse encounters were compared to subjects using a condom less than 75% of the time during anal intercourse), a current steady partner, use of recreational drugs more than once in the past year, and severe lower urinary tract symptoms (LUTS; IPSS ≥ 20). Only variables associated with a *p* value ≤ 0.20 on first iteration of the multiple logistic regression model were included in the final model. Statistical significance was set at *p* < 0.05 and all tests were two-sided. STATA 11 (StataCorp, College Station, TX) was used for all analyses.

Results

A total of 2783 men accessed the survey website; 1769 (63%) completing all portions of the questionnaire related to sexual function and HIV status. This initial cohort had a mean age of 38.8 years old; range, 18–79. After exclusion of men younger than 30 years, 1361 (49%) men constituted the final study cohort with mean age 42.6 ± 9.47 years. Of these men, 1125

(82.7%) were HIV-negative, 110 (8.1%) were HIV-positive/AIDS-positive and 126 (9.2%) were HIV-positive/AIDS-positive. Ethnodemographic data are summarized in Table 1. There was a trend toward greater prevalence of hyperlipidemia, neurologic dysfunction, severe LUTS, depression, and use of both illicit drugs and PDE5 inhibitors with progressively more advanced HIV status.

Information on sexual activity is presented in Table 2, stratified by HIV serostatus. Test for trend indicated that HIV-positive men were significantly less likely to report a regular partner and more likely to report higher risk sexual activity and/or history of higher risk sexual behavior (more lifetime partners, sex with strangers, condom usage with anal sex fewer than 75% of occasions).

The mean IIEF-EF scores with standard deviation were 26.1 ± 5.2, 25.3 ± 6.1, and 25.3 ± 7.3 for men in the HIV-negative, HIV-positive/AIDS-negative, and HIV-positive/AIDS-positive cohorts, respectively. Test for trend indicated significantly (*p* < 0.001) progressively lower mean IIEF-EF scores with progression of HIV status. The percentage of men who reported moderate/severe ED (IIEF-EF < 16) is presented in Fig. 1, stratified by age and HIV status. In men 40–59 years of age, there was a significant trend toward greater incidence of ED when stratified by progressively more advanced HIV/AIDS status. Although there appeared also to be a trend towards greater incidence of ED with advanced HIV-positive status in subjects younger than 40 and older than 60 years, this trend was not statistically significant (*p* > 0.05).

Bivariate and multiple logistic regression models for odds of reporting ED are presented in Table 3. Before adjustment for other variables (Table 3A), HIV infection was a risk factor for moderate/severe ED (odds ratio [OR] = 2.24). When HIV-positive men were subdivided into HIV-positive/AIDS- and HIV-positive/AIDS-positive groups (Table 3B), the odds of ED in men reporting HIV infection alone were no longer significantly different from HIV-negative men (OR 1.63). On the other hand, men with HIV and AIDS had significantly increased odds of reporting ED relative to HIV-negative men (OR 2.84). After multivariate adjustment (Table 3C), men in the HIV-positive/AIDS-positive group had greater odds of ED (OR = 2.80). Ten-year incremental increase in age, diabetes, and severe LUTS were also significantly associated with greater odds of ED after multivariate adjustment (Table 3C). Men with a regular sexual partner had lower odds of ED (OR = 0.42). No other variables were associated with significantly different odds of moderate/severe ED after multiple variable adjustment (data not shown).

The mean PEDT scores with standard deviation were 4.2 ± 4.2, 4.5 ± 4.4, and 4.5 ± 4.2 for men in the HIV-negative, HIV-positive/AIDS-negative, and HIV-positive/AIDS-positive cohorts, respectively. Test for trend did not indicate significantly (*p* = 0.112) progressively higher mean PEDT scores with progression of HIV status. The age-adjusted percentage of men who met criteria for risk of PE (PEDT ≥ 9) is presented in Fig. 2, stratified by HIV status. Test for trend indicated a significantly greater incidence of PE with advanced HIV-positive status in the 30–39 age range. Although the incidence of PE was highest in men with HIV and AIDS for all age cohorts, this trend was not statistically significant in any group older than 40 years.

