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Sexual Dysfunction in an Internet Sample of U.S. Men Who Have Sex with Men

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Abstract

Introduction—Relatively little is known about sexual dysfunction (SD) in men who have sex with men (MSM).

Aim—In order to better understand SD symptoms in MSM, we assessed self-reported SD symptoms, individually and by latent class analysis (LCA).

Methods—In 2004–2005 an Internet sample of U.S. MSM was recruited from gay-oriented sexual networking, chat and news websites. The analytic sample comprised 7,001 men aged 18 or older who reported lifetime male sex partners and oral or anal sex with a male partner in their most recent encounter within the past year.

Main Outcome Measures—Seven questions on SD symptoms that occurred during the past 12 months inquired about low sexual desire, erection problems, inability to achieve an orgasm, performance anxiety, premature ejaculation, pain during sex, and sex not being pleasurable.

Results—Self-reported symptoms of SD were high. Overall, 79% of men reported one or more SD symptoms in the past year, with low sexual desire, erection problems, and performance anxiety being the most prevalent. Four distinct underlying patterns of sexual functioning were identified by LCA: no/low SD, erection problems/performance anxiety, low desire/pleasure, and high SD/sexual pain. High SD/sexual pain was distinguished from the other patterns by club drug use and use of prescription and non-prescription erectile dysfunction medication before sex in the past year. Additionally, men associated with the high SD/sexual pain group were younger, single, more likely to have poor mental and physical health, and more likely to have been diagnosed with a sexually transmitted infection in the past year compared to men in the no/low SD group.

Conclusions—LCA enabled us to identify underlying patterns of sexual functioning among this sample of MSM recruited online. Future research should investigate these distinct subgroups with SD symptoms in order to develop tailored treatments and counseling for SD.

Keywords

Male Sexual Dysfunction; Men Who Have Sex with Men; Internet; Gay Men

Introduction

Relatively little is known about sexual dysfunction (SD) in men who have sex with men (MSM), as most published research has focused primarily on sexual behavior and dysfunction in the context of HIV transmission risk [1,2]. In prevalence studies of sexual problems, erectile dysfunction and pain during sex have been more frequently reported among MSM than men who have sex with women (MSW) [3–5]. SD in MSM has been associated with physical and mental health problems, substance use, and HIV [3,6–11].

Questions relating to the four phases of sexual response from Masters and Johnson[12,13] have been the basis for clinical diagnoses of SD in the Diagnostic and Statistical Manual of Mental Disorders (DSM 4th Edition, Text Revision) [14], and have also been used in prevalence studies of SD symptoms such as the National Health and Social Life Survey (NHSLS) [15]. Two recent studies of self-reported SD symptoms in MSM were conducted, using questions from the NHSLS [15]. Mao et al. [16] assessed SD symptoms among MSM in Australia, using seven items from the NHSLS [15]. During a period of at least 1 month in the past year, 74% reported any SD symptoms. Erection problems, low sexual desire, and performance anxiety were the most commonly reported symptoms. Lau et al. [6] used the same seven items from the NHSLS and conducted a prevalence study of SD symptoms among MSM in China. During a period of at least three consecutive months in the past year, 42% reported at least one symptom of SD. Performance anxiety, low sexual desire, and pain during sex were most commonly reported.

The aim of this Internet research study was to better understand underlying patterns of SD symptoms and their associated demographic and behavioral characteristics reported by MSM in the past year. Using questions from the NHSLS [15], we assessed self-reported SD symptoms individually and by latent class analysis (LCA) [17], which is a statistical technique used to identify distinctive patterns of behavior [18,19]. LCA is well-suited for the evaluation of diagnostic and epidemiologic symptom data [20].

Methods

In 2004–2005, an online anonymous survey was conducted. Eight U.S. and Canadian gay-oriented websites, ranging from sexual networking and chat to news sites, hosted banners linking to the questionnaire about sexual, drug- and alcohol-using behaviors in the most recent encounter as well as in the past year (Figure 1). Participants resided in every U.S. state, Canadian province or territory, and abroad. The survey took between 10 and 15 minutes to complete and no incentives were given. The institutional review board of the lead investigator approved all procedures and granted a waiver of the requirement to obtain documentation of consent.

Overall, 19,253 individuals clicked on the survey banner ad and consented to participate; 7,924 surveys were missing demographic data and/or key outcome variables (i.e., non-completers) and were removed from the dataset (N = 11,329). Non-completers were significantly more likely than completers to be under age 30 (age 18–24 odds ratio [OR]: 1.7, 95% CI 1.4–1.9; age 25–29 OR: 1.3, 95% CI 1.1–1.5). Respondents who did not report sex within the past year were automatically skipped out of sections pertaining to drug use before/during sex, sexual behavior, and SD and were, therefore, excluded from the current analysis.

