

The Correlation between Severity of Overactive Bladder Symptoms with Female Sexual Dysfunction and Sexual Satisfaction of Partners

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Highlights

- The higher the OAB severity, the greater the risk of female sexual dysfunction.
- The sexual satisfaction of partners was markedly declined with aggravating OAB.
- Severity of OAB, exercise frequency, and pelvic floor surgery were the risk factors for the female sexual dysfunction and sexual satisfaction of partner.
- Based on the Overactive Bladder Symptom Score questionnaire, urinary urgency, exercise frequency, and pelvic floor surgery showed the most significant correlation with female sexual dysfunction and sexual satisfaction of partner.

Keywords

Overactive bladder syndrome · Female sexual dysfunction · Sexual satisfaction of partners · Urgency · Urge incontinence

Abstract

Purpose: Sexual dysfunction in women with overactive bladder (OAB) syndrome has been an important topic, while the sexual satisfaction of partners has not been fully investigated. Our aim was to explore the association between the severity of OAB with female sexual dysfunction and sexual satisfaction of partners. **Methods:** A total of 323 patients with OAB recruited in our hospital were included in our study from September 2017 to March 2019. Data were collected by Overactive Bladder Symptom Score (OABSS) questionnaire,

self-designed questionnaire for basic characteristics; Female Sexual Function Index (FSFI); and sexual satisfaction survey for sex partners of patients. χ^2 test or 1-way ANOVA was used to compare the variables among groups. Logistic regression analysis was performed to analyze the severity of OAB with female sexual dysfunction and sexual satisfaction of partners. The correlations between different OABSS domains with female sexual dysfunction and sexual satisfaction of partners were assessed. **Results:** All the patients were classified into mild ($n = 107$), moderate ($n = 98$), severe ($n = 118$) OAB group based on OABSS. Most of the basic information were similar among groups, except for BMI, highest education, occupation, fertility, and history of pelvic floor surgery.

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After multiple factors correction, the severity of OAB, exercise frequency, and the history of pelvic floor surgery were statistically associated with the female sexual dysfunction and sexual satisfaction of partners. Urgency score was significantly correlated with female sexual dysfunction, and the urge incontinence was most significantly associated with the sexual satisfaction of partners. **Conclusion:** Severe OAB was closely associated with female sexual dysfunction and sexual satisfaction of partners. The urgency and urge incontinence should be focused for OAB management.

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Introduction

Overactive bladder (OAB) syndrome is a common condition, in which the feeling of need to urinate is frequent. The increased need to urinate may occur in daytime and nighttime, or both [1]. OAB may result in urge incontinence, when there is a loss of bladder control of patients. This disease is characterized by urgency, urinary frequency, and urge incontinence. Overactive Bladder Symptom Score (OABSS) has been developed to collectively evaluate the symptoms of OAB [2]. Although caffeine and constipation are found to be some of the risk factors, the cause of OAB still remains unknown [3]. OAB often affects more women than men worldwide [4], and its prevalence increases with age [5, 6]. The prevalence of OAB increased in young and middle-aged women [7, 8]. Although OAB is not life-threatening, it significantly affects the quality of life of patients.

Many aspects of quality of life have been reported to be affected by OAB. The OAB symptoms of urgency and urge incontinence negatively affect the health-related quality of life in working, sleeping, traveling, and exercising [9, 10]. The study suggested that there was negative relationship between OAB and sexual dysfunction in women [11]. Kim et al. [12] also reported that OAB was negatively associated with sexual function in Korean young and middle-aged women. A recent study indicated that sexual dysfunction was an issue in middle-aged Iranian women with OAB, and night sweats, varicose disease, and high systolic blood pressure may be the predictors [13]. Female sexual dysfunction is a highly prevalent disorder worldwide, which results in significant personal distress and impacts quality of life [14]. The urinary incontinence, lower urinary tract symptoms, and urgency are closely associated with sexual dysfunction in women [15, 16]. Moreover, a significant difference was found between the Iranian women with OAB with respect to the sub-domain scores related to sex part-

ner [13]. However, the association between the severity of OAB with sexual dysfunction and sexual satisfaction of partners has not been clarified in Chinese women.

Therefore, in this study, 323 patients with OAB were included. We aimed to explore the possible association between severity of OAB with sexual dysfunction in women and the sexual satisfaction of their partners. We anticipate that our findings can be helpful in improving the quality of life and treating patients with OAB.