Bivariate and multiple logistic regression models for odds of reporting PE are presented in Table 4. Before adjustment for

TABLE 1. DEMOGRAPHIC INFORMATION (N=1347)

	<i>HIV(–)</i>		<i>HIV(+)/AIDS(–)</i>		<i>HIV(+)/AIDS(+)</i>		<i>p Value</i>
	<i>n</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>n</i>	<i>%</i>	
Age (mean + / – SD)	42.2 + / – 9.6		43.5 + / – 9.1		44.9 + / – 7.9		
Geographic location							
Western US	209	18.6%	27	24.6%	29	23.2%	
Midwest US	176	15.7%	18	16.4%	18	14.4%	
Northeast US	185	16.5%	18	16.4%	14	11.2%	
Southern US	168	15.0%	18	16.4%	23	18.4%	
Southwest US	69	6.2%	9	8.2%	7	5.6%	
Northwest US	42	3.8%	4	3.6%	11	8.8%	
Canada	75	6.7%	2	1.8%	9	7.2%	
Europe	118	10.5%	9	8.2%	9	7.2%	
Australia	70	6.2%	4	3.6%	4	3.2%	
Other ^a	9	0.8%	1	0.9%	1	0.8%	
City population							
<100,000	365	32.5%	18	16.4%	44	35.2%	
100,000–1,000,000	394	35.1%	52	47.3%	43	34.4%	
>1,000,000	363	32.4%	40	36.4%	38	30.4%	
Racial heritage							
African	30	2.7%	4	3.6%	1	0.8%	
Asian	27	2.4%	4	3.6%	1	0.8%	
Caucasian	957	85.0%	87	79.1%	116	92.1%	
Hispanic	66	5.9%	11	10.0%	4	3.2%	
Native American	17	1.5%	1	0.9%	0	0.0%	
Comorbid medical conditions							
Diabetes	93	8.3%	8	7.3%	4	3.2%	0.185
Coronary artery disease	63	5.6%	7	6.4%	8	5.7%	0.815
Hyperlipidemia	225	20.0%	25	22.7%	36	28.6%	0.045
High blood pressure	304	27.0%	31	28.2%	30	26.8%	0.725
Neurologic dysfunction	64	5.7%	10	9.1%	16	12.7%	0.001
Severe LUTS (IPSS >20)	43	4.0%	8	7.6%	14	11.8%	<0.001
Depression	442	39.3%	56	50.9%	58	46.0%	0.024
Drug use more than once/year							
Methamphetamine	83	7.6%	19	17.4%	35	28.9%	<0.001
Cocaine	139	12.7%	22	20.8%	25	20.8%	0.006
Ketamine	46	4.2%	8	7.4%	14	11.7%	0.004
MDMA (Ecstasy)	142	13.0%	21	19.6%	27	22.3%	0.005
Recreational prescription drugs	159	14.6%	17	15.7%	22	18.8%	0.472
PDE5 inhibitor drugs	358	31.8%	59	53.6%	73	57.9%	<0.001

^aOther International (Asia, Africa, South America, Central America).

Some totals differ secondary to missing data points.

SD, standard deviation; LUTS, lower urinary tract symptoms; IPSS, International Prostate Symptoms Scale; PDE5, phosphodiesterase.

TABLE 2. SEXUAL PRACTICES AS REPORTED, STRATIFIED BY HIV/AIDS STATUS

	<i>HIV(–)</i>		<i>HIV(7plus;)/AIDS(–)</i>		<i>HIV(+)/AIDS(+)</i>		<i>p for trend</i>
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	
Lifetime sexual partners							
0–6	244	22.0%	22	20.2%	21	16.9%	<0.001
7–29	272	24.6%	11	10.1%	15	12.1%	
30–100	300	27.1%	20	18.4%	28	22.6%	
>100	292	26.4%	56	51.4%	60	48.4%	
Have a current regular partner	640	56.9%	56	50.9%	61	48.4%	0.038
Sex with strangers	634	56.4%	74	67.9%	82	65.1%	0.012
Use condoms for insertive anal sex at least 75% of the time	560	50.4%	38	34.9%	46	38.0%	0.001
Use condoms for receptive anal sex at least 75% of the time	641	57.7%	42	38.5%	46	37.7%	<0.001

FIG. 1. Percentage of population with erectile dysfunction (ED).

other variables (Table 4A), HIV-infection was a risk factor for PE (OR=1.44). Men with HIV and AIDS had significantly increased odds of reporting PE compared to HIV-negative men (OR 1.58). However, after multivariable adjustment (Table 4C), HIV/AIDS status was no longer significantly associated with odds of PE. Severe LUTS was independently associated with an increased risk of PE, whereas a 10-year incremental increase in age was associated with lower odds of PE (Table 3C). No other variables were associated with significantly different odds of PE after multiple variable adjustment (data not shown).

The percentage of men (categorized by age) who had sought help from a health care provider for problems with sexual function is depicted in Fig. 3. HIV-positive men younger than 60 years were significantly more likely to have sought help for sexual problems compared to HIV-negative men; the difference in help-seeking behavior based on HIV

status in men over the age of 60 did not attain strict statistical significance ($p=0.084$). Use of PDE5 inhibitor drugs was much more common in HIV-infected men in our cohort (31.8%, 53.6%, 57.9% for HIV-negative, HIV-positive/AIDS-negative, HIV-positive/AIDS-positive, respectively).