The analytic sample was limited to U.S. men with lifetime and past-year male sex partners who were currently sexually active with men. Thus, the following cases were excluded: men living outside the U.S. (N = 1,764), men with missing data on age (N = 193), men with no lifetime male oral or anal sex partners and those missing data on this variable (N = 1,578), men who were not sexually active in the past year or were missing data on this variable (N = 174), men who did not report sex with men in the past year or had missing past-year sex partner data (N = 267), men who did not report oral or anal sex with men in their most recent encounter or had missing encounter data (N = 262), and men who had taken the survey twice (N = 90). In order to detect the 90 duplicate cases, we compared demographic data, encrypted user IP addresses, computer operating system information, and referrer data to verify that these cases were from the same respondent. The more complete case was kept.

In this study, 7,001 U.S. men who were currently sexually active with men comprised the analytic sample. Although 11% ofthe analytic sample also reported sex with females in the past year, men who had lifetime and past-year male sex partners but were currently sexually active with females (202/262) were excluded, as they differed significantly from men in the analytic sample on the Kinsey scale (6% reported being homosexual, 66% bisexual, and 28% heterosexual; $P < 0.001$) and on the prevalence of several SD symptoms (lows exual desire 45%, $P = 0.001$; premature ejaculation 47%, $P < 0.001$), suggesting a difference in perceived sexual orientation and interpretation of SD questions.

Finally, a subgroup of men (N = 174) who met study inclusion criteria, except for not having sex with a man in the past year (or who were missing data on this variable), were slightly older (median age of 44), mostly white (80%), and self-reported higher lifetime mental (52%) and physical health (39%) diagnoses than men included in the analyses. It is possible that the higher reporting of mental and physical health diagnoses, and/or SD itself, may have accounted for the absence of recent sexual activity among this subgroup.

Definition of Key Variables

For the main outcome measures, we used seven questions with yes/no answers from the NHSLS [15], which is based on Masters and Johnson's four phases of sexual response [13]. The current study inquired whether there was "a period of time" in the past 12 months during which SD symptoms occurred: (i) lacked interest in having sex (low sexual desire); (ii) had trouble achieving or maintaining an erection (erection problems); (iii) was unable to have an orgasm (inability to achieve orgasm); (iv) felt anxious, just before having sex, about the ability to perform sexually (performance anxiety); (v) had an orgasm too quickly (premature ejaculation); (vi) experienced pain or discomfort during sex (pain during sex); and (vii) did not find sex pleasurable, even if it was not painful (sex not pleasurable). The internal consistency of the SD questions was moderate (Cronbach's alpha = 0.65). These seven questions were also used in MSM studies of SD symptoms in China and Australia [6,16]. Sexual orientation was measured with the 7-point Kinsey scale [21]. Points were polarized such that the far ends of the scale were labeled "heterosexual" and "homosexual." The midpoint of the scale listed "bisexual." Though no numbers were provided on the scale that participants clicked, these were later coded as 0 through 6. Heterosexual men were coded as 0 or 1, bisexual men were coded as 2, 3, or 4, and homosexual men were coded as 5 or 6.

For the LCA in Table 3, any sexually transmitted infection (STI) in the past year was defined as a new or recurrent diagnosis by a doctor or nurse with the following categories: herpes, human papiloma virus, Chlamydia, gonorrhea, syphilis, chancroid, and non-gonoccocal urethritis. Age was a continuous variable. Relationship status was coded as single (unmarried/no domestic partner) vs. all other (married/domestic male partner; married/domestic female partner; divorced, separated, or widowed from a man; divorced, separated, or widowed from a woman). Income was categorized into low (under $10,000 to $29,999), medium ($30,000 to $49,999), and high ($50,000 to over $100,000), with medium being the omitted reference group. The HIV testing variable was self-reported and was collapsed into HIV-positive vs. HIV-negative/untested (yes, no).

Data Analysis

Chi-square, logistic regression, and factor analyses were conducted using SPSS 14.0 for Windows [22]. LCAs were conducted in Mplus 3.13 [23]. Only differences significant at $P \leq 0.01$ were reported because of the large sample size.

