International Urogynecology Journal (2020) 31:1669–1674
https://doi.org/10.1007/s00192-019-04092-8

ORIGINAL ARTICLE

Severity of urinary incontinence is associated with prevalence of sexual dysfunction

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Received: 19 June 2019 / Accepted: 17 August 2019 / Published online: 28 August 2019
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Abstract

Introduction and hypothesis Urinary incontinence (UI) affects overall health-related and sexual quality of life (QoL) in women. There is no consensus on the impact of severity and type of UI on the prevalence of sexual dysfunction (DS). The aim of this study was to evaluate the association between types and severity of UI and DS.

Methods A cross-sectional study of women with UI. Inclusion criteria: women complaining of UI and > 18 years old. Women with a history of previous treatment for UI, recurrent urinary tract infections, renal lithiasis, previous radiation therapy or pelvic organ prolapse above stage 2 in the Pelvic Organ Prolapse Quantification (POP-Q) system were excluded. Clinical and epidemiological data were collected, and the following questionnaires were applied: ICIQ-SF, ICIQ-OAB, King's Health Questionnaire (KHQ) and Female Sexual Function Index (FSFI).

Results Concerning the type of UI, the majority of women had MUI (69.1%) and 56.8% reported having coital UI. The mean score was 20.81 ± 8.45 in the FSFI questionnaire. There was a prevalence of SD in 71.6% of women, with no difference in types of UI ($p = 0.753$) and loss during sexual intercourse ($p = 0.217$). There was a correlation between severity of UI (ICIQ-SF) and arousal ($r = -0.26$; $p = 0.008$), lubrication ($r = -0.25$; $p = 0.009$), orgasm ($r = -0.25$; $p = 0.009$), pain ($r = -0.26$; $p = 0.007$) and total ($r = -0.28$; $p = 0.004$) domain scores.

Conclusions There is a high prevalence of SD in women with urinary incontinence, irrespective of the type of UI and urine leakage during sexual intercourse. However, the greater the severity of UI is, the worse the sexuality questionnaire scores.

Keywords Urinary incontinence · Sexuality · Quality of life · Coital incontinence · Sexual dysfunction

Introduction

According to the definition of the International Continence Society (ICS), urinary incontinence (UI) is defined as involuntary loss of urine [1]. It can be divided into three types based on associated symptoms: stress urinary incontinence (SUI), urge urinary incontinence (UUI) and mixed urinary incontinence (MUI) with symptoms of urgency associated with leakage of urine under stress [1].

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It has been estimated that approximately 50% of women have episodes of urine loss during their lifetime [2]. In women with complaints of UI, the prevalence rates are approximately 50% for SUI, 10–20% for UUI and 30–40% for MUI [3], according to associated symptoms. It is known that percentages may vary depending on different types of definitions, especially UUI, which is still used in different parts of the world [4].

Recent studies have shown that UI interferes significantly in daily and social activities [5]. Increased severity of incontinence is detrimental to social life, especially for younger women. Difficulties in relationships with partners arise, and even productive capacity is affected, generating feelings of humiliation and stigma [5, 6]. It has been estimated that 46% of women with UI have some degree of sexual dysfunction [7].

There is no consensus in the literature about the impact of severity of UI and prevalence of sexual dysfunction (SD). Some studies have shown that SD is worse in cases of more

severe UI [8]. Other studies, however, have failed to demonstrate any relationship between the amount of urine leakage and SD, finding no correlation with subtype of UI [9, 10].

The aim of this study was to evaluate the association between severity of UI and risk of sexual dysfunction in different types of UI and the impact of this condition on quality of life in women.

Materials and methods

This cross-sectional study was conducted in the Gynecology Outpatient Facility at the Women's Integrated Healthcare Center (CAISM/UNICAMP) from August 2018 to January 2019. The State of Campinas (UNICAMP) is one of the important and largest universities in Latin America, and the Division of Gynecology is a national reference for urogynecological treatments. The treatment is sponsored by the Brazilian Public Health System (SUS).

