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Urine leakage during sexual activity among ethnically diverse, community-dwelling middle-aged and older women

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Abstract

BACKGROUND—Urinary incontinence is associated with decreased female sexual function, but little is known about the prevalence, predictors, and impact of urine leakage during sexual activity among women in the community.

OBJECTIVE—The purpose of this study was to evaluate the prevalence and impact of urine leakage during sex in ethnically diverse, community-dwelling midlife and older women.

STUDY DESIGN—Urinary incontinence and sexual function were assessed by structured questionnaire in a multiethnic, community-based cohort of women enrolled in Kaiser Permanente Northern California, an integrated healthcare delivery system in California. All women were aged 40–80 years and sampled from 1 of 4 racial/ethnic groups (20% black, 20% Latina, 20% Asian, and 40% non-Latina white). Differences in frequency, bother, and fear of urine leakage during sexual activity were examined among women with monthly, weekly, and daily urinary incontinence and across different types of urinary incontinence (stress, urgency, mixed, and other type urinary incontinence), with the use of chi-square tests. Independent risk factors for urine leakage during sexual activity were identified through multivariable logistic regression.

RESULTS—Of the 509 women who reported being sexually active and having at least monthly urinary incontinence, 127 of them (25%) reported experiencing any urine leakage during sex during the past 3 months. Nineteen percent of the women reported being subjectively bothered by leakage during sex, and 16% of them reported restricting sexual activity because of fear of leakage. Women with more frequent underlying urinary incontinence were more likely to report experiencing or being bothered by leakage during sex and restricting sexual activity because of fear of leakage ($P < .001$ for all). Participants with predominantly stress or mixed type urinary incontinence were more likely to report experiencing leakage during sex and being subjectively bothered by this leakage ($P < .002$ for all). Factors independently associated with leakage during

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sex were depression (odds ratio,1.96; 95% confidence interval, 1.20–3.20), symptomatic pelvic organ prolapse (odds ratio, 2.10; 95% confidence interval, 1.11–3.98), mixed vs urgency type urinary incontinence (odds ratio, 3.16; 95% confidence interval, 1.70–5.88), stress vs urgency type urinary incontinence (odds ratio, 1.94; 95% confidence interval, 1.01–3.70), and frequency of sexual activity (odds ratio, 1.6395% confidence interval, 1.05–2.55), but not age or race/ethnicity.

CONCLUSIONS—Up to a quarter of women with at least monthly urinary incontinence in the community may experience urine leakage during sexual activity. Many incontinent women who leak urine during sex remain sexually active, which indicates that the preservation of sexual function should still be a priority in this population. Among incontinent women, depression, pelvic organ prolapse, and stress mixed-type urinary incontinence may be associated with urine leakage during sexual activity.

Keywords

incontinence; sexual dysfunction; urinary incontinence; urine leakage during sexual activity

Urinary incontinence (UI) affects more than one-third of middle-aged and older women[1] and has been shown to have a negative impact on overall functioning and well-being.[2–4] Previous studies have reported that women with frequent UI have less frequent sexual activity, experience more sexual problems, and report overall lower sexual satisfaction than women without incontinence.[5–8] However, it is unclear whether sexual dysfunction among women with UI is a direct consequence of urine leakage during sexual activity or whether UI is simply a marker for other clinical factors that exert independent effects on sexual function.

Currently, it is not known how often women with UI experience urinary leakage during sexual activity, which factors put women with UI at risk for leakage during sexual activity, and how this leakage affects their overall sexual function.[9] As a result, clinicians may have difficulty determining which incontinent women should be screened for urine leakage during sexual activity and may not be able to counsel women effectively about the direct impact of their UI on sexual function.

We conducted an observational study to evaluate the frequency and prevalence of urine leakage during sexual activity among community-dwelling women with UI and to examine the extent to which incontinent women are bothered by or restrict their sexual activity because of leakage during sex. This research was designed to help guide future strategies to identify and prevent sexual dysfunction in middle-aged and older women with UI in the community.