Factor Analysis

For usual drug use before or during sex in the past year, the scree plot [24] of eigenvalues suggested a four-factor solution. This model accounted for approximately 60% of the common variance. The factors were labeled Drug Factor 1 ("club drugs" ketamine, crystal methamphetamine [smoked, snorted, swallowed, or injected], ecstasy, or gamma hydroxy butyrate); Drug Factor 2 (alcohol, marijuana, poppers, cocaine [smoked, snorted, or swallowed], or downers); Drug Factor 3 (sildenafil, vardenafil, or tadalafil [all prescription]); and Drug Factor 4 (sildenafil, vardenafil, or tadalafil [all non-prescription]). The drug categories were not mutually exclusive. Further, cocaine injected (N = 32), and heroin (smoked, snorted, swallowed, or injected, N = 29) were excluded from the drug factors due to small sample size. For the mental health and physical health variables, the scree plot [24] of eigenvalues suggested a two-factor solution in which HIV status was found to act as a standalone, additional variable. The two-factor model accounted for 46% of the common variance. The factors were labeled Mental Health Factor (self-reported lifetime diagnoses for depression, anxiety, or bipolar disorder) and Physical Health Factor (self-reported lifetime diagnoses for hypertension, high cholesterol, heart disease, or diabetes).

LCA

We identified classes of men with similar reports of SD symptoms using finite mixture models [25]. For this study, the finite mixture model comprised the seven SD dichotomous symptom variables which served as indicators of the latent classes. LCA also estimated the size of each class as a proportion of the total sample. Approximately 6% of cases had missing SD symptom data. LCA analyses accounted for missing data on SD symptom items using a maximum-likelihood estimation routine. This method made maximum use of information on men with missing data on indicators of SD and increased our statistical power for detecting and differentiating between SD classes.

Results

Table 1 describes demographic and behavioral characteristics of 7,001 U.S. MSM aged 18 and over who reported lifetime male sex partners and oral or anal sex with a male partner in their most recent encounter within the past year. Most (86%) men reported their most recent encounter with a male partner within the past month. Overall, respondents were predominantly white with high income and a median age of 38 (range 18–85). Most (89%) men self-identified as homosexual, with 10% self-identifying as bisexual and 1% as heterosexual. Among those who answered the HIV testing question (N = 6,466), 14% reported testing HIV-positive. HIV-positive men were significantly older than HIV-negative (mean difference 3.9 years, $P < 0.001$) and untested men (mean difference 8.1 years, $P < 0.001$). The prevalence of self-reported lifetime diagnoses that comprised the Mental Health and Physical Health Factors were anxiety (23%), depression (13%), bipolar disorder (5%), high cholesterol (17%), hypertension (13%), heart disease (3%), and diabetes (3%). Linear associations existed between age and each physical health factor as well as lifetime depression (all $P < 0.001$). The median number of male oral or anal sex partners in the past year was between 6 and 10, with 13% reporting any past-year STI.

Past-Year Prevalence of Sexual Dysfunction Symptoms

Approximately 79% of men reported having one or more SD symptoms over “a period of time” in the past year. In order of prevalence, men reported low sexual desire (57%), followed by erection problems (45%), performance anxiety (44%), sex not being pleasurable (37%), being unable to achieve an orgasm (36%), premature ejaculation (34%), and pain during sex (14%). In Table 1, reporting of past-year SD symptoms differed by certain demographic and behavioral characteristics. Men under age 30, those with income under $50,000, HIV-positive men, single men, men who used club drugs (25%, OR 1.8, $P < 0.001$) or erectile dysfunction medication (prescription, 29%, OR 2.3 and non-prescription, 16%, OR 2.1; both $P < 0.001$) before sex in the past year, men who were diagnosed with an STI (14%, OR 1.6, $P < 0.001$) in the past year, and men reporting lifetime diagnoses of mental health (43%, OR 2.4, $P < 0.001$) or physical health problems (28%, OR 1.5, $P < 0.001$) were significantly more likely to have reported SD symptoms in the past year than their counterparts. Men who had fewer than six sex partners in the past year were significantly less likely to report past-year SD symptoms than men reporting more past-year sex partners.

Multivariate Analysis of SD Symptoms

In bivariate analysis, men aged 50 and older were significantly less likely to report low sexual desire, premature ejaculation, pain during sex, and sex not pleasurable (all $P < 0.001$, respectively) in the past year and therefore served as the age referent group in multivariate analysis. In Table 2, we conducted seven logistic regression analyses for each SD symptom across demographic characteristics.

In the past year, younger men were significantly more likely to report low sexual desire, premature ejaculation, pain during sex, and sex not being pleasurable, compared to men aged 50 and older. Conversely, younger men were significantly less likely to report trouble achieving an orgasm, performance anxiety, or erection problems. Men aged 50 years and older were more than twice as likely to experience erection problems compared to men under 30. SD symptoms varied little by race/ethnicity and income, but varied by HIV status and relationship status. HIV-positive men were significantly more likely than HIV-negative and untested men to report all past-year SD symptoms except for premature ejaculation. Compared to men married to or divorced/separated/widowed from either a man or woman, single men were significantly more likely to report all past-year SD symptoms except for premature ejaculation and pain during sex.