The inclusion criteria were women > 18 years with the complaint of any involuntary loss of urine [1]. Criteria for exclusion were women with a history of previous treatment for UI, recurrent urinary tract infections, renal lithiasis, previous radiation therapy or pelvic organ prolapse stage > 2 in the Pelvic Organ Prolapse Quantification (POP-Q) system. The main aim was to evaluate the relationship between the severity of UI and presence of sexual dysfunction. To assess the severity of UI, validated questionnaires translated into Brazilian Portuguese were used: the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) [11] and the International Consultation on Incontinence Questionnaire Overactive Bladder (ICIQ-OAB) [12]. Sexual dysfunction was defined by the validated questionnaire Female Sexual Function Index (FSFI) scores ≤ 26.55 [13].

Secondary aims were to assess the prevalence of sexual dysfunction in women with UI and specific types of UI, compare the prevalence of sexual dysfunction among different types of UI and evaluate quality of life in women with UI in addition to evaluating factors associated with SD in women with UI. To classify the types of UI (SUI, UUI and MUI), the women's self-report and ICS criteria were used [1]: SUI, complaint of loss of urine on effort or physical activities; UUI, involuntary loss of urine associated with urgency; MUI, involuntary loss of urine associated with urgency and effort or physical activities; coital incontinence, urinary incontinence occurring during or after vaginal intercourse [14]. For assessment of quality of life, the validated King's Health Questionnaire (KHQ) was used [15]. The study was approved by the Ethics Committee of the University of Campinas (UNICAMP) under number CAAE798259174.0000.5404. All women signed the free informed consent term. A sample size of 78 women was calculated, considering a standard deviation of 0.9 [16] for FSFI, a significance level of 0.05 and a standard error of the estimate of 0.20. For statistical analysis, the mean and standard deviation were used for continuous variables, and percentages were used for qualitative variables. We used the chi-square test and Fischer's test to compare clinical and epidemiological characteristics and sexual function. To compare two of the questionnaires, such as the ICIQ-SF, ICIQ-OAB to KHQ and FSFI, as well as compare the remaining clinical characteristics with questionnaires, we used Student's t-test and Mann-Whitney test. Kruskal-Wallis and ANOVA tests were used to compare sexual function domains and subtypes of UI. For a comparison between variables and questionnaire scores, Spearman's correlation test was used. The level of significance was set at 0.05.

Results

Three hundred forty-eight (348) women presented with complaints of urinary incontinence. Of these, 108 women with inclusion criteria and no exclusion criteria were included in the study. The mean patient age was 49 ± 11 years. Most patients had a history of more than three pregnancies (53.7%) and up to two deliveries. Approximately half of the women were postmenopausal and did not report any comorbidities or previous surgeries, and the majority (92.6%) had no prolapse (only 6 women had a state 1 grade prolapse). Concerning the type of incontinence, the majority of women had MUI (69.1%) and reported coital UI (56.5%) (Table 1).

According to UI questionnaires (ICIQ-SF and ICIQ-OAB), women had mean scores of 15.05 ± 4.23 and 7.91 ± 3.33, respectively.

The sexual function questionnaire (FSFI) showed a mean score of 20.71 ± 8. Of 108 women with UI, 73 (71.6%) had sexual dysfunction, without any difference in type of incontinence (SIU, UUI, MUI) ($p = 0.753$) or coital incontinence ($p = 0.217$). We also failed to observe any difference between types of UI and FSFI domains: desire ($p = 0.858$), arousal ($p = 0.485$), lubrication ($p = 0.121$), orgasm ($p = 0.089$), satisfaction ($p = 0.430$), pain ($p = 0.063$) and total ($p = 0.154$) (Table 2). There was no difference between sexual function scores for groups with and without coital incontinence ($p = 0.345$) (Table 2).