Materials and Methods

This study is a cross-sectional analysis of data from the Reproductive Risks of Incontinence Study at Kaiser (RRISK), a multiethnic cohort study of community-dwelling middle-aged and older women designed to identify risk factors of urinary tract dysfunction.[10, 11] All participants in RRISK were women 40–80 years old who were long-time enrollees in Kaiser Permanente Northern California (KPNC), an integrated health care system that delivers care to approximately 25–30% of the Northern California population. To be eligible for RRISK,

women had to be enrolled in KPNC since the age of 21 years and to have given birth to at least one-half of their children at a facility within the KNPC system.

Details about the design and procedures for constructing the RRISK cohort have been described previously.[11] Briefly, to attain a diverse multiethnic cohort, women in the KPNC enrollee database were sampled randomly from within an age and ethnicity strata with the goal of obtaining an overall composition of 20% Asian, 20% black, 20% Latina, and 40% non-Latina white women. Women who were identified initially from enrollee databases were invited to take part in study visits and interviews. To ensure robust participation from women with diabetes mellitus as an established risk factor for UI,[12] 20% of the women for the third data collection wave of RRISK (RRISK3) were also recruited from the KPNC Diabetes Registry, an annually updated database of diabetic KPNC enrollees compiled through abstraction of pharmacy, medical, and laboratory records.

For RRISK3, data from 2016 participants were collected during home-based study visits that were performed between November 2008 and April 2012. Before data collection, participants provided informed consent; all study procedures were approved by the institutional review boards of Kaiser Permanente and the University of California, San Francisco.

Frequency and type of UI were assessed by structured questionnaire measures previously validated against a detailed voiding diary.[13] Participants were first asked, “During the past 3 months, how often have you typically leaked urine, even a small amount,” with response options including less than monthly, monthly, weekly, and daily. Participants who reported experiencing UI at least once a month were then asked to indicate the number of times per month that they leaked urine: (1) with physical activity such as coughing, lifting, sneezing, or exercise to quantify stress-type UI episodes, (2) with an overwhelming urge to urinate or difficulty holding urine to quantify urgency-type UI episodes, or (3) without an activity or overwhelming urge to urinate to indicate other-type UI episodes.

Consistent with past RRISK analyses, we classified participants as having predominantly stress-type UI if at least 2–3 of their total reported urine leakage episodes in the past month were stress type. We classified participants as having predominantly urgency type UI if at least 2–3 of their leakage episodes within the past month were urgency-type. Those who reported that at least 2–3 of their episodes were neither stress nor urgency type were considered to have other predominant UI. Women who reported a combination of stress, and urgency, and/ or other type episodes, with no 1 type of UI comprising at least 2–3 of episodes, were categorized as having mixed type UI.

Sexual activity and function were assessed with the use of structured questionnaire items administered in previous large observational and interventional studies of middle-aged and older women and found to have good construct validity and internal consistency reliability among women with UI.[10, 14] To ensure that the responses were confidential, women were asked to complete the questionnaire in private and then return it in a sealed envelope to the study interviewer. In the RRISK study, sexual activity was defined inclusively as “any activity that is arousing to you, including masturbation,” recognizing that many middle-aged

and older women engage in types of sexual activity other than partnered vaginal intercourse. Participants were first asked if they had any sexual activity in the past 3 months; those who answered affirmatively answered follow-up questions about how frequently they engaged in sexual activity (less than monthly, monthly, weekly, daily). Participants who reported any sexual activity in the past 3 months were asked how often they leaked urine during sexual activity (none, a little, some, most, or all of the time), how bothered they were by urine leakage during sexual activity (not at all, slightly, moderately, quite a bit, or extremely), and how much fear or concern about leakage restricted their sexual activity (not at all, slightly, moderately, quite a bit, or extremely). For these questions about urine leakage during sex, internal consistency reliability was confirmed by Cronbach alpha coefficients >.7.[14]