Discussion

In this study, we investigated the prevalence of sexual function concerns in a population of MSM using instruments for the quantitative assessment of several domains of male sexual function. Our results indicate that HIV infection is associated with poorer erectile function. This is congruent with the first part of our hypothesis, although our multivariate analysis suggests that comorbid conditions (such as those reported by Crum-Cianflone et al.¹⁵) may be the principle factors driving the prevalence of erectile problems in men with HIV infection without AIDS in this contemporary cohort.¹⁵ On the other hand, AIDS-positive status did increase the odds of ED independent of other factors. This finding is in agreement with prior reports and the second portion of our hypothesis on the relationship between HIV progression and sexual problems.^{7,10,11,15} It is suggested that maintenance of immunity in the HIV population may be a marker or even a direct correlate of satisfactory sexual function.

General risk factors for sexual dysfunction (specifically ED) are increasingly prevalent in HIV-positive people as longer life-expectancy (and the comorbid conditions such as hypercholesterolemia, diabetes, hypertension, and others that are associated with both aging and ED) is anticipated with modern antiretroviral therapy.^{14,26} In addition to these general health conditions, depression, fear of passing on HIV, and direct effects of HIV on the physiologic systems responsible for penile erection have also been cited as potential contributors to increased odds of sexual problems in HIV-positive men.^{1,7,12,13,26} Interestingly, in our study HIV-positive status was associated with greater trend toward ED for men in the 40–59 age group, but not for younger or older men. We speculate that “accelerated aging” (which has been hypothesized to account for the relatively high burden of non-HIV

TABLE 3. LOGISTIC REGRESSION FOR ODDS OF MODERATE/SEVERE ERECTILE DYSFUNCTION

	Odds ratio	95% CI	p Value
3A. Unadjusted			
HIV(+)	2.24	1.43, 3.51	<0.001
3B. Unadjusted			
HIV(+)/AIDS(–)	1.63	0.83, 3.17	0.153
HIV(+)/AIDS(+)	2.84	1.66, 4.86	<0.001
3C. Adjusted			
HIV(+)/AIDS(–)	1.46	0.67, 3.17	0.343
HIV(+)/AIDS(+)	2.80	1.46, 5.36	0.002
Age in 10-year increment	1.46	1.13, 1.88	0.004
Diabetes	4.13	2.17, 7.88	<0.001
Depression	1.47	0.89, 2.41	0.13
Severe lower urinary tract symptoms	2.91	1.26, 6.71	0.012
Current steady relationship	0.42	0.25, 0.69	0.001
Used methamphetamine more than once per year	1.69	0.86, 3.31	0.126

CI, confidence interval.

FIG. 2. Percentage of population with premature ejaculation (PE).

health concerns seen in HIV-positive individuals) may hasten age-associated declines in erectile function.²⁷ By the time men are older, an equalization in the burden of comorbid vascular or other erection-related health conditions between HIV-positive and HIV-negative men may lessen the relative difference in ED prevalence. An alternative explanation is that AIDS-defining criteria simply have greater impact on sexual function in men from this age cohort. Further research will be required to understand these relationships.

In a 1994 report Jones et al.¹⁷ suggested that men with HIV were at greater risk of ejaculatory problems; interestingly, in this small observational study HIV-positive MSM reported delayed but not premature ejaculation, whereas HIV-positive hemophiliac patients reported both delayed and premature ejaculation. Lau et al.²⁸ reported that self-reported PE was more prevalent in MSM who engaged in high-risk sexual behaviors and/or experienced significant distress related to discrimination, poor self-acceptance, and

poor support; however, in this report HIV status was not queried.

To our knowledge this is the largest report to date of PE and its association with HIV status in MSM and the only report to use a quantitative measure for assessment of PE. Our instrument (admittedly not validated for use in the MSM population) did not detect a significant association between HIV infection and PE in the adjusted analysis, although on univariate analysis PE was associated with HIV. It is possible that men with HIV and/or AIDS may be more prone to conditions which impact ejaculation function directly; this may account for the higher rate of PE in the unadjusted analysis.