LCA of SD Symptoms

Predictors of latent class membership in regard to SD symptoms included respondents' age, race/ethnicity, income, relationship status, mental and physical health problems, HIV status, past-year history of STIs, and drug use before/during sex in the past year. Statistical and substantive considerations demonstrated that a four-class model was most appropriate and parsimonious. LCA estimated the size of each class in the four-class model as a proportion of the total sample. No/low SD comprised the largest class (32%), followed by erection problems/performance anxiety (24%), low desire/pleasure (23%), and high SD/sexual pain (21%).

In Table 3, findings from the four-class LCA model and its associated behavioral and demographic characteristics are presented in the form of a multinomial logistic regression. Since LCA beta coefficients are similar to multinomial logistic regression and can be interpreted in the same way, adjusted odds ratios (AORs) were calculated in order to compare the odds of membership in one latent class to the odds of membership in another. Three multinomial logistic regression models are presented in Table 3 for the demographic and behavioral characteristics associated with the erection problems/performance anxiety class, low desire/pleasure class, and high SD/sexual pain class. The no/low SD class served as the comparison group for the three other classes in the multinomial logistic regression.

The erection problems/performance anxiety class was significantly associated with being older, single, having physical health problems, and using prescription and non-prescription erectile dysfunction medication before sex, compared with the no/low SD class. The low desire/pleasure class was significantly associated with being younger, single, having poor mental and physical health, and being less likely to use erectile dysfunction medication before sex in the past year, compared with the no/low SD class. The high SD/sexual pain class was distinguished from the other classes by club drug use and use of prescription and non-prescription erectile dysfunction medication before sex in the past year. Men associated with this class were significantly younger, single, more likely to have poor mental and physical health, and more likely to have been diagnosed with an STI in the past year than men in the no/low SD class. Across latent classes, race/ethnicity, income, HIV status, and Drug Factor 2 did not help to distinguish between class memberships in the latent class regression analyses and were therefore not significant, when the other demographic and behavioral characteristics in the model were controlled.

Discussion

In this Internet sample of U.S. MSM recruited from gay-oriented websites in the past year, self-reported symptoms of SD were common. To our knowledge, this is the largest U.S. study of MSM that assessed self-reported symptoms of a possible sexual dysfunction. By detecting patterns of SD symptoms and associated characteristics, we developed a more comprehensive understanding of sexual problems among this sample of MSM.

Prevalence of Past-Year SD Symptoms

Overall, 79% reported one or more SD symptoms "over a period of time" in the past year. This finding is comparable to Mao et al.'s [16] study that reported 74%. Further, the three most prevalent SD symptoms reported in the current study were low sexual desire, erection problems, and performance anxiety, which mirrors findings from Mao et al.'s [16] study. Regarding measurement of SD symptoms, the current study found overall higher rates of SD symptoms than MSM studies using similar criteria [4,6,16]. Reasons why we may have found relatively higher rates of SD symptoms compared to other studies are that: (i) the current study included any SD symptoms reported over "a period of time" in the past year, yielding the highest prevalence of reported symptoms across studies. Mao et al.'s [16] time frame of SD symptoms was "at least one month," which yielded a similarly high prevalence of SD symptoms; however, Lau et al.'s [6] study required participants to report SD symptoms for three consecutive months, lending to a relatively lower prevalence of SD symptoms; (ii) higher reporting of some SD symptom rates in this study may be age-related (i.e., health problems) because this was a relatively older sample of MSM; and (iii) the online format of this study provided anonymity and lack of interviewer bias, possibly contributing to higher reporting. A growing number of studies indicate higher reporting of sensitive information on computer vs. in-person survey methods [26–28].

As a reference point for past-year SD prevalence in MSW, Laumann et al. [29] analyzed data from the NHSLS [15], which was a representative cohort of heterosexual men and women. Overall, 31% of heterosexual men reported past-year SD symptoms, with 21% reporting premature ejaculation, 5% reporting low sexual desire, and 5% reporting erectile dysfunction. Although the current study, as well as Mao et al. [16] and Lau et al. [6], used the same questions as Laumann et al. [29], the populations studied and the underlying prevalence of symptoms differ greatly. These differences suggest that the SD questions may not adequately measure SD in MSM, that SD may be genuinely at far higher levels in MSM, or both. Further, comparing SD symptoms in MSW and MSM and drawing conclusions about their differences may not be appropriate, as the two groups have different cultural norms, interpretation of SD questions, sexual expectations, and gender sex partners.

