ORIGINAL RESEARCH

Characterization of overactive bladder in women in a primary care setting

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Background: Overactive bladder (OAB) represents a disorder with overall increasing prevalence in the American population. However, gender-specific characteristics of OAB and how it relates to the general practitioner are not well described. We sought to determine the distribution and characteristics of OAB in women in a primary care setting.

Methods: Self-administered questionnaires were distributed to patients visiting a family medicine outpatient center. The modified questionnaire included eight questions on evidence of lower urinary tract symptoms (LUTS, OAB-validated 8-question screener [OAB-V8]), two questions on stress urinary incontinence, and one question on incomplete emptying. The questionnaire included demographic characteristics and relevant medical and surgical history. Body mass index was calculated based on weight and height. Chi-square test and risk ratio analysis were used to analyze the relationship between OAB and other independent variables.

Results: Of 1025 questionnaires administered, 386 were completed. Patients ranged from 16 to 97 years, the majority were African American (78.2%), and 49.7% were premenopausal while 50.3% were postmenopausal. OAB was present in 46.4% of premenopausal women and 41.7% of postmenopausal women. OAB was significantly associated with overweight status (body mass index 25.0–29.9, $P = 0.042$) and obesity (body mass index ≥ 30, $P < 0.001$). Overall, obese women were twice as likely to have OAB (relative risk = 1.99, 1.31–3.04) than women with normal weight. OAB was not shown to correlate with race, cigarette use, history of hysterectomy, or parity.

Conclusion: OAB was evident in 44% of all female patients surveyed, which is much higher than previously reported estimates. In addition, overweight women were more likely to have OAB. Increased awareness of OAB in the primary care setting should be considered for women's general health.

Keywords: overactive bladder, incontinence, women, primary care

Introduction

According to the International Continence Society, overactive bladder (OAB) is characterized by urinary urgency, with or without urge incontinence, usually with frequency and nocturia, in the absence of causative infection or pathological conditions, and represents a spectrum of disorders with a range of presentations and management options.[1–7] According to a population-based survey of 16,776 men and women aged 40 years and older conducted by Milsom et al [5] in six countries, by telephone or direct interview, the prevalence of OAB in Europe has been estimated to be 15.6% in men and 17.4% in women. The National Overactive BLadder Evaluation survey (NOBLE), in which 11,740 Americans agreed to participate, found the overall prevalence of OAB to be 16.9% in women and 16.0% in men.[2] OAB negatively affects quality of life and

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carries a large psychosocial and economic burden,[1–3] because such increased awareness of OAB is important for appropriate intervention towards quality of life improvement. However, gender-specific awareness in a general physicians practice is not well described, and the disorder may be underdiagnosed.[4] We sought to determine the prevalence and characteristics of OAB in women in a primary care setting.

Methods

Over a three-month period, 1025 self-administered questionnaires on urinary symptoms were distributed to patients over 16 years of age who visited a family medicine outpatient center while waiting to be seen by their primary care physician.[6] In total, 525 patients agreed to participate in this study, of which 386 (73.5%) were women. This study was granted exemption by the Institutional Review Board of the relevant institution.

The modified questionnaire included eight questions on evidence of lower urinary tract symptoms (LUTS) using the Overactive Bladder-Validated 8-question screener [OAB-V8],[6,8] two questions on stress urinary incontinence, and one question on incomplete emptying of the bladder after urination. Responses were answered on a 6-point symptom bother scale ranging from 0 (not at all) to 5 (a great deal). An additional question was asked about the effect of urinary symptoms on quality of life, with answers ranging from 0 (delighted) to 6 (terrible). The questionnaire also included data on demographic characteristics and relevant medical and surgical history. Patient weight and height were measured for calculating body mass index (kg/m^2).

Primary care physicians then reviewed the questionnaire with their patients at the end of the visit, and reported on exit clinical diagnoses, whether they detected any urinary symptoms, whether the symptoms were detected before or after reviewing the questionnaire, and whether they would treat or refer the patient to a specialist. These questions were similar to those used in a study to assess physician awareness of urinary symptoms.[5]

Patients were considered to have OAB if their OAB-V8 score was ≥8.[8] Positive OAB-V8 scores were categorized into three levels of severity, ie, 8–10, 11–13, and ≥14. The presence of specific LUTS was then analyzed. The criteria for LUTS and OAB subtypes are shown in Table 1. Patients who did not complete the OAB-V8 and stress urinary incontinence questions were excluded from the study. Patients were categorized into age groups of <25, 25–34, 35–44, 45–54, 55–64, 65–74, and ≥75 years. Women were considered to be premenopausal if they were younger than 55 years of age and postmenopausal if older than 55 years.