Sociodemographic data such as race/ethnicity, age, and relationship status were also collected with the use of the self-administered questionnaires. For race/ethnicity, participants were asked to self-identify as African American/black, Asian American/Asian, non-Latina white/caucasian, or Latina/Hispanic. Selected chronic health conditions were assessed by asking participants about previous physician diagnosis of heart disease, diabetes mellitus, and depression. To identify women with symptomatic pelvic organ prolapse, women were further asked about feelings of bulging or pressure or protrusion caused by their uterus, bladder, or rectum dropping out of the vagina or visible bulging or protrusion from the vagina in the past 3 months. Diagnosis of diabetes mellitus was further confirmed by review of clinical records that were abstracted from KPNC that were indicated by the use of a glycemic control medication, elevated hemoglobin A1c level of >7%, or serial fasting blood glucose of >125 mg/dL. Obstetric history was assessed initially by a questionnaire that asked about date and mode of delivery, with correlation from data abstraction of medical records of deliveries performed at KPNC.[15] Women were defined as postmenopausal if they reported by questionnaire that they had experienced no menstruation in the last year.

For this study, analyses focused on the subset of participants who reported at least monthly UI and being sexually active in any form in the past 3 months. Within this sample, descriptive statistics were used to examine the distribution of frequency of urine leakage during sexual activity, bothersomeness of leakage during sexual activity, and restriction of sexual activity because of fear of leakage. Differences in the distribution of each of the aforementioned outcomes across UI frequency categories (monthly, weekly, or daily) were examined with the use of the Mantel-Haenszel Chi-Square tests. Differences in the distribution of these outcomes by clinical type of UI (stress-predominant, urgency-predominant, or mixed-type UI) were examined with general chi-square tests. A multivariable logistic regression model was developed to assess independent associations between demographic and clinical participant characteristics with urine leakage during sexual activity. Age, race/ethnicity, marital status, frequency of UI, clinical type of UI, frequency of sexual activity, depression history, symptomatic pelvic organ prolapse, and body mass index were all included in this model as factors that were thought to have high a priori potential to have an independent effect on urine leakage during sexual activity. All analyses were performed with the use of SAS software (version 9.4; SAS Institute, Inc, Cary, NC).

Results

Of the 2016 women in the RRISK3 cohort, 1430 reported being sexually active in the past 3 months; of these women, 509 reported monthly or more frequent UI during this period and were eligible to be included in the analytic sample. The demographic and clinical characteristics of the 509 participants are summarized in Table 1. The mean age (±standard deviation) was 58.7±9.2 years; 57% of the women were from racial or ethnic minorities (primarily black, Latina, or Asian). More than two-thirds of the women (71%) were married or living as married. Approximately 67% of them had at least weekly UI; 33% of them had predominantly stress type UI; 25% of them had predominantly urgency type UI, and 36% of them had mixed stress and urgency type UI.

Overall, 25% of women (n=127) reported urine leakage during sexual activity at least a little of the time. As expected, women with more frequent underlying UI were more likely to report more frequent urine leakage during sex ($P < .0001$; Figure). Twelve percent of women with monthly UI, in contrast to 41% of women with daily UI, reported leaking urine during sex at least a little of the time.

Overall, 19% of incontinent women reported some subjective bother associated with urine leakage during sex, and 16% reported restricting their sexual activity to some degree because of fear of leakage during sex. Participants who experienced more frequent underlying UI were more likely to report being bothered subjectively by leakage during sex and restricting sexual activity because of fear of leakage ($P < .0001$ for both). Seven percent of women with monthly UI, as opposed to 33% of women with daily UI, reported being at least slightly bothered by leakage during sex, and 6% of women with monthly UI, as opposed to 28% of women with daily UI, reported restricting sex at least slightly because of fear of leakage. Within the specific subset of 127 women who reported experiencing urine leakage during sex at least “a little of the time” in the past 3 months, 78 women (61%) reported being at least “slightly” bothered by leakage during sex, and 49 women (39%) reported being at least “moderately” bothered by leakage during sex.

