Prevalence of Overactive Bladder and Stress Urinary Incontinence in Women Who Have Sex with Women: An Internet-Based Survey

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Abstract

Women who have sex with women (WSW) are a medically underserved population. Data on urologic health in WSW are scant. We hypothesized that the prevalence of urinary symptoms in WSW is similar to population norms and that urinary symptoms in WSW would be associated with known risk factors for urologic problems. WSW were recruited to participate in an internet-based survey via invitations, listserves, and social media. Primary outcome measures were the validated Overactive Bladder Questionnaire (OAB-q) and a single question assessing stress urinary incontinence (SUI). OAB status was dichotomized by OAB-q score (0–8 = none/mild; >8 = moderate/severe). SUI was dichotomized by single item response (none/little bit of the time = none/mild; sometimes through always = moderate/severe). Ethnodemographic, health, sexuality, and relationship data was also collected. Multivariable logistic regression utilizing 17 factors was performed with SAS V9.2, followed by multivariable analysis with stepwise selection based on the initial analysis (included factors, $p < 0.25$). The final study population consisted of 1,566 adult WSW with mean age 34.6 ± 10.4 years. Moderate/severe OAB was present in 354 (23%) women; 275 (18%) reported moderate/severe SUI. Concomitant OAB and SUI were present in 183 (12%). In multivariable analysis with stepwise selection, OAB symptoms were significantly associated with diabetes, history of urinary tract infection, gynecologic surgery, routine health care, and consultation with a provider regarding urinary symptoms. SUI symptoms were associated with sexual bother. This is the first survey report of prevalence and associations of OAB and SUI in a population of WSW. SUI and OAB were prevalent in WSW. Further attention to urological health in WSW is warranted.

Introduction

URINARY INCONTINENCE (UI; involuntary loss of urine), stress urinary incontinence (SUI; involuntary loss of urine associated with increased abdominal pressure), and overactive bladder (OAB; including symptoms of urgency, frequency, and nocturia with or without urge incontinence) are exceedingly common disorders.^{1,2} Health related quality of life assessments indicate that approximately 65% of women with UI are moderately to extremely bothered by their urinary tract symptoms.³

The five-country European Prospective Investigation into Cancer and Nutrition (EPIC) reported an 11.8% prevalence of OAB in 19,165 individuals ≥ 18 years of age.⁴ A similar study in the United States OAB on Physical and Occupational Limitations study (OAB-POLL) used census-

matched demographic data to create a population representative study with 5,023 female participants.⁵ The overall prevalence of OAB (moderate to severe symptoms with or without incontinence) in OAB-POLL was 30%. OAB-POLL did report a positive association between age and OAB symptoms; amongst women 18–29 years of age, OAB was present in 14.9% of Caucasian women versus 24.4%–26% in black and Hispanic women. The prevalence of OAB was progressively higher with increasing age (28.9%–31.3% for women age 30–39 years, 31.8%–37.5% for women age 40–49 years, 33.9%–45.3% for women age 50–59 years, and 31.5%–39.8% for women age 60–70 years).⁵ The National Overactive Bladder Program (NOBLE) in the United States evaluated the prevalence of OAB in 5,204 male and female U.S. subjects ≥ 18 years of age via validated symptom-based scoring criteria. The overall prevalence of OAB among adult women in NOBLE was 16.9%. The

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prevalence of OAB in NOBLE was higher in older women—2% of women 18–24 years of age reported OAB compared with 19.1% of those 65–74 years of age.⁶

The Study of Women Across the Nation reported a 25% prevalence of SUI in American women, with peak prevalence in the fifth decade of life.⁷ In the National Health and Nutrition Examination Study (NHANES) study, the prevalence of incontinence of any type was 49.6%.⁸ The prevalence of SUI in NHANES was 18.8% in women age 20–39 years, 33.1% ages 40–59 years, and 20.6% in women 60 years of age or older.^{8,9}