Table 1 Criteria for lower urinary tract symptoms and overactive bladder subtypes

	Identification criteria
LUTS	
Urgency	Answer ≥1 to any one of the three OAB-V8 questions on urge to urinate
Frequency	Answer ≥1 to any one of the two OAB-V8 questions on frequent urination
Nocturia	Answer ≥1 to the OAB-V8 question on nocturia
UUI	Answer ≥1 to one of the two OAB-V8 questions on urine leakage associated with urge
SUI	Answer ≥1 to one of the two questions on urine leakage associated with physical activities, sneezing, coughing, or laughing
MUI	Meet the criteria for both UUI and SUI described above
Incomplete emptying	Answer ≥1 to the question on incomplete emptying
OAB subtypes (based on presence of above symptoms)	
OAB-F	OAB-V8 score ≥8 with symptoms of frequency and/or nocturia only
OAB-U	OAB-V8 score ≥8 with symptoms of urgency without incontinence
OAB-UUI	OAB-V8 score ≥8 with symptoms of UUI and no SUI
OAB-SUI	OAB-V8 score ≥8 with symptoms of SUI and no UUI
OAB-MUI	OAB-V8 score ≥8 with symptoms of MUI

Abbreviations: OAB, overactive bladder; LUTS, lower urinary tract symptoms; UUI, urge urinary incontinence; MUI, mixed urinary incontinence; SUI, stress urinary incontinence; OAB-V8, overactive bladder validated 8-question screener; F, frequency alone; U, urgency without incontinence.

Statistical analysis

The Chi-square test was used to determine statistically significant differences between the premenopausal and postmenopausal groups. To determine the relationship between OAB prevalence and other factors (race, body mass index, parity, history of smoking, and history of hysterectomy), covariates were first evaluated using the Chi-square test. Statistically significant ($P < 0.05$) covariates then underwent risk ratio (RR) analysis. Patients were excluded if they did not report on the variable to be analyzed. Results are presented as RR and 95% confidence interval (CI). All statistical analyses were performed using SPSS software (v.14.0 for Windows; SPSS Inc, Chicago, IL).

Results

Nineteen patients were excluded from the study due to incomplete answers on the OAB-V8 and stress urinary incontinence questionnaires, yielding a final group of 386 women in the current analysis. Table 2 reports the

Table 2 Characteristics of participants

Characteristic, n (%)	Premenopause (n = 192)		Postmenopause (n = 194)		Total (n = 386)	
Age, years						
<25	23	(12.0)	–	–	23	(6.0)
25–34	50	(26.0)	–	–	50	(13.0)
35–44	46	(24.0)	–	–	46	(11.9)
45–54	73	(38.0)	–	–	73	(18.9)
55–64	–	–	72	(37.1)	72	(18.7)
65–74	–	–	79	(40.7)	79	(20.5)
≥75	–	–	43	(22.2)	43	(11.1)
Race						
Black	157	(81.8)	145	(74.7)	302	(78.2)
Hispanic	18	(9.4)	20	(10.3)	38	(9.8)
White	3	(1.6)	3	(1.5)	6	(1.6)
Other/not stated	14	(7.3)	26	(13.4)	40	(10.4)
Education						
Less than high school	4	(2.1)	17	(8.8)	21	(5.4)
High school graduate	58	(30.2)	73	(37.6)	131	(33.9)
Some college/college graduate	66	(34.4)	18	(9.3)	84	(21.8)
Graduate school	18	(9.4)	9	(4.6)	27	(7.0)
Not stated	46	(24.0)	77	(39.7)	123	(31.9)
Body mass index, kg/m^2						
<25.0	36	(18.8)	31	(16.0)	67	(17.4)
25.0–29.9	45	(23.4)	62	(32.0)	107	(27.7)
≥30	79	(41.1)	74	(38.1)	153	(39.6)
Not stated	32	(16.7)	27	(13.9)	59	(15.3)
History of smoking						
Yes	57	(29.7)	53	(27.3)	110	(28.5)
No	135	(70.3)	141	(72.7)	276	(71.5)
Parity						
<2	63	(32.8)	29	(14.9)	92	(23.8)
2–4	87	(45.3)	86	(44.3)	173	(44.8)
≥5	35	(18.2)	66	(34.0)	101	(26.2)
Previous surgical history						
Bladder surgery	4	(2.1)	10	(5.2)	14	(3.6)
Urinary leakage surgery	1	(0.5)	2	(1.0)	3	(0.8)
Hysterectomy	13	(6.8)	63	(32.5)	76	(19.7)
OAB status						
Normal	103	(53.6)	113	(58.2)	216	(56.0)
OAB with UI	75	(39.1)	65	(33.5)	140	(36.3)
OAB without UI	14	(7.3)	16	(8.2)	30	(7.8)

Abbreviations: OAB, overactive bladder; UI, urinary incontinence; BMI, body mass index.

characteristics of the women studied, including age, ethnicity, education, body mass index, parity, smoking, prior surgical history, and OAB status. Patients ranged from 16 to 97 years, the majority were African American (78.2%), and 49.7% of all the women were premenopausal and 50.3% were postmenopausal.