In symptom-level multivariate analysis, notable differences were found by age, relationship, and HIV status. Younger men were more likely than older men to report low sexual desire, premature ejaculation, pain during sex, and sex not being pleasurable in the past year. Possible reasons for pain during sex could be inexperience or proctitis due to an STI [4,30]. Older men were more likely to report trouble achieving an orgasm, performance anxiety, and erection problems—symptoms that may signal poor physical or emotional health and/or be age-related [3,16]. Single men were more likely to have past-year SD symptoms compared to all other men, which could be due to a lack of experience in sexual relationships or SD that inhibits men from getting into relationships. HIV-positive men were significantly more likely than HIV-negative and untested men to report all past-year SD symptoms except for premature ejaculation. Several studies have found that HIV-positive MSM are more likely to report SD symptoms than HIV-negative or untested MSM [8,31]. Reasons for this difference in reporting may be due to medication side effects of antiretrovirals or from HIV itself, as well as psychosocial issues such as depression, performance anxiety, or fear of infecting others [8, 10,31,32].

LCA

Using latent class analysis, we found four distinct patterns of SD symptoms: men reporting no or low SD symptoms (which served as a reference group), erection problems and performance anxiety, low desire and pleasure, and high SD symptoms and sexual pain.

Characteristics associated with the erection problem and performance anxiety class included being older, single, having physical health problems, and using prescription and non-prescription erectile dysfunction medication before sex. While some men reporting this behavior pattern may have used prescribed erectile dysfunction medication to counteract physical health problems, it is possible that some men used non-prescription erectile dysfunction medication in order to reduce performance anxiety, and thus took the medication as a back-up measure. Sandfort and de Keizer [1] hypothesize that MSM may be more prone to sexual performance anxiety than MSW. In a study of erectile and ejaculatory functioning in a sample of MSM and MSW [3], age and performance anxiety were strong predictors of erection problems in both MSM and MSW; however, MSM had higher performance anxiety than MSW, regardless of whether or not they reported erection problems.

The *low desire and pleasure* class was associated with being younger, single, and having mental and physical health problems. The finding that young men report low sexual desire and pleasure was surprising. However, little research has been conducted specifically on low sexual desire in males [33]. We have no way of knowing whether the young men in this study, who reported low desire and pleasure, would have a clinical diagnosis of hypoactive sexual desire disorder (HSDD). Primary male HSDD is rare and usually occurs in the context of a sexual secret, such as having a paraphilia, preferring masturbation over sex with others, having a history of sexual abuse, or having inner conflict about sexual identity [6,33,34]. Secondary HSDD is more common and is most often seen as a reaction to a sexual dysfunction, such as erectile dysfunction or premature ejaculation [33]. Secondary HSDD may stem from mental health issues (depression or anxiety), medication side effects, or from partner-associated situations [33–35]. Finally, the culture of “perfect intercourse performance” may greatly contribute to secondary HSDD [33,34].

The high SD and sexual pain class was associated with being younger, single, having mental and physical health problems, having a past-year STI diagnosis, reporting club drug use before sex in the past year, and use of prescription and non-prescription erectile dysfunction medication before sex in the past year. SD in MSM has been associated with physical and mental health problems, as well as STIs [3,7,36]. Distress associated with having an STI may contribute to the onset of an SD that persists long after the STI has been treated [36]. SD in some MSM has been attributed to substance use before sex [6,36]. In the context of using substances to increase sexual pleasure, some men may experience sexual problems and define it as SD [37]. Club drugs, such as crystal methamphetamine and ecstasy, can inhibit an erection. Studies of erectile dysfunction medication used in conjunction with club drugs to counteract sexual side effects has been associated with HIV transmission risk [38–40]. In two online studies of MSM and HIV transmission risk [41,42], risk factors associated with crystal methamphetamine use before sex included young age, having an STI, and being HIV-positive.

Laumann et al. [29] used LCA in his analysis of SD symptoms in MSW, finding four latent classes among men: no SD, premature ejaculation, low desire, and erection problems. Although the sample population and prevalence of past-year SD symptoms in Laumann et al.’s [29] study differs from the current study, some LCA similarities exist between the two studies, suggesting that certain underlying patterns of dysfunction such as low desire and erection problems may occur regardless of sexual partnering.

Limitations

Because there are few studies of SD in MSM, cross-study comparisons are difficult to make; there are marked differences in how SD symptoms have been defined, the duration and frequency of symptoms, and populations studied. This was a cross-sectional study, conducted for research purposes, to assess the prevalence of self-reported symptoms of SD. We used items from the NHSLS [15], most of which are based on the DSM [14]. We did not inquire about

the initial onset of symptoms, frequency or duration of SD symptoms, level of symptom severity, or the context in which symptoms occurred. Further, we did not collect information regarding SD symptoms in the context of male encounters, female encounters, or both.