Our primary aim was to to evaluate the relationship between the severity of UI and presence of sexual dysfunction. There was a significant association between the severity of UI and presence of sexual dysfunction, but it was not confirmed in UUI women. Women with sexual dysfunction had ICIQ-SF scores that were significantly higher ($p = 0.035$), although there was no difference in severity of overactive bladder. Furthermore, there was an inverse correlation between severity of urinary incontinence (ICIQ-SF) and sexual function domains: arousal ($r = -0.26$, $p = 0.008$), lubrication ($r = -0.25$, $p = 0.009$), orgasm ($r = -0.25$, $p = 0.009$), pain (r =

Table 1 Sociodemographic characteristics of the 108 women included in the study

Variables	*N* (%)
Age (years) X ± SD	49 ± 11
20–29	4 (3.7%)
30–39	18 (16.6%)
40–49	33 (30.6%)
50–59	35 (32.4%)
≥ 60	18 (16.7%)
Pregnancy X ± SD	3 ± 1
0	3 (2.8%)
1–2	48 (44.5%)
3–4	46 (42.6%)
≥ 5	11 (10.1%)
Parity X ± SD	2 ± 1
0	4 (3.7%)
1–2	57 (52.8%)
3–4	41 (37.9%)
≥ 5	6 (5.6%)
Menopause	
Yes	51 (47.2%)
No	57 (52.8%)
Comorbidities	
Hypertension	31 (28,8%)
Diabetes	14 (12,9%)
COPD	3 (2.7%)
None	60 (55.6%)
Previous surgeries	
Without previous surgery	55 (50.9%)
Others	26 (24.2%)
HTA	11 (10.2%)
Kelly-Kennedy and levator myorraphy	9 (8.3%)
Subtotal hysterectomy	5 (4.6%)
Total vaginal hysterectomy	2 (1.8%)
Prolapse (POP-Q)	
Stage 0	101 (93.5%)
Stage 1	6 (5.6%)
Stage 2	1 (0.9%)
Type of urinary incontinence	
SUI	26 (23.6%)
MUI	76 (69.1%)
UUI	6 (5.5%)
Coital UI	
Yes	47 (56.5%)
No	61 (43.5%)

X mean, *SD* standard deviation, *UI* urinary incontinence, *COPD* chronic obstructive pulmonary disease, *HTA* total abdominal hysterectomy, *POPQ* pelvic organ prolapse quantification, *SUI* stress urinary incontinence, *MUI* mixed urinary incontinence, *UUI* urge urinary incontinence

−0.26, $p = 0.007$) and total (r = −0.28, $p = 0.004$). There was no correlation between severity of storage symptoms and sexual function. There was a correlation between severity of UI (ICIQ-SF) and quality of life in the domains of incontinence impact (r = 0.46, $p < 0.001$), daily activity limitations (r = 0.47, $p < 0.0001$), physical limitations (r = 0,47, $p < 0.001$), social limitations (r = 0.48, $p < 0.001$), emotions (r = 0.41, $p < 0.001$), sleep and disposition (r = 0.24, $p = 0.0092$) and severity measures (r = 0.24, $p < 0.001$). Regarding ICIQ-OAB scores and quality of life, all domains were affected: health perception (r = 0.22, $p = 0.0190$), incontinence impact (r = 0.34, $p = 0.0003$), daily activity limitations (r = 0.37, $p < 0.0001$), physical limitations (r = 0.32, $p = 0.0006$), social limitations (r = 0.42, $p < 0.0001$), personal limitations (r = 0.27, $p = 0.0040$), emotions (r = 0.36, $p = 0.0001$), sleep and disposition (r = 0.38, $p < 0.0001$) and severity measures (r = 0.34, $p = 0.0002$) (Table 3).

Sexual dysfunction had a major impact on quality of life in women with UI, primarily in the physical ($p = 0.019$), personal ($p < 0.001$) and emotional ($p = 0.009$) domains (Table 4). Women with coital UI also had worse QoL scores in daily activity limitations ($p = 0.049$), physical limitations ($p = 0.014$), social limitations ($p = 0.021$), personal limitations ($p < 0.001$), emotions ($p = 0.012$), sleep and disposition ($p = 0.012$).