Methods

Subjects

From September 2017 to March 2019, 323 patients with OAB admitted to our hospital were recruited into our study. OAB was diagnosed based on the 2017 updated Canadian Urological Association guidelines for diagnosis and management for OAB [17]. The OAB symptoms were assessed by OABSS questionnaire. OAB was determined by urinary urgency score >2 and total OABSS >3. The female patients aged 30–45 years were included in our study, and all the included patients were willing to complete the questionnaire. OAB patients complicated with other diseases such as urinary tract infections and neurological conditions were excluded. Other exclusion criteria included urinary urgency score ≤2 and failure to questionnaire.

The basic information of the included patients were evaluated by the self-designed questionnaire taking. Patients were asked to fill the Female Sexual Function Index (FSFI) to assess the female sexual function of OAB patients. The sexual satisfaction of sex partners of patients was evaluated by the questionnaire based on Visual Analogue Scale (VAS). This study was approved by the Ethics Committee of The Fifth People's Hospital of Shanghai affiliated to Fudan University and informed consent had been obtained from each patient before study.

Self-Designed Questionnaire for Basic Characteristics

The demographic characteristics of patients were collected based on the self-designed questionnaire. There are 16 items in the questionnaire, including age, BMI, highest education, native place, marital status, occupation, income, medical payment method, smoking, alcohol drinking, exercise, age of first sexual intercourse, fertility, abortion, history of pelvic floor surgery, and number of sex partners within half a year.

OABSS Questionnaire

OABSS has been developed to evaluate the severity of all the symptoms of OAB patients in a single result. There are 4 aspects scored in OABSS, including day- and nighttime urination frequency, urinary urgency, and urge incontinence. There are 2 points for daytime frequency, 0 for frequency ≤7, 1 for frequency 8–14, and 2 for frequency ≥15. There are 3 points for nighttime urination frequency, such as 3 score for frequency ≥3. The urinary urgency subscale contains 6 items scored 0 (frequency = 0 weekly) to 5 points (frequency ≥5 daily), which is similar for urge incontinence subscale. Total score ranging from 0 to 15 were obtained by summing each score. Patients with OABSS score ≤5, 6 ≤OABSS score ≤11, and OABSS score ≥12 were considered as having mild, moderate, and severe OAB, respectively.

Table 1. Basic characteristics of included patients

Factor	Mild (n = 107)	Moderate (n = 98)	Severe (n = 118)	F/ χ^2	p value
Age, years	37.16±4.62	38.04±5.29	36.99±4.95	1.341	0.263
BMI, kg/m ²	22.18±4.23	23.72±4.76	23.92±4.06	5.269	0.006
Highest education, n (%)					
High school diploma and below	37 (34.6)	42 (42.9)	29 (24.6)	8.133	0.017
Mechanical degree and above	70 (65.4)	56 (57.1)	89 (75.4)		
Native place, n (%)					
Town	7 (6.5)	7 (7.1)	13 (11.0)	1.739	0.419
City	100 (93.5)	91 (92.9)	105 (89.0)		
Marital status, n (%)					
Not married	13 (12.1)	18 (18.4)	12 (10.2)	3.305	0.192
Married	94 (87.9)	80 (81.6)	106 (89.8)		
Occupation, n (%)					
Mental worker	40 (37.4)	26 (26.5)	59 (50.0)	12.547	0.002
Manual labor	67 (62.6)	72 (73.5)	59 (50.0)		
Income, n (%)					
≤6,000 yuan	57 (53.3)	44 (44.9)	68 (57.6)	3.535	0.171
>6,000 yuan	50 (46.7)	54 (55.1)	50 (42.4)		
Medical payment, n (%)					
Health care	101 (94.4)	93 (94.9)	110 (93.2)	0.294	0.863
Self-payment	6 (5.6)	5 (5.1)	8 (6.8)		
BMI group, n (%)					
Normal	77 (72.0)	57 (58.2)	57 (48.3)	13.051	0.001
Disorder	30 (28.0)	41 (41.8)	61 (51.7)		
Smoking, n (%)					
No	105 (99.1)	98 (100.0)	116 (98.3)	2.434	0.296
Yes	1 (0.9)	0 (0.0)	2 (1.7)		
Alcohol drinking, n (%)					
No	103 (96.3)	94 (95.9)	117 (99.2)	3.097	0.213
Yes	4 (3.7)	4 (4.1)	1 (0.8)		
Exercise frequency, n (%)					
<1 time/week	42 (39.3)	51 (52.0)	72 (61.0)	10.689	0.005
≥1 time/week	65 (60.7)	47 (48.0)	46 (39.0)		
Age for first sexual life, n (%)					
≤16 years	4 (3.7)	2 (2.0)	3 (2.5)	5.605	0.231
17–22 years	49 (45.8)	44 (44.9)	39 (33.1)		
>22 years	54 (50.5)	52 (53.1)	76 (64.4)		
Reproductive number, n (%)					
0	20 (18.7)	11 (11.2)	6 (5.1)	12.175	0.016
1	42 (39.3)	37 (37.8)	43 (36.4)		
2	45 (42.1)	50 (51.0)	69 (58.5)		
Abortion, n (%)					
0	36 (33.6)	31 (31.6)	31 (26.3)	7.080	0.132
1	47 (43.9)	31 (31.6)	51 (43.2)		
≥2	24 (22.4)	36 (36.7)	36 (30.5)		
History of pelvic floor surgery, n (%)					
Yes	46 (43.0)	53 (54.1)	73 (61.9)	8.069	0.018
No	64 (57.0)	45 (45.9)	45 (38.1)		
Number of sex partners					
1	101 (94.4)	91 (92.9)	112 (92.4)	0.385	0.825
≥2	6 (5.6)	7 (7.1)	9 (7.6)		