Age-specific distribution of OAB and OAB subtypes are shown in Figures 1 and 2. Evidence of general OAB did not vary much with age (Figure 1). However the prevalence of OAB with urgency subtype (OAB-U) was greatest (16%) in the 45–54-year age group (Figure 2), whereas OAB subtypes including those with urge urinary incontinence

and mixed urinary incontinence were ≤5% among all age groups. As shown in Table 2, OAB was present in 46.4% of premenopausal women (± urinary incontinence) and 41.7% of postmenopausal women.

Of the women surveyed, 216 women did not meet a diagnosis of OAB, of whom 103 were premenopausal and 113 postmenopausal. Among the premenopausal women without OAB, LUTS reported were frequency (57.3%), nocturia (48.5%), and urgency (22.3%), whereas for postmenopausal women, urinary frequency was reported in 63.7%, nocturia in 58.4%, and urgency was present in 23.0% (Table 3). Urge urinary incontinence was present in 38.5% of
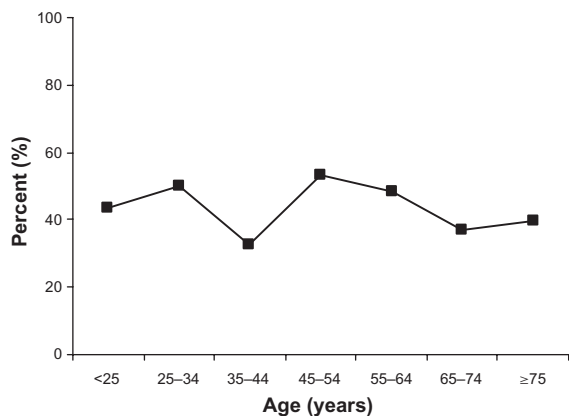
Figure 1 Distribution of overactive bladder by age.

Table 3 Distribution of lower urinary tract in women without overactive bladder by menopausal status

n (%)	Premenopause (n = 103)	Postmenopause (n = 113)
Symptoms		
Frequency	59 (57.3)	72 (63.7)
Nocturia	50 (48.5)	66 (58.4)
Urgency	23 (22.3)	26 (23.0)

postmenopausal women and stress urinary incontinence was present in 22.1% (data not shown, $P > 0.05$).

OAB was significantly associated with overweight (body mass index 25.0–29.9) in women ($P = 0.042$) and obesity (body mass index ≥ 30, $P < 0.001$, Table 4). However, when menopause status was controlled, this association was only found in obese premenopausal women ($P < 0.001$), who had a greater than two-fold increased risk for OAB (RR = 2.43, 1.34–4.40). Overall, obese women were twice as likely to have OAB (RR = 1.99, 1.31–3.04) than women of normal weight ($P < 0.001$).

Interestingly, OAB was significantly associated with incomplete bladder emptying ($P < 0.001$) and with stress urinary incontinence ($P < 0.001$) in both pre- and postmenopausal women; OAB was not shown to vary with race, cigarette use, history of hysterectomy, or parity in women (data not shown).

Discussion

In this study, we found an OAB distribution among women in a primary care setting that is more than double that reported
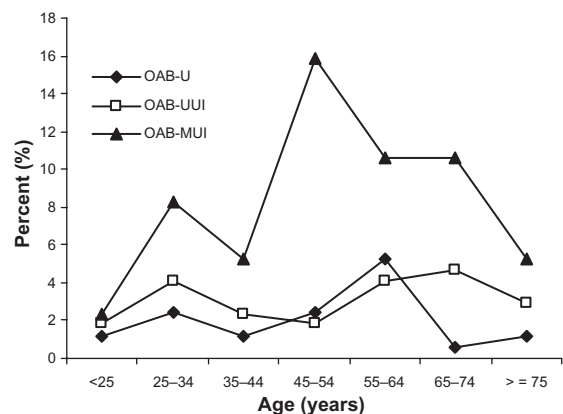
in a recent US population-based study.[2] Unlike the previous population-based studies,[2,7] in which responses regarding LUTS were elicited from noninstitutionalized individuals through telephone interviews, our questionnaire relies on self-report by primary care outpatients and review by primary care physicians at the conclusion of the visit. Thus, our data collection method resembles an office-based primary care physician study,[5] which had an OAB prevalence estimate that was highest (26.5%) and more closely resembles our results. In the studies cited above, OAB was defined based on the presence and/or frequency of specific LUTS, while in our study, OAB criteria are based on scoring on a symptom bother scale. Furthermore, the populations in the previously cited studies were predominantly white, while our patient population was mostly African American. These differences may contribute to the discrepancy in OAB prevalence found in our study compared with the prevalence previously reported.