There is a critical need to standardize SD question definitions, duration, severity, and frequency of symptoms in order to increase the reliability and validity of findings across studies. Finally, we can only generalize findings to MSM who used the online sites from which participants were recruited.

Conclusions

A large percentage of U.S. MSM recruited online from gay-oriented sexual networking, chat, or news websites self-reported experiencing SD symptoms in the past year. We did not provide monetary incentives to complete the survey, yet it is clear that MSM who participated in this online study, as well as in our other online studies [41,4346], were willing to report and describe their health and sexual functioning. The use of the Internet as a treatment medium for SD is at an early stage; however, several online studies have found promising reductions in SD symptoms through online interventions in MSW [47–49].

Research on MSM and SD is limited, and more formative work is necessary to understand what MSM consider to be their sexual problems and the contexts of these problems. Researchers and clinicians have noted that diagnostic tools for assessing SD, such as the DSM [14], do not acknowledge sexual problems in MSM separately from MSW [1,4,36,50]. For example, pain associated with anal intercourse is not acknowledged in the DSM. Rosser et al. [4] argues for an expanded classification of sexual disorders, such as anodyspareunia, which would refer to pain during anal sex for men or women. Gaining understanding about the social, cultural, and physical aspects of SD symptoms in MSM will help researchers and clinicians to more accurately assess and refine SD criteria as it relates to MSM.

Using LCA enabled us to identify underlying patterns of sexual functioning among this sample of MSM recruited online from gay-oriented websites. The clustering of SD symptoms such as erection problems and performance anxiety, low desire and pleasure, and high SD and sexual pain, indicate distinct subgroups with differing dysfunction and associated characteristics. Future research should investigate these patterns in order to develop tailored treatments, possibly online, for SD in MSM. For men seeking treatment for SD, addressing mental and physical health issues, medication or substance misuse, or relationship problems that may manifest as SD are important in the assessment and treatment of SD in MSM [36].

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Figure 1.
Sample banner ad.

Table 1

Demographic and behavioral characteristics of U.S. MSM recruited online (N = 7,001)

Characteristic	Overall Characteristics N (%)	Any Past-Year SD Symptoms		*P*
		Yes	No	
Age, N = 7,001				
18–29	1,522 (22)	1,268 (23)	187 (18)	
30–39	2,310 (33)	1,844 (33)	332 (33)	
40–49	2,269 (32)	1,753 (32)	357 (35)	
50+	900 (13)	696 (12)	135 (14)	0.009
Race/Ethnicity, n = 6,891				
White, Non-Hispanic	5,576 (81)	4,456 (81)	791 (80)	
African American, Non-Hispanic	275 (4)	206 (4)	46 (5)	
Hispanic	572 (8)	449 (8)	90 (9)	
Asian/Pacific Islander	154 (2)	112 (2)	28 (3)	
Mixed/Other race	314 (5)	261 (5)	34 (3)	0.080
Income, N = 6,446				
up to $29,999	1,335 (21)	1,105 (21)	158 (17)	
$30,000 to $49,999	1,827 (28)	1,477 (29)	235 (26)	
$50,000 or more	3,284 (51)	2,565 (50)	521 (57)	<0.001
HIV status, self-report, N = 6,466				
HIV negative	4,836 (75)	4,030 (74)	774 (78)	
HIV positive	940 (14)	827 (15)	106 (11)	
Untested	690 (11)	573 (11)	110 (11)	0.001
Legal relationship status, N = 6,934				
Single	4,872 (70)	3,952 (72)	656 (66)	
Domestic partner/legally married to woman	245 (3)	188 (3)	37 (4)	
Domestic partner/legally married to man	954 (14)	713 (13)	167 (17)	
Divorced/separated/widowed from woman	602 (9)	461 (8)	100 (10)	
Divorced/separated/widowed from man	261 (4)	203 (4)	34 (3)	0.003
Self-defined sexual orientation, N = 6,966*				
Homosexual	6,207 (89)	4,958 (89)	887 (88)	
Bisexual	721 (10)	551 (10)	115 (11)	
Heterosexual	38 (1)	28 (1)	4 (1)	0.330
Drug factors, before/during sex, past year, N = 6,996				
Drug Factor 1†	1,701 (24)	1,368 (25)	154 (15)	<0.001
Drug Factor 2‡	5,811 (83)	4,629 (83)	812 (80)	0.021
Drug Factor 3§	1,952 (28)	1,591 (29)	150 (15)	<0.001
Drug Factor 4¶	1,063 (15)	862 (16)	82 (8)	<0.001
Lifetime oral/anal sex with men, N = 7,001				
1–10	832 (12)	643 (12)	148 (15)	
11–50	1,759 (25)	1,415 (25)	258 (25)	
51–100	1,265 (18)	1,014 (18)	179 (18)	