p < 0.05 was considered to be significant.

Table 2. Risk factors for female sexual dysfunction and sexual satisfaction of partners

Factor	Female sexual dysfunction		Sexual satisfaction of partners	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
OAB (mild OAB as reference)	2.240 (1.622, 3.094)	<0.001	-0.612 (-0.727, -0.496)	<0.001
Highest education (mechanical degree and above vs. high school diploma and below)	0.840 (0.483, 1.460)	0.537	-0.063 (-0.259, 0.133)	0.529
Occupation (manual labor vs. mental worker)	1.023 (0.602, 1.737)	0.933	0.116 (-0.073, 0.306)	0.228
BMI (overweight vs. normal)	1.237 (0.733, 2.087)	0.426	-0.009 (-0.196, 0.178)	0.927
Exercise frequency (≥ 1 vs. < 1 per week)	0.369 (0.221, 0.615)	<0.001	0.313 (0.127, 0.499)	0.001
Reproductive number (≥ 1 vs. 0)	0.954 (0.660, 1.380)	0.804	-0.075 (-0.509, 0.058)	0.268
Pelvic floor surgery (no vs. yes)	0.534 (0.321, 0.886)	0.015	0.219 (0.034, 0.403)	0.021

p < 0.05 was considered to be significant. OAB, overactive bladder.

FSFI Score

FSFI is a self-report measure for female sexual function evaluation [18]. There are 19 items covered 6 domains of sexual function, such as desire (2 items), arousal (4 items), lubrication (4 items), orgasm (3 items), satisfaction (3 items), and pain (3 items). The score for each domain was assessed based on factor analysis. The range of total score is 2–36. Subjects with total score ≤ 26.55 were considered to be with female sexual dysfunction.

Sexual Satisfaction Assessment for Sex Partner of Patients

VAS is developed to measure a characteristic or an attitude that cannot be directly detected [1]. Currently, VAS has been widely applied in pain measurement. In this study, we designed a questionnaire based on VAS to measure the sexual satisfaction of sex partner of OAB patients. The subjects were asked to mark the sexual satisfaction of patients ranging from 1 (no satisfaction) to 10 (great satisfaction). After questionnaire, the scores were collected for further analysis.

Statistical Analysis

The statistical analysis was performed by SPSS 19.0 software (IBM, Armonk, NY, USA). The continuous variables were expressed as mean \pm standard deviation (SD), and the comparison was performed by 1-way ANOVA. The categorical variables were displayed as *n* (%). The differences between categorical variables were analyzed by χ^2 test. Logistic regression analysis and linear regression analysis were performed to analyze the association between OAB severity and female sex function disorder (sexual satisfaction for sex partner). *p* < 0.05 was considered as significant.