Discussion

This study evaluated the effects of severity of UI and sexual function in women with the complaint of UI, using validated questionnaires. Women with severe UI had low rates of sexual function and significantly high risk for SD. We found a high prevalence of SD according to questionnaire scores in women with urinary incontinence, irrespective of the type of UI, including coital incontinence. UI has an impact on woman's quality of life, and low rate scores of sexual function were associated with low quality of life.

Our results demonstrated a weak association between severity of UI and low rates of sexual function. It is known that SD is multifactorial, influenced by psychological, social and emotional factors, among others. All may coexist, explaining the discordant results in the literature. Nevertheless, our study found an association similar to other studies. A study of 1262 Korean menopausal women concluded that the severity of UI was associated with SD [17], similar to our findings. Another two studies also showed this association [18, 19]. The total mean FSFI score indicated that women in this study had scores consistent with risk for SD and had low scores in all sexual function domains. Another article found similar results showing that a decrease in libido is associated with severity of urinary incontinence, as our data indicated, and higher ICIQ-SF scores are related to sexual dysfunction [8].

Table 2 Mean scores of sexual function domains and type of UI in 108 women included in the study

	Type of urinary incontinence					Coital UI		
FSFI Domains	Total Mean ± SD	SUI *N* = 26 Mean ± SD	MUI *N* = 76 Mean ± SD	UUI *N* = 6 Mean ± SD	*p***	Yes *N* = 47 Mean ± SD	No *N* = 61 Mean ± SD	*p**
Desire	3.01 ± 1.28	3.09 ± 1.27	3.01 ± 1.28	2.70 ± 1.41	0.858	3.00 ± 1.29	3.02 ± 1.28	0.838
Arousal	3.22 ± 1.23	3.38 ± 1.19	3,.18 ± 1.27	3.05 ± 1.03	0.485	3.14 ± 1.07	3.28 ± 1.35	0.133
Lubrication	3.50 ± 1.79	3.70 ± 1.68	3.56 ± 1.79	2.05 ± 1.84	0.121	3.49 ± 1.66	3.52 ± 1.90	0.728
Orgasm	3.54 ± 1.86	4.09 ± 1.84	3.43 ± 1.80	2.40 ± 2.25	0.089	3.43 ± 1.68	3.63 ± 2.01	0.410
Satisfaction	3.84 ± 1.72	4.17 ± 1.46	3.78 ± 1.79	3.20 ± 1.86	0.430	3.65 ± 1.64	3.99 ± 1.78	0.231
Pain	3.62 ± 2.06	4.20 ± 1.91	3.56 ± 2.04	1.87 ± 2.22	0.063	3.52 ± 1.72	3.71 ± 2.31	0.274
Total score	20.71 ± 8.48	22.64 ± 7.57	20.47 ± 8.54	15.27 ± 10.1	0.154	20.23 ± 7.50	21.09 ± 9.23	0.345

N number of women, *SD* standard deviation, *UI* urinary incontinence, *SUI* stress urinary incontinence, *MUI* mixed urinary incontinence, *UUI* urge urinary incontinence, *Coital UI* urinary incontinence during intercourse, *FSFI* Female Sexual Function Index

*Mann-Whitney test, **Kruskal-Wallis test

An association between sexual dysfunction and UI is multifactorial. It may be related to coital incontinence, incontinence at penetration, urgency and lower urinary tract symptoms after sexual intercourse, in addition to symptoms of urinary frequency, urgency and suprapubic pain [14]. Furthermore, the physical and psychological impact of UI is considerable. Women with urinary incontinence may have a decreased libido, lower vaginal lubrication and pain during sexual intercourse [16]. Some women explained that fear of coital urinary incontinence caused diminished desire, resulting in anxiety and a decreased libido [7].