Urine leakage during sex was reported by 35% of women with mixed stress and urgency type UI, by 25% of women with predominantly stress type UI, and by 14% of women with predominantly urgency or other type UI ($P < .0002$ for heterogeneity across all UI type categories; Table 2). Twenty-nine percent of women with mixed-type UI, 17% of those with stress-predominant UI, and <10% of those with urgency predominant or other type of UI reported being at least slightly bothered by urine leakage during sex ($P < .002$ for heterogeneity across all UI type categories; Table 2).

In multivariable analyses, women were more likely to experience urine leakage during sex at least a little of the time if they had a history of depression or symptomatic pelvic organ prolapse (Table 3). Urine leakage during sex was also associated with weekly or more frequent sexual activity and weekly or more frequent underlying UI after adjustment for other participant characteristics. In addition, women with predominantly stress type UI had >90% increased adjusted odds of reporting urine leakage during sex compared with those with predominantly urgency type UI, and women with mixed type UI had an >3-fold

increased adjusted odds of reporting urine leakage during sex compared with those with predominantly urgency type UI. Neither age nor race/ethnicity was an independent risk factor for urine leakage during sex after we controlled for other variables.

Comment

In this multiethnic, community-based population of women with at least monthly UI, a quarter of the women who were sexually active reported experiencing at least some urine leakage during sexual activity. Although <20% of incontinent women overall reported feeling subjectively bothered by leakage during sex and only 16% reported restricting sex because of fear of leakage, the prevalence of self-reported bother and fear of urine leakage during sex increased substantially with increasing frequency of underlying UI.

Our findings also suggest that urine leakage during sexual activity is substantially more likely to occur in community-dwelling women with stress-predominant or mixed type UI in comparison with urgency-predominant UI. These results are consistent with past research that was based in smaller referral populations, which includes a previous study of women referred to a urogynecology practice for coital incontinence, in which approximately 80% were found to have stress-predominant UI.[16] In a previous urodynamic study of sexually active women who were evaluated at a tertiary referral center, 75% of those with urine leakage during sex were also described as having urodynamic evidence of stress incontinence.[17]

Perhaps contradictory to expectations, many women who experienced urine leakage during sex in our cohort remained sexually active; in fact, urine leakage during sex was associated with a higher rather than lower self-reported frequency of sexual activity. On the 1 hand, this finding may simply reflect the fact that women who have more frequent sexual activity have more opportunities to leak urine during sex. On the other hand, these findings may also indicate that, even when women experience urine leakage during sex, sexual activity may continue to play a regular and important role in their day-to-day lives. Rather than assuming that women with urine leakage during sex are likely to abandon sexual activity, our results may suggest that clinicians who care for women with UI should prioritize the preservation of sexual activity as a potentially important contributor to overall function and well-being, regardless of continence status.

Not surprisingly, women with UI were also more likely to report urine leakage during sexual activity if they also experienced symptomatic pelvic organ prolapse. As a form of pelvic floor dysfunction, pelvic organ prolapse frequently co-exists with UI (especially stress type UI) and tends to be a marker of more severe UI in women.[18, 19] Previous studies with smaller sample sizes and primarily white participants have suggested that pelvic organ prolapse is associated with multiple forms of sexual dysfunction in women, which includes leakage during sex.[20–22] In comparison, a past study that also examined community-dwelling women found no significant associations between sexual dysfunction and pelvic organ prolapse [23]; however, this study excluded women without a stable sexual partner.[23]

Our findings also indicate that incontinent women are substantially more likely to report urine leakage during sex if they also have a history of depression. Several previous studies have reported associations between depression and overall sexual dysfunction,[24, 25] including problems with orgasm and arousal and decreased satisfaction and interest in sexual activity. Our research suggests that depression is associated specifically with urine leakage during sex, as a potential direct contributor to sexual dysfunction in incontinent women.[26, 27] Given that our data are cross-sectional, however, we are unable to draw conclusions about the directionality of this relationship. On the 1 hand, it is possible that depression is simply a consequence of UI-related sexual dysfunction[28–30] or may lead to greater participant-perceived burden of UI-related sexual dysfunction. On the other hand, it is also possible that depression may contribute to the development of risk factors for urine leakage during sex, just as depression is hypothesized to contribute to risk factors or worse outcomes of other chronic diseases.[31–34]