Lesbian and bisexual women account for an estimated 2% and 1% of the female population of the United States, respectively.^{10,11} There also exists a population of women who have in the past or currently engage in sexual activity with other women without endorsing a lesbian or bisexual identity. The term “women who have sex with women” (WSW) has been used to describe all women who engage in sexual activity with other women regardless of self-identified sexual orientation.¹² Up to 7% of U.S. women aged 18–59 years report a sexual history with another woman;¹³ however, some women who have a sexual history or even current relationships with other women may not necessarily identify as WSW.¹²

WSW and other persons from lesbian/gay/bisexual/transgender (LGBT) communities are frequently excluded from health research.¹⁴ This deficiency was recently outlined in an Institute of Medicine report that called for increased demographic and health outcomes research specific to this population.¹⁴ WSW have increased prevalence of chronic health conditions including obesity and asthma, reduced utilization of preventive health and screening services and poorer overall health related quality of life.^{15–17} There is a higher prevalence of potential risk factors for incontinence (e.g., obesity, reduced utilization of healthcare screening resources) in WSW as compared with self-identified heterosexual women.¹⁷ Despite this, there is a paucity of research into urinary incontinence and lower urinary tract symptoms in this medically underserved population.

In this observational cohort study, we assessed symptoms of OAB and stress urinary incontinence (SUI) in a population of WSW. Our intent was to evaluate, for the first time to our knowledge, self-reported bladder symptoms in WSW and to determine associated demographic and health characteristics in this population. We hypothesized that the prevalence of SUI and OAB would be similar in WSW to what has been reported in prior general population studies and that bladder symptoms would be associated with common risk factors identified in prior studies.

Material and Methods

We performed a cross-sectional, internet-based survey of WSW. Sampling was achieved by distribution of invitations to local, national, and international LGBT community centers, organizations catering to WSW and advertisements on Facebook (www.facebook.com) directed toward lesbians and other WSW. This methodology has been previously utilized in prior studies of lesbian sexuality.¹⁸ Potential participants were provided a link to an informational page about the survey that was posted on an internet-based survey site (www.surveymonkey.com). Participants who elected to participate could progress from the informational page to the

survey itself. Respondents were informed that they would be asked to provide personal ethnodemographic, health, and sexuality information as part of a study to enhance understanding and awareness of sexual and urologic health in WSW. Participants were given the option to decline or stop the survey at any time. Implied consent was assumed based on voluntary completion of the instrument. No personally identifying information was collected and no incentive was provided for participation. The survey software was declined repeat survey entries from a single internet protocol address so as to reduce the likelihood of repeat participants. Institutional review board approval was obtained prior to recruitment.

Inclusion criteria included women at least 18 years of age, English literate, who use the internet, and self-identify as a woman who has sex with women. Participants were not required to be currently in a same gender sexual relationship nor were there a minimum number of same sex contacts for participation. Enrollment of all participants occurred from January 19, 2010, to May 19, 2010.

Outcome variables

Assessment for overactive bladder and/or urgency incontinence. The primary outcome measure was the Overactive Bladder Questionnaire (OABq).¹⁹ The OABq is a validated eight-item assessment of overactive bladder symptoms. The OABq has demonstrated excellent validity and reliability in both community and clinical settings.^{19,20} Symptom items address both diurnal voiding frequency and symptom bother of frequency, urgency, nocturia, and incontinence. Response options for each of the eight items were presented as 6-point Likert scales ranging from “none of the time” to “all of the time” for frequency and “not at all” to “a very great deal” for the symptom bother questions. A total score of 8 or greater on the OABq indicates high risk for OAB.²⁰ Therefore, for subsequent analysis we classified women with OABq less than 8 as having “no/mild” OAB, and women with OABq greater than 8 as having “moderate/severe” OAB. A recall period of 4 weeks was utilized, as in the originally described OABq, to minimize recall burden.

Assessment for stress urinary incontinence. We included a single question “During the past four weeks, how often have you had leakage of urine with coughing, sneezing, lifting, laughing, exercising, etc.?” with six response categories ranging from “none of the time” to “all of the time.” This single question was similar to that utilized in the NHANES trial for assessment of the presence of SUI, which was defined as responding yes to the question, “During the past 12 months, have you leaked or lost control of even a small amount of urine with an activity like coughing?” with an adjustment of the time frame to 4 weeks to reduce recall bias and to remain consistent with the questions utilized for the OABq.⁸ For analysis, SUI responses were dichotomized; a response of “none of the time” or “little bit of the time” was classified as no/mild SUI. A response of “some of the time,” “a good amount of the time,” “most of the time,” or “all of the time” was categorized as moderate/severe SUI.