Results

Basic Information among OAB Patients

A total of 323 OAB patients with a mean age of 37 ± 4.96 years were included. Based on OABSS score, 323 patients were classified into mild (*n* = 107), moderate (*n* =

98), and severe (*n* = 118) OAB group. There were no significant differences in the basic information of patients among groups, such as age, marital status, income, and medical payment (*p* > 0.05). However, the characteristics of BMI, highest education, occupation, exercise frequency, fertility, and history of pelvic floor surgery were significantly different among the patients with mild, moderate, and severe OAB (all, *p* < 0.05). The comparisons of the basic information of OAB patients are listed in Table 1.

Association between OAB Severity and Female Sexual Function Disorder

According to the cutoff value of FSFI score [19], the included OAB patients were assigned to 2 groups, including female sexual dysfunction group (≤ 26.55 ; *n* = 199) and normal sexual function group (> 26.55 ; *n* = 124). The number of patients with female sexual dysfunction was obviously different among mild (*n* = 41, 38.3%), moderate (*n* = 65, 66.3%), and severe OAB (*n* = 93, 78.8%) patients (*p* < 0.001). Logistic regression analysis showed that the higher the OAB severity, the greater the risk of sexual dysfunction (OR [95% CI] = 2.478 [1.841, 3.335], *p* < 0.001).

Association between OAB Severity and Sexual Satisfaction of Partners

The score of sexual satisfaction of partners of patients with mild (3.33 ± 0.70), moderate (2.68 ± 0.89), and severe (1.95 ± 0.78) OAB was significantly different (*p* < 0.001). Linear regression analysis showed that the mean score of sexual satisfaction of partners was markedly declined with aggravating OAB (β [95% CI] = -0.690 [-0.799, -0.580], *p* < 0.001).

Table 3. Association between OABSS with female sexual dysfunction and sexual satisfaction of partners

Factor	Female sexual dysfunction		Sexual satisfaction of partners	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
Daytime urination	1.380 (0.908, 2.097)	0.132	-0.101 (-0.242, 0.040)	0.159
Nighttime urination	1.377 (0.918, 2.065)	0.122	-0.059 (-0.195, 0.078)	0.399
Urinary urgency	1.594 (1.002, 2.534)	0.049	-0.144 (-0.287, -0.001)	0.049
Urge incontinence	0.924 (0.670, 1.274)	0.630	-0.271 (-0.373, -0.170)	<0.001
Exercise frequency (≥ 1 vs. < 1 per week)	0.373 (0.222, 0.627)	<0.001	0.241 (0.016, 0.365)	0.032
Pelvic floor surgery (no vs. yes)	0.568 (0.340, 0.947)	0.030	0.191 (0.063, 0.419)	0.008

p < 0.05 was considered to be significant. OABSS, Overactive Bladder Symptom Score.

Risk Factors for Female Sexual Dysfunction and Sexual Satisfaction of Partners

Multifactor regression analysis determined that OAB severity (2.240 [1.622, 3.094], $p < 0.001$), exercise frequency (0.369 [0.221, 0.615], $p < 0.001$), and pelvic floor surgery (0.534 [0.321, 0.886], $p = 0.015$) were the risk factors for female sexual dysfunction. Similarly, the severity of OAB, exercise frequency, and pelvic floor surgery were the risk factors for the significantly declined sexual satisfaction of partner (Table 2).

Association between OABSS with Female Sexual Dysfunction and Sexual Satisfaction of Partners

In order to explore the association between OABSS scores with female sexual function dysfunction and sexual satisfaction, multiple factor logistic regression analysis was performed. As shown in Table 3, based on the OABSS questionnaire, urinary urgency, exercise frequency, and pelvic floor surgery showed the most significant correlation with female sexual dysfunction (all, $p < 0.05$). Furthermore, the factors such as urinary urgency, urge incontinence, exercise frequency, and pelvic floor surgery showed significant association with sexual satisfaction of partners (all, $p < 0.05$). Urge incontinence showed the most effect on sexual satisfaction among all the factors (-0.271 [-0.373, -0.170], $p < 0.001$).

Discussion

OAB is a common condition, which is negatively related to the quality of life of patient, such as sexual dysfunction. Female sexual dysfunction is a topic in young and middle-aged women with OAB, which is not easy to talk about. The prevalence of OAB syndrome is relatively high

in women aged over 40 years, varying from 19 to 49% in Asia and European countries [20, 21]. Many studies have focused on the effect of OAB on female sexual function outside of China, while the association between the severity of OAB with sexual dysfunction and sexual satisfaction of partners has not been clarified in Chinese women.