Characteristic	Overall Characteristics N (%)	Any Past-Year SD Symptoms		*P*
		Yes	No	
101–500	1,873 (27)	1,505 (27)	248 (24)	
501 +	1,272 (18)	984 (18)	178 (18)	0.063
Past year oral/anal sex with men, N = 7,001				
1–5	2,444 (35)	1,914 (34)	400 (39)	
6–10	1,143 (16)	951 (17)	131 (13)	
11–50	2,556 (36)	2,053 (37)	342 (34)	
51 or more	858 (13)	643 (12)	138 (14)	<0.001
Past year any sexually transmitted infection, N = 6,638	863 (13)	760 (14)	93 (9)	<0.001
Mental Health Factor‖ N = 6,480	2,590 (40)	2,344 (43)	237 (24)	<0.001
Physical Health Factor** N = 6,480	1,735 (27)	1,525 (28)	205 (21)	<0.001

*Sexual orientation was measured with the 7-point Kinsey scale. Points were polarized, such that the far ends of the scale were labeled “heterosexual” and “homosexual,” with midpoint labeled “bisexual.”

†Drug Factor 1: “club drugs” ketamine, crystal methamphetamine (smoked, snorted, swallowed, and injected), ecstasy, gamma hydroxy butyrate.

‡Drug Factor 2: alcohol, marijuana, poppers, cocaine (smoked, snorted, or swallowed), downers.

§Drug Factor 3: sildenafil, vardenafil, or tadalafil (all prescription).

¶Drug Factor 4: sildenafil, vardenafil, or tadalafil (all non-prescription).

‖Self-reported lifetime diagnoses of depression, anxiety or bipolar disorder.

**Self-reported lifetime diagnoses of hypertension, high cholesterol, heart disease, or diabetes.

Drug categories are not mutually exclusive. Cocaine injected and heroin (smoked, snorted, swallowed, or injected) were excluded due to small sample size. Some variables have missing data.

Table 2

Multivariate logistic regressions on demographic characteristics associated with past-year sexual dysfunction symptoms in an Internet sample of U.S. MSM (N = 5,813)[†]

	Low sexual desire AOR (99% CI)	Unable to achieve orgasm AOR (99% CI)	Premature ejaculation AOR (99% CI)	Pain during sex AOR (99% CI)	Sex Not pleasurable AOR (99% CI)	Performance anxiety AOR (99% CI)	Erection problems AOR (99% CI)
Age							
18–29	1.7 (1.3–2.2)***	0.6 (0.5–0.8)***	1.7 (1.3–2.3)***	3.2 (2.1–5.0)***	1.8 (1.3–2.3)***	0.8 (0.6–1.0)	0.4 (0.3–0.5)***
30–39	1.6 (1.3–2.0)***	0.6 (0.5–0.8)***	1.4 (1.0–1.7)**	2.2 (1.4–3.3)***	1.5 (1.1–1.9)***	0.8 (0.6–0.9)**	0.5 (0.4–0.6)***
40–49	1.4 (1.1–1.7)***	0.8 (0.7–1.0)	1.2 (0.9–1.5)	1.3 (0.9–2.0)	1.2 (0.9–1.5)	0.9 (0.7–1.1)	0.7 (0.6–0.9)***
50+ (Referent)	—	—	—	—	—	—	—
Race/Ethnicity							
White (Referent)	—	—	—	—	—	—	—
African American	0.8 (0.6–1.2)	0.6 (0.4–0.9)***	0.7 (0.5–1.0)	0.9 (0.5–1.5)	0.9 (0.6–1.3)	0.8 (0.6–1.2)	0.9 (0.6–1.3)
Hispanic	0.9 (0.7–1.1)	0.9 (0.7–1.2)	1.0 (0.8–1.3)	1.3 (0.9–1.8)	0.9 (0.7–1.2)	0.9 (0.8–1.2)	0.9 (0.7–1.2)
Asian/Pacific Islander	0.8 (0.5–1.2)	0.9 (0.5–1.5)	0.6 (0.4–1.0)	1.5 (0.8–2.7)	1.2 (0.8–1.9)	1.0 (0.6–1.7)	1.4 (0.8–2.2)
Mixed/Other race	1.1 (0.8–1.5)	0.9 (0.7–1.3)	0.8 (0.5–1.1)	1.3 (0.8–1.9)	0.9 (0.7–1.4)	1.0 (0.7–1.5)	0.9 (0.7–1.3)
Income							
up to $29,999	0.9 (0.8–1.1)	1.0 (0.8–1.3)	1.1 (0.9–1.3)	1.4 (1.0–1.8)**	1.1 (0.9–1.3)	1.0 (0.8–1.2)	1.1 (0.9–1.3)
$30,000 to $49,999 (Referent)	—	—	—	—	—	—	—
$50,000 or more	0.9 (0.7–1.0)	0.8 (0.7–0.9)**	0.9 (0.8–1.1)	0.9 (0.7–1.2)	0.9 (0.8–1.1)	0.9 (0.8–1.2)	0.9 (0.8–1.2)
HIV Status							
Positive	1.5 (1.2–1.9)***	1.8 (1.5–2.2)***	1.1 (0.9–1.4)	1.7 (1.3–2.2)***	1.5 (1.2–1.8)***	1.4 (1.1–1.7)***	1.9 (1.6–2.4)***
Relationship Status							
Single	1.3 (1.1–1.5)***	1.2 (1.0–1.4)**	0.9 (0.8–1.1)	1.2 (0.9–1.5)	1.4 (1.2–1.7)***	1.3 (1.1–1.5)***	1.3 (1.1–1.6)***