Additional survey parameters. Respondents provided their age and race/ethnicity (African, Asian, Caucasian, Latino, Native American, other). Respondents were asked if they had or had ever been treated for the following medical

conditions (yes/no): diabetes, neurodegenerative disease, depression, urinary tract infection in the past year, gynecologic cancer, gynecological/pelvic surgery (defined as surgery on the bladder, vagina, uterus, or ovaries), history of vaginal delivery or C-section, and menopausal status.

TABLE 1. MULTIVARIABLE ANALYSIS
OF MODERATE/SEVERE OVERACTIVE BLADDER

Covariate	Odds ratio			p-Value
	Point estimate	95% Wald CI Lower	Upper	
Age				0.53
18–30	ref	ref	ref	
31–40	1.01	0.44	2.33	
41–50	0.62	0.24	1.57	
51–60	1.2	0.35	4.08	
60+	0.97	0.11	8.68	
Ethnicity				0.33
Caucasian	ref	ref	ref	
African	1.5	0.66	3.42	
Asian ^a	7.36	0.99	54.6	
Latina	0.78	0.28	2.18	
Native American	1.01	0.29	3.5	
No reply/other	1.65	0.61	4.44	
Sexual orientation				0.76
Homosexual	ref	ref	ref	
Bisexual	1.04	0.49	2.19	
Heterosexual	<0.001	<0.001	>999.99	
Other	0.46	0.099	2.11	
Diabetes (yes vs. no)	2.9	1.43	5.9	0.003
Neurodegenerative diseases (yes vs. no)	1.4	0.2	9.72	0.74
Depression (yes vs. no)	1.57	0.93	2.66	0.09
UTI (yes vs. no)	1.62	0.86	3.03	0.13
Gyn cancer (yes vs. no)	0.83	0.33	2.06	0.69
Gyn surgery ^b (yes vs. no)	1.68	0.96	2.93	0.07
Vaginal delivery (yes vs. no)	1.43	0.53	3.86	0.49
C-section (yes vs. no)	1.4	0.59	3.32	0.45
Menopausal status (post vs. pre)	0.79	0.37	1.69	0.54
Routine health care (yes vs. no)	0.49	0.26	0.92	0.03
Consulted a provider regarding urinary symptoms	3.15	1.62	6.13	0.001
Sexual function				<0.001
No bother	ref	ref	ref	
Moderate bother	4.76	1.86	12.17	
Severe bother	4.79	2.15	10.66	
Relationship status				0.16
Female partner	ref	ref	ref	
Non-female partner	1.47	0.6	3.59	
No partner	0.59	0.26	1.34	
History of sexual assault (yes vs. no)	1.53	0.88	2.66	0.13

Numbers in bold indicate statistical significance.

^aIncluding Pacific Islander.

^bSurgery on bladder, uterus, ovaries, or vagina.

CI, confidence interval; Gyn, gynecological; ref, referent; UTI, urinary tract infection.

Participants were additionally asked to provide information on sexual orientation (homosexual/lesbian, bisexual, heterosexual, queer, and other), whether they had a current regular partner (yes/no), and whether they had been a victim of sexual abuse or assault (yes/no). Participants with a regular partner were asked the gender of their partner (female, male, and other). Participants were asked (yes/no) if they routinely saw a health care provider and if they had ever consulted a healthcare provider for a urological problem.