In our study, 323 OAB patients with a mean age of 37 ± 4.96 years were included. All the patients were classified into mild, moderate, and severe OAB group. In a previous study, the prevalence of OAB in Iran was found to be 37.9%, of which 18.5 and 2.9% were present with moderate and severe OAB [13]. But in our study, most patients included were present with severe OAB (36.5%), which was different from the previous study, indicating that the severe OAB syndrome might be focused in Chinese population.

The prevalence of female sexual dysfunction in our study was consistent with that ranging from 26 to 74% reported in women with urinary incontinence symptoms [22]. More importantly, the previous study suggested that severe OAB was closely related to worse sexual function [23]. And it has been reported that up to 87% of women were disturbed by sexual dissatisfaction [24]. In accordance with previous reports, our data in this study showed the female sexual dysfunction were present in 199 cases, which accounted for 61.6% of all patients. Female sexual dysfunction is a very common sexual health problem worldwide. Female sexual dysfunction is found to be associated with a wide range of factors, including medical, biological, psychological, and relationship factors [25, 26]. And the prevalence of female sexual dysfunction in Chinese women with OAB is, however, unknown. Our study for the first time revealed that the severity of OAB increased the risk of the incidence of female sexual dysfunction in Chinese patients.

Among the subdomains of OABSS questionnaire, urinary urgency score was found to be closely related to the female sexual dysfunction. Urgency as a pivotal symptom in OAB showed more significant effect on quality of life [27]. It is reported that urinary urgency showed a negative effect on the sexual life of women [28]. In a study of 306 women, Nilsson et al. [28] suggested that the sexual life was negatively affected by the worry of urgency. In the present study, urinary urgency showed significant association with female sexual dysfunction and sexual satisfaction of partners. However, whether successful management of urgency can improve the sexual function of women with OAB needs to be further studied.

In addition, our data showed that scores of sexual satisfaction of partners were significantly different among mild, moderate, and severe OAB patients. Previous study suggested that the severity of lower urinary tract symptoms such as OAB in males significantly declined the sexual activity and satisfaction [29]. Furthermore, a significant difference was found between the Iranian women with OAB with respect to the subdomain scores related to sex partner [13]. However, rare evidence supported the severity of OAB in women were closely related to sexual satisfaction of partners in Chinese population.

Moreover, in this study, the factors such as urge incontinence, exercise frequency, and pelvic floor surgery showed significant association with sexual satisfaction of partners. Urinary incontinence is a major issue in adult women, impacting women suffering from this condition in social activities and sexual intimacy [30, 31]. The previous research suggested that in women urinary incontinence significantly affected the marital satisfaction scores, compared with those without urinary incontinence [32]. Based on the qualitative evidence, the urinary incontinence showed negative effect on intimate relationship. Besides, a previous study indicated that the exercise program relieved the OAB syndrome of obese young women [33]. A previous random trial showed that exercise improved the sexual function of women with antidepressants treatment [34]. The female sexual dysfunction was found to be related to pelvic floor disorders, such as urinary incontinence and pelvic organ prolapse [35]. Pelvic floor transvaginal electrical stimulation significantly improved the sexual function of women with urinary incontinence [36]. Citak and his colleagues [37] indicated that the pelvic floor muscle exercises had positive effect on improving female sexual function. These correlated findings can support the risk factors for female sexual function and sexual satisfaction of partners.

In conclusion, our study demonstrated the effect of OAB severity on female sexual dysfunction and sexual satisfaction of partners. When analyzing different domains of OABSS, urgency score showed significant effect on female sexual function and the urinary incontinence was closely correlated with the sexual satisfaction of partners. The exercise frequency and pelvic floor surgery were the factors that affect the female function score and sexual satisfaction of partners. The awareness of physical health should be improved for OAB patients and female sex dysfunction should be included in clinical management of OAB.

Statement of Ethics

This study was approved by Ethics Committee of Tongji University School of Medicine and The Fifth People's Hospital of Shanghai, Fudan University.

Conflict of Interest Statement

The authors declare that they have no conflicts of interest.

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Author Contributions

Conception and design of the research: Y.W., D.W., and G.S.; acquisition of data: C.S., W.J., and Y.W.; analysis and interpretation of data: Y.W., Y.W., and X.W.; statistical analysis: Y.W., Y.W., and J.Z.; drafting the manuscript: Y.W.; and revision of the manuscript for important intellectual content: Y.W. All authors read and approved the final manuscript.

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