

Original Article

Association between urinary symptoms and severity of urinary incontinence in Brazilian women

Associação entre sintomas urinários e gravidade da incontinência urinária em mulheres brasileiras

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ABSTRACT

Introduction: Urinary Incontinence (UI) is an involuntary loss of urine, being a global health problem. Investigating the association between lower urinary tract symptoms and severity is essential for the treatment. **Objective:** To evaluate associations between lower urinary tract symptoms and the severity of urinary incontinence in Brazilian women. **Methods:** An observational and cross-sectional study, based on the observation of medical records in a retrospective manner. A sample composed of women assisted by the Outpatient Pelvic Physiotherapy Service of the Maternity School Assis Chateaubriand. Incontinence Severity Index (ISI) and the severity measures scale of King's Health Questionnaire (KHQ) were used Mann-Whitney or Kruskal-Wallis test for continuous variables and Fisher's exact test for categorical variables. Data were analyzed and analyzed by Jamovi 1.2.25 software and with an alpha of significance less than 0.05 **Results:** A total of 400 women with a mean age of 55 years (± 12.2) participated in the study. Mixed UI was the most prevalent UI type (44.5%). There was an association between the presence of associated lower urinary tract symptoms (mainly storage bladder symptoms) and the severity of urinary incontinence. Mean scores of KHQ increase with increasing ISI severity ($p < 0.001$). **Conclusion:** It is concluded that there is an association between the presence of associated lower urinary tract symptoms and the increased severity of UI in women.

Keywords: Pelvic floor. Pelvic floor disorders. Physical therapy modalities.

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INTRODUCTION

The International Continence Society (ICS) defines urinary incontinence (UI) as any involuntary loss of urine and it can be classified into three main types: stress urinary incontinence (SUI), which involves complaints of loss of urine associated with coughing and sneezing and strenuous activities such as exercise; urge urinary incontinence (UUI), in which there is loss of urine associated with sudden feelings of urgency; and mixed urinary incontinence (MUI), characterized by the presence of symptoms of both SUI and UUI ¹. Women with this condition may have other lower urinary tract symptoms (LUTS) associated. LUTS are categorized into bladder storage symptoms (nocturia, enuresis, urgency, urge incontinence and increased urinary frequency), of bladder voiding symptoms (hesitancy, intermittency, dysuria, urine retention, straining to urinate, slow urinary flow), and the post-voiding symptoms which are the feeling of incomplete emptying and post-voiding dribbling ^{2,3}.

The occurrence of UI is associated with increasing age, comorbidities, functional disability, hormonal factors, environmental factors, gender and sedentary behavior ^{4,5}, being an important public health problem, since it has a high prevalence in the world population, especially in women. Population studies reveal a prevalence that varies between 5 and 69%, with the highest prevalence ranges found in the elderly population ⁶⁻⁸. A population study carried out in all geographic regions of Brazil found a prevalence of this condition is 52.8% of women, with about 30% complaining of SUI ³. In addition, more than half of women also have other associated LUTS, the most frequent being related to the bladder storage phase ³.

UI worsening quality of life, mental health, quality of sexual life, productivity at work, especially attitudes related to health and social participation ^{2,9-11}. Women tend to have negative beliefs about UI and misinformation about etiological factors, prevention and treatment ¹². Most women believe that UI is a condition without cure or with exclusively surgical management, without prevention, and that age is the determining factor ¹². These beliefs prevent the search for care or urinary complaints at less severe levels if not specifically questioned, ^{7,12}. In a study in which 24% of women had moderate to severe symptoms, 39% considered that spending the rest of their lives with their current urinary condition would be a very negative aspect, and that they were unhappy and/or dissatisfied ¹¹. Women with increased frequency perception and other bladder voiding symptoms were more likely to seek treatment while women with nocturnal enuresis and urinary losses without specific reasons were more likely to discontinue treatment ¹¹.