This analysis benefits from a large, ethnically diverse sample of community-dwelling middle-aged and older women and characterization of multiple aspects of UI by the use of measures previously validated against a detailed voiding diary. Nevertheless, some limitations of this study should be noted. First, UI type and frequency were assessed solely by self-report questionnaires, without additional information obtained from detailed diaries or urodynamic measurements. Nevertheless, the questionnaire measures that were used to distinguish clinical type of UI in this study previously were found to correlate well with classification of UI type with the use of data from voiding diaries.[13] Second, although a very inclusive definition of sexual activity was used to allow for all possible forms of sexual activity practiced by women who were middle-age and older, study measures did not allow us to distinguish specifically between the effects of individual sexual practices, such as penetrative vs nonpenetrative intercourse or self-stimulation. As a result, we could not determine whether the impact of urine leakage during sex may be greater for women if the leakage is witnessed by a sexual partner in comparison with self-stimulation. Third, our sample consisted of only incontinent women who reported being sexually active in some form during the past 3 months. Thus, women may not have been included in this sample if they completely refrained from engaging in sexual activity during this period because of their UI.[35] As a result, our study may underestimate the full impact of urine leakage during sex, such as the possibility that some women may have avoided sexual activity entirely because of concerns about this leakage.

Overall, clinicians should be aware that up to one-quarter of community-dwelling, sexually active women with UI may experience urine leakage during sexual activity. Among incontinent women, those with more frequent underlying UI, co-morbid depression, symptomatic pelvic organ prolapse, and either stress-predominant or mixed type UI may be at particularly increased risk of UI-related sexual dysfunction. Because many incontinent women who experience urine leakage during sex continue to remain sexually active, these women may benefit from counseling and support from their clinicians about strategies to minimize the impact of their incontinence on their sexual function.

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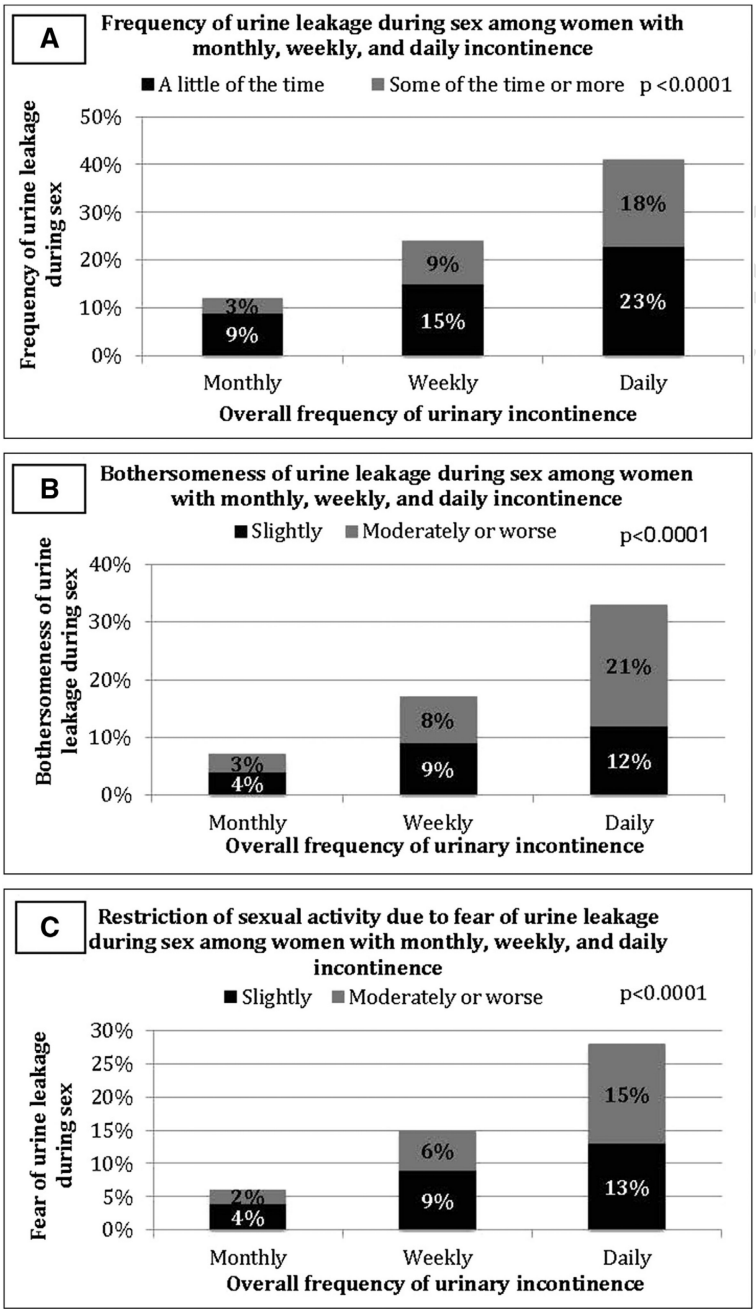