Sexual function was assessed with a modified version of the Female Sexual Function Index (FSFI), previously validated for use in lesbian populations.^{18,21} Total FSFI score is calculated by summing the score from six domains (desire, arousal, lubrication, orgasm, satisfaction, and pain) of female sexual functioning.²¹ Results were dichotomized as high versus low risk for female sexual dysfunction based on a score that has been previously described in a non-WSW population (>26.55 representative of high risk).²² Lower scores on the FSFI have been associated with greater sexual dissatisfaction in WSW.²³

Statistical analyses. First, a binary logistic regression (univariate analysis) was completed to study the association between the OAB and the SUI dichotomized scores and each of the independent variables. Next, the Wald chi-squared test was used for the null hypothesis of no association between each of the independent variables and (dichotomized) OAB and SUI score each as a dependent variable. A multivariable analysis was then completed with inclusion of all 17 independent variables in the analysis, with either the dependent variable of dichotomized OAB or SUI score as reported in Table 1 or Table 2, respectively. For Tables 1 and 2, only those individuals who completed the OAB or SUI questionnaires, respectively, and also responded to the 17 dependent variables tested in the multivariate analysis were included. All subjects who accessed and provided these specific survey responses are included in Table 3. Only participants who provided answer responses to the specific variables of age and completion of overactive bladder (OAB) or stress urinary incontinence (SUI) questionnaires are included for Tables 5–7. A p-value <0.05 was considered statistically significant for all analyses.

The independent risk factors evaluated in the multivariable analysis included age, ethnicity, sexual orientation, history of diabetes, neurodegenerative disease, depression, urinary tract infection in past year, gynecological cancer, gynecologic or pelvic surgery, vaginal delivery or Caesarean section, menopausal status, use of routine healthcare, consultation of a provider for urologic symptoms, affects on sexual function by FSFI score, relationship status, and a history of sexual assault. All analyses were performed with SAS Version 9.2 (SAS Institute Inc.).

Results

The survey was accessed by 2,433 women; 1,566 women (64%) completed the survey. The mean ($\pm$ standard deviation) age was 34.6 ($\pm$ 10.4 years), and the majority of the participants were Caucasian (n = 1,149, 73%; Table 3). With respect to sexual orientation, 1,141/1,566 (73%) self-identified as homosexual/lesbian, 298 (19%) as bisexual, 8 (<1%) as heterosexual, and 119 (8%) as other/no answer provided. Partner status of the study population is presented in Table 4.

TABLE 2. MULTIVARIABLE ANALYSIS OF MODERATE/SEVERE STRESS URINARY INCONTINENCE

Covariate	Odds ratio			
	Point estimate	95% Wald CI		p-Value
		Lower	Upper	
Age				0.91
18–30	ref	ref	ref	
31–40	1.41	0.65	3.08	
41–50	1.35	0.57	3.17	
51–60	1.4	0.43	4.59	
60+	0.77	0.07	8.67	
Ethnicity				0.91
Caucasian	ref	ref	ref	
African	1.03	0.5	2.16	
Asian	0.87	0.13	5.69	
Latina	0.6	0.23	1.53	
Native American	0.77	0.23	2.61	
No reply/other	0.79	0.3	2.07	
Sexual orientation				0.43
Homosexual	ref	ref	ref	
Bisexual	1.13	0.57	2.25	
Heterosexual	1.08	0.08	14.58	
Other	0.28	0.05	1.49	
Diabetes (yes vs. no)	1.86	0.94	3.69	0.08
Neurodegenerative diseases (yes vs. no)	0.39	0.05	2.87	0.36
Depression (yes vs. no)	1.43	0.88	2.31	0.15
UTI (yes vs. no)	1.2	0.66	2.18	0.55
Gyn cancer (yes vs. no)	1.02	0.43	2.42	0.97
Gyn surgery (yes vs. no)	0.92	0.54	1.57	0.77
Vaginal delivery (yes vs. no)	1.27	0.47	3.44	0.64
C-section (yes vs. no)	0.83	0.35	1.97	0.67
Menopausal status	0.57	0.27	1.23	0.15
Routine health care (yes vs. no)	0.68	0.38	1.22	0.19
Consulted a provider regarding urinary symptoms	1.38	0.72	2.63	0.34
Sexual function				0.003
No bother	ref	ref	ref	
Moderate bother	1.94	0.82	4.61	
Severe bother	3.36	1.6	7.05	
Relationship status				0.08
Female partner	ref	ref	ref	
Non-female partner	1.26	0.54	2.91	
No partner	0.47	0.22	1.04	
History of sexual assault (yes vs. no)	1.05	0.64	1.71	0.85

Forty-five percent of participants reported a history and/or current diagnosis of depression ($n=697$), 8% diabetes mellitus ($n=125$), and 41% had been pregnant ($n=643$). Moderate to severe OAB was present in 354/1,452 (24%) women, and moderate to severe SUI was present in 275/1,433 (19%; Tables 5, 6). Concomitant SUI and OAB were present in 183 (12%; Table 7).

