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Effects of overactive bladder syndrome on female sexual function

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Abstract

This study was to evaluate the impact of the symptoms of overactive bladder (OAB) syndrome on female sexual function. Seventy nine patients with OAB (OAB group) and 79 healthy women (control group) underwent physical examination at our center, and had their sexual function evaluated using the female sexual function index (FSFI). In accordance with the presence or absence of urge incontinence, the OAB group was further divided into the wet and dry groups. The sexual function was evaluated again after 3 months of pharmacotherapy. We investigate the difference of sexual function between OAB and control group. The effect of OAB severity and OAB pharmacotherapy on sexual function was also explored. There were no significant differences between OAB group and control group, including age, body mass index (BMI), education, occupation, fertility, parity, childbirth, and menopause. Compared with the control group, the OAB group had significantly lower FSFI scores. The respective mean ± standard error FSFI scores in the control group and the OAB group were 2.98 ± 1.07 and 2.27 ± 0.96 for desire, 3.48 ± 1.16 and 2.32 ± 1.44 for arousal, 4.60 ± 1.13 and 3.10 ± 1.95 for lubrication, 3.37 ± 0.87 and 2.63 ± 1.04 for orgasm, 3.58 ± 1.02 and 2.41 ± 1.35 for sexual satisfaction, 3.58 ± 1.02 and 2.41 ± 1.35 for sexual pain, and 22.24 ± 5.29 and 15.59 ± 7.47 for the total score ($P < .05$ for all comparisons). The scores for desire, lubrication, orgasm, sexual satisfaction, pain, and total FSFI between the OAB-dry and OAB-wet subgroup were similar while score of arousal in OAB-wet subgroup was significantly increased compared with that of OAB-dry. OABSS score was commonly used in the assessment of OAB severity. The difference of the FSFI scores among mild OAB group, moderate OAB group, and severe OAB group was statistically significant ($P < .05$). Female FSFI sexual function scores were significantly improved after OAB pharmacotherapy ($P < .05$). Women with OAB syndrome have poorer sexual function than healthy women. Patients with more serious OAB experience more disturbing sexual dysfunction. Female sexual function scores were significantly improved after OAB pharmacotherapy.

Abbreviations: FSD = female sexual dysfunction, FSFI = female sexual function index, OAB = overactive bladder, OABSS = overactive bladder symptom score, UDI = urogenital distress inventory.

Keywords: female sexual dysfunction, female sexual function, female sexual function index, overactive bladder symptom score, overactive bladder

1. Introduction

Overactive bladder (OAB) syndrome is characterized by urgency, frequent urination, and nocturia with or without urgency urinary incontinence, with the exclusion of urinary tract infections or other pathological factors.[1] OAB is a common chronic disease in urology, with a global incidence of 14.6% that is increasing each year.[2] Repeated episodes of OAB seriously decrease quality of life, including daily social activities, psychology, physiology, work, and sexual life.

Female sexual dysfunction (FSD) includes a variety of sexual problems with desire, arousal, orgasm, and pain, as described by the American Foundation of Urologic Disease FSD.[3] FSD is a common but often overlooked problem with an incidence of 30% to 63%.[4] The occurrence of FSD is related to multiple factors, including anatomical, physiological, medical, psychological, and social aspects.[5]

Few studies have focused on the correlation between female OAB and FSD. One previous study reported that the incidence of FSD is 22% in healthy women compared with 47% in women with OAB,[6] and another study reported that women with OAB often have a reduced sexual life and decreased sexual satisfaction.[7] However, some researchers have stated that although OAB seriously affects the life quality of women, it does not lead to a corresponding decline in the quality of their sexual life.[8] The impact of OAB on female sexual function has not been reported in China. The present study aimed to explore the relationship between OAB and female sexual function in Chinese women.

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X-DL and NL have contributed equally to this work.

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Brief Summary: Compared with healthy women, women with OAB have more serious sexual dysfunction. Female sexual function scores were significantly improved after OAB pharmacotherapy.

All data generated or analyzed during this study are included in this published article [and its supplementary information files]. The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

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2. Materials and methods

This study was approved by the Institutional Ethics Committee of the First Affiliated Hospital of Fujian Medical University and written informed consent was obtained from all patients.

The inclusion criteria for patients with OAB were: married women aged 20 to 55 years with a fixed sexual partner; patients who met the definition of OAB from the International Association for Urinary Control, which states that urgency may be combined with frequent urination and nocturia with or without urinary incontinence, but does not include symptoms caused by infection or other pathological factors; OAB symptom score (OABSS): the urinary urgency score of at least 2 points, and a total score of at least 3 points; disease duration of >3 months; the ability to complete the questionnaire independently.