** $P<0.01$;

*** $P<0.001$.

[†] Multivariate logistic regressions were run for each sexual dysfunction symptom.

AOR = adjusted odds ratio.

Cl = confidence interval.

Table 3

LCA. Estimated effect of demographic and behavioral characteristics on class membership in the four-class model among U.S. MSM recruited online

Referent outcome group: No/Low sexual dysfunction	**Erection problems and performance anxiety**		**Low desire and pleasure**		**High sexual dysfunction and sexual pain**	
Characteristics	B	AOR	B	AOR	B	AOR
Age	0.02**	**1.02**	−0.07***	**0.93**	−0.03***	**0.97**
Relationship status						
Single (no steady partner)	0.29**	**1.34**	0.31**	**1.36**	0.39***	**1.48**
Race/Ethnicity						
African American	−0.16		−0.37		−0.10	
Hispanic	−0.51		−0.36		−0.03	
Asian	0.07		−0.24		0.65	
Mixed/Other race	0.15		0.11		−0.03	
Income						
Low income	0.01		−0.11		0.09	
High income	−0.25		−0.12		−0.20	
Health factors						
Mental health factor	0.34		1.06***	**2.89**	1.37***	**3.94**
Physical health factor	0.38***	**1.46**	0.38**	**1.46**	0.40***	**1.49**
HIV status						
HIV positive	−0.12		−0.06		0.09	
Past year characteristics						
Any STI	0.23		0.23		0.34**	**1.40**
Drug Factor 1	0.25		0.15		0.33**	**1.39**
Drug Factor 2	0.01		0.27		0.06	
Drug Factor 3	1.62***	**5.05**	−0.81**	**0.44**	1.50***	**4.48**
Drug Factor 4	1.12***	**3.06**	−0.97***	**0.38**	1.13***	**3.09**

Multinomial logistic regression models were performed for the latent class models for MSM respondents with lifetime male sexual partners and at least 1 male partner during the 12 month period prior to the survey. Three multinomial logistic regression models were run separately for each latent class. LCA analyses accounted for missing data on SD items using a maximum-likelihood estimation routine.

Age: continuous variable. Relationship status: single (unmarried/no domestic partner) vs. all other (married/domestic male partner; married/domestic female partner; divorced/separated/widowed from man; divorced/separated/widowed from woman). Income: low (<$10,000 to $29,999), medium ($30,000 to $49,999), and high ($50,000 to $100,000+), with medium a referent group. Mental Health Factor: lifetime

diagnoses of depression, anxiety or bipolar disorder. Physical Health Factor: lifetime diagnoses of hypertension, high cholesterol, heart disease, diabetes. HIV-Positive: self-reported and dichotomous (yes, no). Any sexually transmitted infection (STI) in the past year: defined as a diagnosis by a doctor or nurse with herpes, human papiloma virus, Chlamydia, gonorrhea, syphilis, chancroid, or non-gonoccocal urethritis. Drug Factor 1: “club drugs” ketamine, crystal methamphetamine (smoked, snorted, swallowed, and injected), ecstasy, gamma hydroxy butyrate; Drug Factor 2: alcohol, marijuana, poppers, cocaine (smoked, snorted, or swallowed), downers; Drug Factor 3: sildenafil, vardenafil, or tadalafil (all prescription); Drug Factor 4: sildenafil, vardenafil, or tadalafil (all non-prescription). Drug categories are not mutually exclusive.

** $P \leq 0.01$;

*** $P \leq 0.001$.

B = beta coefficient; AOR = adjusted odds ratio.