Our data indicate that HIV-positive men are more likely than HIV-negative men to engage in high-risk sexual behaviors. While a history of higher risk activity is not unexpected in men with HIV infection, it is a particularly concerning finding in this cohort that high risk behaviors remain quite prevalent even in the setting of known HIV infection. While this may be occurring in the context of men having sex with partners who are already HIV-positive, the risk of transmitting other sexually transmitted infection (STI) organisms or strains of HIV resistant to highly active antiretroviral therapy (HAART) persist in seropositive individuals. Many HIV-positive individuals take steps to protect themselves and partners from HIV transmission after seroconversion; it is clear, however, that a subset of the HIV-positive population requires further education and encouragement on means to curb the spread of the epidemic. Health care providers have a responsibility and an opportunity to provide education and advice on safer sex practices for all individuals requesting treatment for sexual dysfunction, particularly individuals with HIV infection. As there is also a relationship between drugs of abuse, high-risk sexual behavior, and HIV seroconversion, education regarding the risks of drug use is also critical.^{29,30}

Use of prescription erectogenic drugs in the MSM population is a special circumstance that merits additional comment. A higher rate of *de novo* HIV infection has been reported in MSM who use erectogenic medications versus those who

TABLE 4. LOGISTIC REGRESSION FOR ODDS OF PREMATURE EJACULATION

	Odds ratio	95% CI	p Value
4A. Unadjusted			
HIV(+)	1.44	1.00, 2.06	0.048
4B. Unadjusted			
HIV(+)/AIDS(-)	1.29	0.77, 2.14	0.337
HIV(+)/AIDS(+)	1.58	0.99, 2.489	0.05
4C. Adjusted			
HIV(+)/AIDS(-)	1.26	0.74, 2.15	0.394
HIV(+)/AIDS(+)	1.39	0.84, 2.29	0.197
Age in 10-year increment	0.79	0.65, 0.95	0.014
Hyperlipidemia	1.46	0.98, 2.18	0.061
Diabetes	0.81	0.41, 1.56	0.523
Severe lower urinary tract symptoms	2.58	1.46, 4.53	0.001

CI, confidence interval.

FIG. 3. Percentage of men who have sought medical help for sexual problems, stratified by age and HIV status.

do not.³¹⁻³⁵ The increased risk in this population appears to be primarily mediated by a greater prevalence of high-risk behavior in erectogenic drug users, i.e., use of erectogenic drug therapy to facilitate penile erection in high risk sexual situations.³¹⁻³⁵ HIV-positive men in our cohort were more likely to have sought help in dealing with sexual concerns relative to HIV-negative men; in some cases this may have led to prescription of an erectogenic medication, a finding supported in our study by the higher rate of PDE5 inhibitor use in the HIV-positive groups. While prescription of erectogenic medications is appropriate therapy for MSM (with or without HIV) who have ED, it must be emphasized that education on safer sex is an essential component of patient education for all individuals receiving erectogenic prescriptions.³⁶

We acknowledge several limitations of our study. Our data were gathered from a self-selected group of English-speaking, Internet-using MSM (primarily located in North America) who were willing to take an Internet sexuality survey; ergo, results cannot necessarily be generalized to all MSM. Older MSM represent a relatively small portion of our overall cohort so conclusions in this portion of the survey population must be interpreted cautiously. The veracity of subject responses in an anonymous survey such as this is always unclear, although in the absence of any form of compensation for participation there is no clear reason for misrepresentation. There is a possibility that some subjects might have taken the survey more than once. We must also entertain the possibility that some subjects might provide false data with the intention of maliciously skewing data; although our outreach efforts were not disseminated outside of real world and online venues designed to reach MSM, it is possible that individuals with prejudicial attitudes towards MSM and/or individuals with HIV might have learned about the study and supplied data intended to portray either/both of these groups in a negative light.³⁷ Use of HAART was not assessed in our study and this must be acknowledged as a limitation of our dataset. It is entirely possible that use of HAART may be responsible for some of the increased burden of sexual problems in HIV-positive men in our study cohort as this has been reported by other investigators.^{8,14,26} Occult comorbid conditions may also be present in this population, although we maintain that we

accounted for the vast majority of causes of sexual dysfunction in the male population.

These data from a contemporary cohort suggest that HIV-positive MSM with advanced disease (i.e., AIDS) are at significantly increased odds of erectile dysfunction relative to HIV-negative MSM. HIV-positive MSM with no evidence of AIDS appear to have a slight (but statistically insignificant) increase in odds of ED relative to HIV-negative MSM. Some previously established risk factors for sexual problems (diabetes, increasing age, depression) are associated with increased odds of erectile dysfunction in this population and these comorbid factors may be important determinants of ED in the HIV-positive population. There appear to be few, if any, significant direct associations between PE and HIV infection although other conditions prevalent in the HIV-positive population may contribute to a higher burden of PE.

Conclusions

This large cohort study provides new data on the prevalence and burden of sexual problems in contemporary HIV-positive and HIV-negative MSM in the developed world. Additional studies on physiologic mechanisms underlying sexual problems in HIV-positive men are warranted so as to improve our capacity to provide optimal care for these individuals and to help control further spread of the epidemic.

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Author Disclosure Statement

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