In multivariable analysis, a number of risk factors were associated with moderate to severe OAB symptoms (Table 1) and moderate to severe SUI (Table 2). Risk factors that were independently associated with OAB included diabetes (odds ratio [OR] 2.9, 95% confidence interval [95% CI] 1.4–5.9),

TABLE 3. POPULATION DEMOGRAPHICS ($N=1,566$)

Variable	n (Percentage)
Age (years)	
18–30	540 (34.5)
31–40	514 (32.8)
41–50	278 (17.8)
51–60	101 (6.4)
> 60	19 (1.2)
No answer	114 (7.3)
Race/ethnicity	
Caucasian	1149 (73.4)
African/African American	126 (8.0)
Latina	94 (6.0)
Asian/Pacific Islander	31 (2.0)
Native American	33 (2.1)
Other/no answer	133 (8.5)
Sexual orientation	
Homosexual/lesbian	1141 (72.9)
Bisexual	298 (19.0)
Heterosexual	8 (0.5)
Other/no answer	119 (7.6)
Comorbid conditions (yes/no)	
Diabetes	125 (8.0)
Neurodegenerative disorder	22 (1.4)
Depression	697 (44.5)
HIV/AIDS	3 (0.2)
UTI (in past year)	243 (15.5)
Gynecological cancer	71 (4.5)
Gynecological surgery ^a	48 (3.1)
History of pregnancy	643 (41.1)
History of vaginal delivery	418 (26.7)
History of C-section	138 (8.8)

^aSurgery on bladder, uterus, ovaries, or vagina.

routine utilization of health care (OR 0.5, 95% CI 0.3–0.9) and prior consultation with a provider specifically about urinary symptoms (OR 3.2, 95% CI 1.6–6.1). The odds of moderate or severe sexual bother was also markedly higher in women with OAB (OR 4.8, 95% CI 1.9–12.2 for moderate versus no sexual bother; OR 4.8, 95% CI 2.2–10.7 for severe versus no sexual bother).

On multivariable analysis of SUI, sexual bother was the only variable significantly associated with moderate to severe SUI. Relative to women who reported no subjective bother from sexual function, women with moderate sexual bother had OR for SUI of 1.9 (95% CI 0.8–4.6) and women with severe bother had OR for SUI of 3.4 (95% CI 1.6–7.1).

TABLE 4. PARTNER STATUS

	Female partner	Non-female partner	No partner
Lesbian ($n=1,141$)	906 (80%)	16 (1%)	213 (19%)
Bisexual ($n=298$)	100 (34%)	116 (39%)	80 (27%)
Something else ($n=119$) [*]	55 (48%)	29 (25%)	30 (26%)
Heterosexual ($n=8$)	0	7 (88%)	1 (12%)

Totals may not sum to 100% due to missing variables.

^{*}Includes respondents who made no response and those who did not identify as lesbian, bisexual, or heterosexual.

TABLE 5. PREVALENCE OF MODERATE/SEVERE OVERACTIVE BLADDER BY AGE

Age	n	OAB +	Percent (per age)
18–30	540	93	17.2%
31–40	514	149	29.0%
41–50	278	73	26.3%
51–60	101	31	30.7%
>60	19	8	42.1%

n = 1,452 with complete data on age and overactive bladder (OAB) questionnaire.