Table 3 Correlation among ICIQ-SF, ICIQ-OAB, FSFI and KHQ scores of 108 women

Questionnaires	Urinary incontinence			
	ICIQ-SF		ICIQ-OAB	
	r**	*p*	r**	*p*
FSFI				
Desire	−0.15626	0.1187	0.00344	0.9728
Arousal	−0.26152	0.008	−0.16391	0.0997
Lubrication	**−0.25662**	0.009	−0.09671	0.3336
Orgasm	−0**.25524**	0.009	−0.11222	0.2615
Satisfaction	−0.17941	0.07	−0.01948	0.8459
Pain	**−0.26553**	0.007	−0.13358	0.1807
Total	**−0.28367**	0.004	−0.10987	0.2716
KHQ				
Health perception	0.04934	0.6121	**0.22534**	0.0190
Incontinence impact	**0.46016**	< 0.0001	**0.34506**	0.0003
Daily activity limitation	**0.47678**	< 0.0001	**0.37352**	< 0.0001
Physical limitation	**0.47678**	< 0.0001	**0.32529**	0.0006
Social limitations	**0.48992**	< 0.0001	**0.42546**	< 0.0001
Personal limitations	**0.40472**	< 0.0001	**0.27639**	0.0040
Emotions	**0.41637**	< 0.0001	**0.36390**	0.0001
Sleep and disposition	**0.24971**	0.0092	**0.38822**	< 0.0001
Severity measures	**0.24971**	< 0.0001	**0.34661**	0.0002

Statistically significant values are shown in bold

ICIQ-SF International Consultation on Incontinence Questionnaire-Short Form, *ICIQ-OAB* International Consultation on Incontinence Questionnaire Overactive Bladder, *FSFI* Female Sexual Function Index, *KHQ* King's Health Questionnaire, *r* coefficient of correlation

**Spearman's correlation test

Table 4 Relationship between questionnaire scores and sexual dysfunction in 108 women

		Sexual dysfunction		
		No Mean ± SD	Yes Mean ± SD	*P*** value
ICIQ	ICIQ-SF	13.59 ± 3.91	15.58 ± 4.33	**0.018***
	ICIQ-OAB	7.55 ± 3.24	8.00 ± 3.39	0.495
KHQ	Health perception	31.90 ± 21.02	37.67 ± 26.72	0.271
	Incontinence impact	74,14 ± 27.13	82.53 ± 23.08	0.131
	Daily activity limitation	58.05 ± 31.06	58.22 ± 33.92	0.964
	Physical limitations	52.87 ± 28.55	68.49 ± 28.94	**0.019***
	Social limitations	29.89 ± 27.60	44.98 ± 38.06	0.097
	Personal limitations	15.33 ± 23.08	40.79 ± 35.58	**< 0.001***
	Emotions	35.25 ± 26.74	54.95 ± 35.23	**0.009***
	Sleep and disposition	38.51 ± 23.61	45.21 ± 28.39	0.294
	Severity measures	57.93 ± 22.40	65.21 ± 20.04	0.120

Statistically significant values are shown in bold

**SD* standard deviation, *ICIQ-SF* International Consultation on Incontinence Questionnaire-Short Form, *ICIQ-OAB* International Consultation on Incontinence Questionnaire Overactive Bladder, *KHQ* King's Health Questionnaire

**Kruskal-Wallis test

The prevalence of SD was slightly higher in this study than in rates reported in the literature. Our results showed a prevalence of 71.57%, while the prevalence rate of sexual dysfunction was up to 56% in a systematic review [10].