The exclusion criteria for patients with OAB were: pregnancy or lactation; urinary tract infection, stress urinary incontinence, or mixed urinary incontinence; gynecological inflammation, tumor, and endocrine diseases; treatment with hormone replacement therapy during the perimenopausal period and a previous history of pelvic surgery; OAB and FSD treatment in the previous 3 months, such as with anticholinergic drugs, behavioral therapy, and local estrogen therapy; depression and other diseases that can cause FSD; spousal sexual dysfunction.

The inclusion criteria for the control group were: married women aged 20 to 55 years with a fixed sexual partner; OAB symptom score (OABSS): the urinary urgency score of <2 points, and a total score of <3 points; ability to complete the questionnaire independently. The exclusion criteria for the control group were: pregnancy or lactation; depression and other diseases that can cause FSD; spousal sexual dysfunction.

The previously reported incidence of FSD in the normal population is 22%, and that in OAB patients is 47%.[6] Considering the effective recovery rate of the questionnaire, the sample size was increased by 10%. A final total of 158 patients were included in the present study, comprising 79 patients in each group.

2.1. Main outcome measures

The OABSS developed by Homma et al[9] is commonly used for symptom assessment and screening of OAB. The scale contains 4 items: the number of times the patient urinates during the day (0–2 points), the number of times the patient urinates at night (0–3 points), urgency (0–5 points), and urge incontinence behavior (0–5 points). The total score is the sum of the 4 items. The OABSS is used to diagnose patients with OAB (total score ≥3 and urinary urgency score ≥2), mild OAB (total score 3–5), moderate OAB (total score 6–11), and severe OAB (total score ≥12). OABSS score was commonly used in the assessment of OAB severity.

The urogenital distress inventory (UDI) assesses the effects of urinary incontinence on the quality of life from the following three aspects[10]: irritation symptoms (frequent urination and urge incontinence); stress symptoms (stress urinary incontinence, a small amount of urine leakage); discomfort symptoms (difficulty in emptying the bladder, vaginal discomfort, or pain). Each item is scored as having no impact on life (0 points), mild impact (1 point), moderate impact (2 points), or a severe impact (3 points), and the final score is calculated as the average score of the scale × 100/3 (range 0–100 points). The final score increases in tandem with the severity of the symptoms of urinary incontinence and the severity of the impact on the quality of life.

The female sexual function index (FSFI) is widely used to evaluate FSD.[11] The scale consists of 19 questions about the sexual function of women in 6 dimensions, including sexual desire, sexual arousal, sexual intercourse lubrication, pain, orgasm, and sexual satisfaction; a total FSFI score of <25 indicates the presence of FSD. Each dimension consists of 2 or 3 questions. The score is multiplied by the relevant influence coefficient to obtain the standard score. The scores of each dimension are added to calculate the total score. The total score increases in tandem with the degree of sexual function. The present study used the Korean female scoring standard, and a FSFI total score of <25 was taken to indicate FSD.[12] At our center, for those diagnosed with OAB definitely, pharmacotherapy with tolterodine was recommended in combination with the patient's wishes. The selection criteria of pharmacotherapy were as follows: definitive diagnosis of OAB; the course of OAB ≥3 months; OABSS score ≥6 (moderate or severe OAB); willing to receive medical treatment. There was a total of 55 OAB patients receiving pharmacotherapy (tolterodine, 2 mg twice daily, orally). The FSFI score was used to evaluate female sexual function again after 3 months of pharmacotherapy.

2.2. Statistical analyses

The data were statistically analyzed using SPSS statistical software (version 21.0, IBM Corp., Armonk, NY). statistical software. The general data were described using mean, standard deviation, frequency, and percentage. When describing the statistical results, count data were expressed as a percentage (%), while measurement data were expressed as mean ± standard deviation. Chi-square test or Fisher test was used to analyze categorical variables. If there were only 2 independent sample groups in the statistical analysis, we select Student *t* test or Mann–Whitney *U* test for numerical variables. Continuous variables normally distributed were compared using Student *t* test while those that were not normally distributed were analyzed by Mann–Whitney *U* test. If there were only 3 independent sample groups in the statistical analysis, we select One Way analysis of variance (ANOVA) for numerical variables.