Figure. Frequency, bothersomeness, and restriction of sexual activity because of fear of urine leakage during sex among women with monthly, weekly, and daily incontinence

A–C, $P < .0001$, calculated with the use of the Mantel-Haenszel chi-square test.

TABLE 1

Demographic and clinical characteristics of sexually active women with at least monthly urinary incontinence

Characteristic	N = 509
Age, y (mean±SD)	58.7±9.2
Body mass index, kg/m^2 (mean±SD)	31.2±7.5
Race/ethnicity, n (%)	
Non-Latina white	220 (43.2)
Black	85 (16.7)
Latina white	123 (24.2)
Asian	81 (15.9)
Relationship status, n (%)	
Single	145 (28.5)
Married	363 (71.5)
Frequency of sexual activity,[a] n (%)	
Less than monthly	139 (27.3)
Monthly but not weekly	167 (32.8)
Weekly but not daily	197 (38.7)
Daily or more frequent	6 (1.2)
Clinical type of urinary incontinence,[b] n (%)	
Predominantly stress	167 (32.8)
Predominantly urgency	129 (25.3)
Predominantly other	30 (5.9)
Mixed stress and urgency	183 (36.0)
Frequency of urinary incontinence, n (%)	
Monthly	168 (33.0%)
Weekly	184 (36.2%)
Daily	157 (30.8%)
Frequency of urine leakage during sexual activity, n (%)	
None of the time	379 (74.9)
A little of the time or more	127 (25.1)
Comorbid conditions, n (%)	
Depression[c]	115 (22.6)
Symptomatic pelvic organ prolapse[d]	54 (10.6)
Diabetes mellitus[e]	137 (26.9)
Heart disease[c]	28 (5.5)
Menstruation status,[f] n (%)	
Premenopausal	404 (79.4)
Postmenopausal	105 (20.6)

Characteristic	N = 509
Parity, n (%)	
0	79 (15.6)
1	63 (12.4)
2	177 (34.8)
>3	189 (37.2)

[a]Participants reported how frequently they engaged in sexual activity in the past 3 months, with sexual activity defined inclusively as “any activity that is arousing to you, including masturbation”;

[b]Women were categorized as having predominantly stress incontinence if they reported that 2–3 of their leakage episodes per month, predominantly urgency incontinence if 2–3 of their leakage episodes were urgency type, and predominantly other incontinence if 2–3 of their leakage episodes were other type; mixed stress and urgency incontinence was defined as no 1 type of leakage comprising 2–3 of the leakage episodes;

[c]Women self-reported previous physician diagnoses of depression and heart disease;

[d]Symptomatic pelvic organ prolapse was defined as a dropping, bulging, or protrusion of the bladder, vagina, uterus, and/or rectum;

[e]Review of clinical records was used to confirm the diagnosis of diabetes mellitus, which was indicated by use of a glycemic control medication, ≥1 occasions of elevated hemoglobin A1c level of >7%, or fasting blood glucose of >125 mg/dL;

[f]Women were considered postmenopausal if they reported no menstruation in the last year.