Studies diverged according to the definition of UI used. However, a recent study showed that the impact of UI is qualitative rather than quantitative. Just losing urine already has an impact on women's overall health-related and sexual quality of life [20]. In agreement with this finding, we chose to use the definition of urinary incontinence proposed by the ICS, in which patient complaint establishes the diagnosis, without any need of objective tests. In our study, there was no difference in the prevalence of SD in the three types of UI assessed (SUI, UUI and MUI), and there was no association between the severity of storage symptoms and risk scores for sexual dysfunction. A study showed similar results with a prevalence of SD in 52, 56.1 and 54.3% of women with SUI, UUI and MUI [21], respectively. A systematic review linked the type of UI to SD, but the literature is controversial as to which type of UI exerts a greater impact on sexual function [10]. Some studies postulate that the simple occurrence of urine leakage has already had an impact on sexual function, irrespective of the type of leakage (stress or urgency) [10, 22, 23]. A study showed that women with overactive bladder but without urinary incontinence had better SD scores and women with MUI had worse scores. SUI had an impact on sexual function in women, especially due to urine leakage at penetration [16, 21, 24].

There was a high prevalence of coital incontinence in this sample, which is in agreement with data in the literature [25, 26]. Some studies have shown an association between coital incontinence and worse sexual function, although our analysis did not confirm these data [10, 25, 26]. Nevertheless, in 2002, Shaw et al. demonstrated in a systematic review that the literature is conflicting when coital incontinence and sexual function are analyzed, since there is a wide variety of methodologies employed in research as well as different definitions for coital UI [27].

There was a correlation between severity of UI and negative impact on quality of life in all domains except for health perception. Some studies have indicated that UI significantly impaired quality of life, although there was no correlation with the amount of urine loss [20, 23, 28]. Nevertheless, our case study showed that quality of life was more impaired in more severe cases of UI according to ICIQ-SF scores. The more severe the incontinence is, the more difficult the social interaction, especially in younger patients. Their interpersonal relationships and even productive capacity may be affected, generating feelings of humiliation and stigma [5, 6]. In 2014, Abrams et al. showed that patients with any subtype of UI, especially those classified as having moderate or severe UI, had a poorer quality of life [5]. Limitations in women with UI include worrying that people in close proximity may notice the smell of urine. Frequent change of underclothes, restriction of fluid intake and sleep deprivation result in decreased energy levels for activities of daily living [5, 29]. Women with irritative symptoms (OAB) also had a worse quality of life in our study, which is corroborated by diverse studies in the literature [16, 24]. OAB was associated with worse quality of life, and the OAB questionnaire severity was not associated with low rates of sexual function. It corroborated a study that included 127 nurses (51 with OAB and 76 health controls) and found that quality of life and sexual health were affected by OAB. However, after controlling by age, BMI and parity, OAB did not significantly affect sexual health [30].

Sexuality plays a major role in a woman's quality of life. This study showed that there is a correlation between SD and poor quality of life, primarily in the domains of physical and personal limitations and of emotions. In addition, data showed that women with coital UI scored worse in almost all KHQ domains. Some studies have shown that women with UI feel ashamed and inadequate and suffer from emotional distress. These women report feeling unhappy and irritated and also blame themselves for the disturbance. Furthermore, many women rate themselves as unfit for work or lack concentration for activities of daily living [15].

Positive points in this article are the validated questionnaires used to evaluate urinary and sexual symptoms and standardized use of the ICS definition of UI, in which a woman's complaint is considered important. Some authors consider that questionnaires are the most accurate in measuring sexual function [14]. In addition, some urinary questionnaires, such as the King's Health Questionnaire, contain domains relevant to sexual function [14]. The sample of this study was mainly composed of women with MUI. All had been referred to a tertiary care hospital and were anxious to receive surgical treatment. Therefore, it was a specific population, which may be a negative point. Future studies are needed with a larger number of women and a higher proportion of UUI patients in particular.

Conclusion

There is a high prevalence of SD in women with urinary incontinence, irrespective of the type of UI and leakage during sexual intercourse. More severe UI, however, is related to low rate scores on sexuality questionnaires and severe SD. UI has an impact on woman's quality of life, and sexual function scores have a linear relationship with quality of life.

Compliance with ethical standards

Conflicts of interest None.

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