To our knowledge, this is the first study to evaluate the association between OAB, SUI, and demographic/health factors in WSW. The prevalence of moderate to severe OAB (24%) and SUI (19%) in our study is reasonably consistent with the most frequently cited ranges for OAB and SUI prevalence in adult women.^{4–8} However, it is noteworthy that our aggregate study population is younger when compared with the populations in other published population prevalence studies.^{4–8} Compared with age-matched populations, the rate of SUI in our study is within expected ranges, but the prevalence of OAB in our study group is similar to slightly higher, particularly in the youngest age cohort (age 18–29 years).^{4–6}

Diabetes has been associated with an up to a two-fold increase in OAB in women.^{24–26} The estimated prevalence of diabetes among U.S. adults is 9% according to the National Health Interview Survey.²⁷ In concordance with these data, 8% of our surveyed population was diabetic. Data on diabetes prevalence in WSW is generally scant.²⁸ However, it is well established that obesity (a predisposing factor for diabetes) is more common in lesbian women compared with their heterosexual peers.²⁹ Sexual minority women are also at higher risk of chronic health conditions, cardiovascular disease risk factors, and decreased utilization/access to preventive health care when compared to the heterosexual female population.¹⁷ These disparities may contribute to a more severe end organ effect and a delay in appropriate management of diabetes when it is present. Diabetes and/or obesity may affect the propensity of lesbian or bisexual women to develop OAB; further research into this issue is warranted.

The reported prevalence of SUI in our study (19%) is within the previously cited range of prevalence rates in the general female population.^{7,8} As for OAB, SUI rates are as high as would be anticipated in the adult female population surveyed as a whole, despite a lack of association in this

TABLE 6. PREVALENCE OF MODERATE/SEVERE STRESS URINARY INCONTINENCE BY AGE

Age	n	OAB +	Percent (per age)
18–30	530	51	9.6%
31–40	511	121	23.7%
41–50	273	79	28.9%
51–60	100	21	21.0%
>60	19	3	15.8%

n = 1,433 with complete data on age and stress urinary incontinence (SUI).

TABLE 7. COMORBIDITY OF OAB AND SUI

OAB	SUI	
	None/mild n (%)	Moderate/severe n (%)
None/mild	1043 (66.6)	118 (7.5)
Moderate/severe	200 (12.8)	183 (11.7)

n = 1,544 with complete responses to continence questionnaires; complete age data not required.

population on multivariate analysis with pregnancy-related factors in WSW. This may be attributable to a markedly lower rate of pregnancy history in our population of WSW compared with non-WSW females. Although we did not use a validated instrument for the assessment of SUI, a single-item patient reported loss of urine with stress maneuvers should adequately encompass the symptoms of urine loss with strain.

Although this is the first description of its type in the WSW population of risks of SUI and OAB with associated risk factors, we recognize the limitations inherent to a study that is limited to self-selected, English-speaking individuals who utilize the internet and social media platforms. Our results cannot necessarily be generalized to other populations of WSW, particularly older women who are less likely to utilize social media. As a cross-sectional, internet-based study, recall bias is also a substantial concern; we must acknowledge the possibility of misrepresentation, either deliberate or accidental. The accuracy of subject responses to a survey such as this is never certain, but there are no grounds to suspect that respondents would deliberately enter false information for an anonymous, uncompensated survey. The single-item question on SUI used to assess the burden of stress incontinence in our population is not a validated scale and hence our conclusions with respect to SUI should be interpreted cautiously. Although 92% of our study population identified as lesbian or bisexual we did include many women who did not report a lesbian/bisexual identity and/or a current same sex partner. While this inclusivity may slightly limit our ability to generalize our results to all lesbian/bisexual women, we believe that the inclusive nature of our survey is reflective of the larger population of WSW. Further research is certainly warranted.

Conclusions

The prevalence of SUI in our population of WSW was similar to previously published population prevalence estimates; the rate of OAB in this population was similar to slightly higher than expected based on population norms. There was an association in WSW of OAB with diabetes and consultation with medical professionals. SUI and OAB were both independently associated with a measure of sexual function. Our results highlight a need for increased screening efforts and studies of effects of and management of chronic health conditions, including urinary tract symptoms, in WSW.

Author Disclosure Statement

No competing financial interests exist.

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