3. Results

The present study included 79 sexually active female patients who were treated for OAB from December 2017 to December 2018 (OAB group); the OAB group was further divided into the dry group and the wet group in accordance with the presence or absence of urge incontinence. The control group consisted of 79 healthy women without urinary tract symptoms or other disease.

The general information of all study participants is shown in Table 1. There were no significant differences between the 2 groups, including age, BMI, education, occupation, fertility, parity, childbirth, and menopause. The results of each dimension and the total score of the 2 groups are shown in Table 2. The scores of all dimensions of the FSFI scores (including desire, arousal, lubrication, orgasm, sexual satisfaction, pain, and total FSFI score) in the OAB group were significantly lower than those in the control group ($P < .001$).

There was no significant difference in baseline data between the OAB-dry subgroup and OAB-wet subgroup (Table 3). Although the scores of all domains of the FSFI (desire, arousal, lubrication, orgasm, satisfaction, pain, and total score) tended to be higher in the OAB wet group than in the dry group, only the score for

Table 1

Comparison of baseline data between OAB group and control group.

Normal information	OAB group N = 79	Control group N = 79	*P* value
Age	40.56 ± 9.51	39.23 ± 8.30	.351
Body mass index	20.98 ± 2.74	21.61 ± 2.84	.164
Education			.514
Above high school	7.59% (6/79)	12.66% (10/79)	
High school	53.16% (42/79)	46.84% (37/79)	
Below high school	39.24% (31/79)	40.51% (32/79)	
Occupation			1.000
Housewives	30.38% (24/79)	30.38% (24/79)	
Office workers	69.62% (55/79)	69.62% (55/79)	
Fertility			.668
No	15.19% (12/79)	17.72% (14/79)	
Have	84.81% (67/79)	82.28% (65/79)	
Parity			.235
Vaginal	73.13% (49/67)	69.23% (45/65)	
Cesarean section	26.87% (18/67)	30.77% (20/65)	
Childbirth			.335
0	12% (12/79)	17.72% (14/79)	
1	50.63% (40/79)	58.23% (46/79)	
2	31.65% (25/79)	24.05% (19/79)	
3	2.53% (2/79)	0.00% (0/79)	
Menopause			.502
Pre-menopause	63.29% (50/79)	68.35% (54/79)	
Post-menopause	36.71% (29/79)	31.65% (25/79)	
OABSS	7.25 ± 2.15	–	

Count data: percentage (%); Measurement data: mean ± standard deviation.
OAB = overactive bladder, OABSS = OAB symptom score.

arousal significantly differed between the wet group and the dry group ($P = .028$). The scores for desire, lubrication, orgasm, sexual satisfaction, pain, and total FSFI were similar between the OAB-dry and OAB-wet subgroup. (Table 4).

The difference of the scores of desire, arousal, lubrication, orgasm, sexual satisfaction, pain and total FSFI among mild OAB group, moderate OAB group, and severe OAB group was statistically significant (Table 5, $P < .05$).

There was a total of 55 OAB patients receiving pharmacotherapy (tolterodine, 2 mg twice daily, orally). The result showed that female sexual function (including desire, arousal, lubrication, orgasm, sexual satisfaction, pain, and total FSFI score) was significantly improved after pharmacotherapy compared with that before treatment (Table 6, $P < .05$).

Table 2

Comparison of each dimension and total score between OAB group and control group.

Dimensions	OAB (n = 79)	Control (n = 79)	*P* value
Desire	2.27 ± 0.96	2.98 ± 1.07	<.001
Arousal	2.32 ± 1.44	3.48 ± 1.16	<.001
Lubrication	3.10 ± 1.95	4.60 ± 1.13	<.001
Pain	2.83 ± 1.84	4.212 ± 1.20	<.001
Orgasm	2.63 ± 1.04	3.37 ± 0.87	<.001
Satisfaction	2.41 ± 1.35	3.58 ± 1.02	<.001
FSFI	15.59 ± 7.47	22.24 ± 5.29	<.001

Measurement data: mean ± standard deviation; FSFI = female sexual function index; OAB = overactive bladder.

Table 3

Comparison of dry and wet subgroups of OAB.