We find that OAB with incontinence is more common than OAB without incontinence in both pre- and postmenopausal women. Most studies on female urinary incontinence have reported stress urinary incontinence as being more common than urge urinary incontinence,[5] especially in younger women,[9,10] while mixed urinary incontinence was the major

Figure 2 Distribution of overactive bladder subtypes by age.

Table 4 Relative risk for overactive bladder by body mass index category

Comparison group*	Risk ratio**		
	Relative risk	95% CI	P
All women			
BMI 25.0–29.9	1.57	0.96–2.46	0.042
BMI $\geq$ 30.0	1.99	1.31–3.04	<0.001
Premenopausal women			
BMI 25.0–29.9	–	–	0.221
BMI $\geq$ 30.0	2.43	1.34–4.40	<0.001
Postmenopausal women			
BMI 25.0–29.9	–	–	0.134
BMI $\geq$ 30.0	–	–	0.108

Notes: *Women in the corresponding age group with BMI < 25 served as the reference group; **Risk ratio was calculated only when $P < 0.05$; risk ratio = prevalence of overactive bladder in women with comparison BMI/prevalence of overactive bladder in women with reference BMI of <25.
Abbreviations: BMI, body mass index; CI, confidence interval.

presentation overall.[5,9,10] We find that most women with OAB have OAB-mixed urinary incontinence, whereas urge urinary incontinence and OAB-urge urinary incontinence are more prevalent than stress urinary incontinence and OAB-stress urinary incontinence in women with OAB. These findings are supported by others[11,12] who have reported black women to have lower rates of stress urinary incontinence but higher rates of urge urinary incontinence than white women. The significant association between OAB and stress urinary incontinence we found is also supported.[10]

We find a significant association between OAB and incomplete emptying of the bladder in both pre- and post-menopausal women which could be related to a variety of factors.[13–16] Although bladder outlet obstruction leading to incomplete emptying is commonly seen in benign prostatic hyperplasia in older men,[15] the relationship between OAB and incomplete emptying in women may involve mechanisms other than obstruction.[13]

Obesity as a risk factor for OAB[2,10] and urinary incontinence[9,14,17] have been previously reported. The risk for OAB we found for all obese women (1.99) is similar to that reported by Stewart et al[2] (2.2) in obese women with OAB-urge urinary incontinence. However, contrary to earlier reports,[2,5,7] we do not find OAB prevalence to increase with advancing age in women. We also do not find any significant association between OAB and smoking, although some studies have demonstrated that smoking may be a risk factor for urinary incontinence.[14,17] Additionally, we do not find any significant association between OAB and hysterectomy in pre- or postmenopausal women. However, some previous studies have demonstrated that hysterectomy increased the risk for urge urinary incontinence[18] but not stress urinary incontinence.[18,19] Hysterectomy is thought to contribute to urinary incontinence through pelvic nerves or pelvic floor damage.

When interpreting the results of this study, several limitations should be considered. Language barriers, patient trust concerns, and cultural differences pose challenges in implementing a questionnaire-based study. Furthermore, women may report precipitancy (an impending feeling of incontinence) with stress urinary incontinence, which might be interpreted as urgency and this would be exacerbated in obese women, for simple biomechanical reasons. Nonetheless, measures were taken to ensure that questionnaires were distributed to all eligible patients who visited the clinic in an effort to minimize overestimation of response. However, a self-selection bias may be present, given that patients with LUTS may be more inclined to complete the questionnaire

than those without any symptoms. Because the majority of our participants were African American, it is difficult to draw any conclusions about racial differences in the prevalence of OAB.

Conclusion

OAB was evident in 44% of all female patients in our study, which is a number much higher than previously reported estimates. Increasing the awareness of OAB among primary care physicians, and adopting clinical tools, such as a reliable and valid screening questionnaire, may aid in increasing the detection and treatment of OAB.

Disclosure

The authors report no conflicts of interest in this work.

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