TABLE 2

Frequency, bothersomeness, and restriction of sexual activity because of fear of urine leakage, stratified by predominant type of incontinence

Predominant type of incontinence[a]	**Measure**			
Frequency of urine leakage during sexual activity (n=506), n (%)	**None of the time**	**A little of the time**	**Some of the time or more**	***P* value**[b]
Stress predominant	125 (75.3)	28 (16.9)	13 (7.8)	.0002
Urgency predominant	111 (86.0)	14 (10.9)	4 (3.1)	
Mixed stress and urgency predominant	118 (64.9)	33 (18.1)	31 (17.0)	
Other predominant	25 (86.2)	3 (10.3)	1 (3.5)	
Bothersomeness of urine leakage during sexual activity (n=485), n (%)	Not at all	Slightly	Moderately or worse	*P* value[c]
Stress predominant	132 (83.0)	11 (6.9)	16 (10.1)	.002
Urgency predominant	108 (90.8)	5 (4.2)	6 (5.0)	
Mixed stress and urgency predominant	128 (71.5)	23 (12.9)	28 (15.6)	
Other predominant	26 (92.8)	1 (3.6)	1 (3.6)	
Restriction of sexual activity because of fear of urine leakage (n=493), n (%)	Not at all	Slightly	Moderately or worse	*P* value[d]
Stress predominant	138 (85.7)	13 (8.1)	10 (6.2)	.08
Urgency predominant	110 (89.4)	9 (7.3)	4 (3.3)	
Mixed stress and urgency predominant	145 (80.1)	19 (10.5)	17 (9.4)	
Other predominant	22 (78.6)	1 (3.6)	5 (17.8)	

[a] Participants were characterized as having predominantly stress-type urinary incontinence if they reported that at least 2–3 of their total urine leakage episodes in the past month were stress-type and as having predominantly urgency-type urinary incontinence if they reported that at least 2–3 of their leakage episodes within the past month were urgency-type; those who reported that at least 2–3 of their episodes were neither stress nor urgency type were considered to have other predominant urinary incontinence; women who reported a combination of stress, urgency, and/or other type episodes, with no 1 type of urinary incontinence comprising at least 2–3 of episodes were categorized as having mixed-type urinary incontinence;

[b] Derived from chi-square test that assessed heterogeneity in frequency of urine leakage during sexual activity among women with different predominant type of incontinence;

[c] Derived from chi-square test that assessed heterogeneity in bothersomeness of urine leakage during sexual activity among women with different predominant type of incontinence;

[d] Derived from chi-square test that assessed heterogeneity in restriction of sexual activity because of fear of urine leakage among women with different predominant type of incontinence.

TABLE 3

Adjusted associations between participant characteristics and self-reported urine leakage during sexual activity[a]

Characteristic	Odds ratio (95% confidence interval)[b]
Age (per 1 year increase)	0.98 (0.96–1.01)
Race/ethnicity	
Black vs white	0.90 (0.46–1.78)
Asian vs white	0.95 (0.49–1.85)
Latina white vs white	0.74 (0.42–1.29)
History of depression	1.96 (1.20–3.20)[c]
Symptomatic pelvic organ prolapse	2.10 (1.11–3.98)[c]
Body mass index (per 1 unit increase)	0.99 (1.02–1.05)
Married or living as married	1.00 (0.62–1.63)
At least weekly urinary incontinence	3.60 (2.07–6.28)[c]
At least weekly sexual activity	1.63 (1.05–2.55)[c]
Predominant type of incontinence:	
Stress vs urgency	1.94 (1.01–3.70)[c]
Other vs urgency	0.80 (0.24–2.69)
Mixed vs urgency	3.16 (1.70–5.88)[c]

[a] Defined by participants who reported leakage during sex at least “a little of the time”;

[b] Derived from a single multivariable regression model that simultaneously adjusted for all characteristics in the table: age, race/ethnicity, history of depression, symptomatic pelvic organ prolapse, body mass index, marital status, frequency of incontinence, frequency of sexual activity, and predominant clinical type of incontinence;

[c] $P<.05$.