Variables	Dry N = 43	Wet N = 36	*P* value
Age	39.02 ± 10.05	42.47 ± 8.70	.111
BMI	20.12 ± 2.85	21.17 ± 2.50	.09
Fertility			.241
No	20.93% (9/43)	11.11% (4/36)	
Have	79.06% (34/43)	88.88% (32/36)	
Production methods			.415
Natural childbirth	64.71% (22/34)	78.13% (25/32)	
Cesarean section	35.29% (12/34)	21.87% (7/32)	
Childbirth			.132
0	20.93% (9/43)	11.11% (4/36)	
1	55.81% (24/43)	44.44% (16/36)	
2	23.25% (10/43)	38.88% (14/36)	
3	0.00% (0/43)	5.55% (2/36)	
UDI	22.73 ± 14.43	25.00 ± 11.91	.456

Count data: percentage (%); measurement data: mean ± standard deviation. OAB = overactive bladder, UDI = urogenital distress inventory.

Table 4

Comparison of the dimensions of the 2 subgroups of dry and wet OAB.

Dimension	Dry N = 43	Wet N = 36	*P* value
Desire	2.14 ± 0.90	2.43 ± 1.02	.195
Arousal	2.02 ± 1.49	2.72 ± 1.25	.028
Lubrication	2.90 ± 2.17	3.39 ± 1.57	.252
Pain	2.75 ± 2.01	2.98 ± 1.55	.57
Orgasm	2.55 ± 0.95	2.74 ± 1.15	.43
Satisfaction	2.42 ± 1.38	2.49 ± 1.27	.815
FSFI	14.80 ± 8.03	16.77 ± 6.43	.239

Measurement data: mean ± standard deviation; FSFI = female sexual function index; OAB = overactive bladder.

Table 5

The effect of OAB severity on female sexual function.

Dimension	OAB-mild N = 14	OAB-moderate N = 57	OAB-severe N = 8	*P* value
Desire	3.17 ± 0.95	2.21 ± 0.84	1.20 ± 0.00	<.001
Arousal	3.83 ± 0.50	2.27 ± 1.23	0.03 ± 0.10	<.001
Lubrication	5.18 ± 0.55	2.96 ± 1.76	0.45 ± 0.68	<.001
Pain	4.60 ± 0.51	2.71 ± 1.75	0.60 ± 0.85	<.001
Orgasm	3.47 ± 0.59	2.63 ± 0.94	1.16 ± 0.66	<.001
Satisfaction	3.25 ± 0.69	2.41 ± 1.38	0.97 ± 0.63	<.001
FSFI	23.52 ± 1.43	15.21 ± 6.57	4.42 ± 1.16	<.001

Measurement data: mean ± standard deviation; FSFI = female sexual function index, OAB = overactive bladder.

Table 6

The effect of OAB pharmacotherapy on female sexual function.

Dimension	Pre-treatment N = 55	Post-treatment N = 55	*P* value
Desire	2.07 ± 0.88	3.05 ± 0.96	<.001
Arousal	1.96 ± 1.39	3.14 ± 0.88	<.001
Lubrication	2.56 ± 1.94	3.59 ± 1.30	<.001
Pain	2.34 ± 1.81	3.41 ± 1.35	<.001
Orgasm	2.19 ± 0.91	2.80 ± 0.65	<.001
Satisfaction	2.10 ± 1.34	2.82 ± 1.00	<.001
FSFI	13.25 ± 7.03	18.84 ± 3.98	<.001

Measurement data: mean ± standard deviation; FSFI = female sexual function; OAB = overactive bladder.

4. Discussion

Sexual life is an important part of the quality of life. However, it is very difficult to assess sexual health, especially when this taboo topic is related to urinary incontinence. Patients usually do not talk spontaneously about the adverse effects of OAB or urinary incontinence on their sexual life. The usage of self-administered questionnaires provides a way to collect information about sexual health, while reducing the potential embarrassment and response bias associated with interviews and management questionnaires. The FSFI is a simple, effective, and reliable self-reporting indicator of female sexual function; it is suitable for women of different ages, is widely used, and accurately reflects the status of female sexual function.[11] Therefore, the FSFI was used in the present study to assess the adverse impact of OAB on the sexual function of female patients.

The present study followed a case-control design. Except for the diagnosis of OAB, there were no significant differences in the basic data of the 2 groups. Thus, the only differences between these 2 groups were attributable to OAB. The OAB group had significantly lower FSFI scores than the control group, and OAB had a negative impact on sexual function. These findings are consistent with previous research.[13,14] A previous study found that sexual activity was interrupted by OAB symptoms 4.8 times more frequently compared with the asymptomatic group.[13] The extent to which OAB affects sexual function may be affected by physical, psychological, or socioeconomic factors, in addition to the severity of the disease. Symptoms of OAB may cause paralysis and decreased libido. Fear of urinary leakage and frequent urination also prevents women from engaging in intimate sexual behavior.[15] Urinary incontinence or urgency caused by OAB is unpredictable and unavoidable. Women with urge incontinence often experience urinary incontinence during orgasm, leading to anxiety.[16] Furthermore, incontinence makes some women feel unclean and unattractive, and so they avoid sex.[17] In addition, the loss of urine caused by OAB affects the normal acidic pH of the vagina, disturbing the normal flora and leading to vaginal dryness and vaginal lubrication dysfunction, which ultimately results in pain and difficulty in performing sexual intercourse. Fear of leakage or urgency during sexual intercourse or orgasm, frustration, and low self-esteem lead to the elimination of sexual desire and sexual aversion. Pain, sexual arousal disorder, and orgasm problems cause patients to avoid sex.[18] In a cross-sectional study, the authors revealed that worse sexual function frequently observed in postmenopausal women with severe OAB.[19] In this study, OABSS score was commonly used in the assessment of OAB severity. According to OABSS score, the difference of the scores of desire, arousal, lubrication, orgasm, sexual satisfaction, pain, and total FSFI among mild OAB group, moderate OAB group, and severe OAB group was statistically significant in the whole cohort. Therefore, OAB severity has a significant effect on sexual function, and patients with more serious OAB tend to experience a worse sexual dysfunction. Besides, we also found that female sexual function was significantly improved after pharmacotherapy compared with that before treatment, which was consistent with previous studies.[14]

A survey conducted in the United States showed that the overall prevalence of female OAB is 16.9%, and the incidences of dry and wet OAB are 55% and 45%, respectively.[20] Similarly, in our study, the dry group accounted for 54% of the patients with OAB, while the wet group accounted for 46%. There were no significant differences in baseline data and FSFI scores between the 2 subgroups, except that the wet group reported a greater degree of sexual arousal than the dry group. Most studies suggest that urinary incontinence has a negative impact on a woman's sexual life.[18] However, some studies have reported the opposite finding. One study that evaluated the sexual dysfunction of 80 women with OAB found no difference in the extent of the effects of wet versus dry OAB on FSD.[21] The present study also reached a similar conclusion, in that FSD was more greatly affected by OAB syndrome itself than incontinence. As there were no differences in the scores of the urogenital distress inventory between the 2 OAB subgroups, this suggests that the main problem that affected sexual function was OAB syndrome rather than urinary incontinence. The physiological pathology of OAB syndrome also has a negative impact on the patient's sexual function. Balzarro et al[22] concluded via meta-analysis that OAB-wet would result in sexual dysfunction, and that OAB treatments showed improvement of both the OAB-wet and the sexual function. In this study, we demonstrated that both OAB-wet and OAB dry were risk factors for female sexual dysfunction. Further, we also found that OAB pharmacotherapy significantly contributed to improving the female sexual dysfunction. The results were consistent with previous studies.

There were several limitations in this study. Firstly, the present study found that the mean FSFI score of the healthy women in the control group was 22.3, which was lower than the normal cut-off value of 25 points; this relatively low score may be due to religious factors and culture in China. For example, some of the questions are "How often do you feel sexually or sexually interested?" and "How do you evaluate your sexual needs?", which may be difficult for Chinese women to answer truthfully. In addition, the FSFI questionnaire assesses the subjective feelings of the patient. Although the researchers answered each patient's questions regarding the FSFI, it is still possible that the assigned score was lower than the actual score that described the situation because of the deviation in the understanding of the questionnaire. Furthermore, the FSFI scale used in the present study was designed for use by Caucasians and African Americans. Although the Korean standard reduces the cut-off value for FSD to >25, the average age of the population surveyed using the Korean standard was 28.5 years,[12] which was substantially lower than the average age of the present study participants. The relatively high mean age of 39.23 years in the control group may have resulted in the relatively low mean FSFI score seen in the present study. Finally, this is a small single-center pilot study with relatively short-term follow-up. Therefore, multi-center and prospective trials with large sample size for are required to confirm the external validity of this study.

5. Conclusion

Compared with healthy women, women with OAB have more serious sexual dysfunction, which has a serious impact on the quality of their sex life. Patients with more serious OAB experience more disturbing FSD. Female sexual function was significantly improved after OAB pharmacotherapy. Clinical staff should pay attention to the impact of disease on FSD when evaluating patients with OAB.

Author contributions

Conceptualization: Xiao-Dan Lin, Hong Li.
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