Studies point out that the assessment of UI severity is essential to identify the impact on quality of life and behavioral changes adopted by this population ^{2,6,7}. However, the relationship between these measures is still not well established in the literature to address the association of UI severity with urinary symptoms directly ¹³. Therefore, the main objective of the present study was to evaluate associations between LUTS and UI severity in Brazilian women referred to physiotherapeutic treatment. As a secondary objective, this study aimed to evaluate associations between two instruments that aim to measure the severity of UI.

METHODS

Study design and setting

This is an observational, cross-sectional study based on retrospective data collection from assessment standardized forms, questionnaires and medical records of women assisted at Pelvic Physiotherapy Outpatient Service of *Maternidade Escola Assis Chateaubriand, Universidade Federal do Ceará*, Fortaleza, Brazil. Clinical data of women treated at the service between January 2017 and August 2021 were considered. The present study was part of an expanded project in partnership of *Projeto de extensão e pesquisa em Fisioterapia na Saúde da Mulher (PROFISM)*, approved by the Research Ethics Committee. This report followed the STROBE Checklist for cross-sectional studies.

Participants

Women who had the main complaint of UI and were 18 years of age or older were included. Women with diagnoses associated with gynecological cancer, neurological disorders, chronic pelvic pain, severe pelvic organ prolapses and other pelvic floor disorders were excluded.

Variables

The dependent variables (outcomes) are the classification of UI severity by the Incontinence Severity Index (ISI) and the severity measures scale of King's Health Questionnaire (KHQ). independent variables are the LUTS, as described below. Socioeconomic and demographic, clinical and reproductive factors are descriptive variables.

Data source/measurements

Data collection was carried out using evaluation forms and questionnaires validated for clinical practice, incorporated and widely used in the routine of the pelvic physiotherapy. In the anamnesis, through an evaluation form, sociodemographic data were collected (age, marital status, education and profession), clinical data (main complaint and associated diseases), gynecological and obstetric history, and lower urinary tract symptoms (urinary loss before urination, enuresis, nocturia, urgency, urge incontinence, loss on exertion, dysuria, feeling of incomplete emptying, hesitation, post-voiding dribbling, intermittent flow and straining to urinate).

The Incontinence Severity Index (ISI) was adopted to classify the severity of UI. ISI is a validated questionnaire, translated and adapted for the Brazilian population, IU severity is based on two questions about the frequency and amount of urinary losses. Its score varies from 1 to 12 and the final score is obtained by multiplying the frequency by the quantity (mild, moderate, severe or very severe). The index has a reliability of 0.93 in Cronbach's α coefficient and 0.96 in the intraclass correlation coefficient, which is considered excellent reliability, in addition to a positive correlation ($r=0.72$, $p<0.01$) between the results obtained in the index and in the pad test, thus consisting of satisfactory reliability, internal consistency and construct validity¹⁴.

The "severity measure" of King's Health Questionnaire (KHQ) was also used. KHQ has a level A of recommendation by the ICS for its use in clinical research. The questionnaire was validated and translated for Brazilian women with UI¹⁵. Scores range from 0 to 100 and the higher the score, the worse the quality of life related to that domain. In this study, only the KHQ "severity measure" was used for evaluation¹⁵. This measure, composed of 5 items, reflects the degree to which UI affects everyday life, such as: the need to use pads, restriction of fluid intake, need to change clothes often, constant concern about urine odor and whether one is embarrassed because of the bladder problem. The severity measures of the KHQ presented a reliability of 0.79 Cronbach's α coefficient and 0.81 in the intraclass correlation, being considered an acceptable reliability and strong correlation¹⁵.

Bias

The retrospective nature of the data collection can introduce bias into our study. To minimize this, we performed a cautious extraction from the database, checking the charts when there was doubt about some variable or missing data. Besides that, the service uses standard evaluation forms and validated questionnaires. The data collection was always under supervision of physical therapists with women's health specialization.

Data analysis

The collected data were stored and analyzed in Jamovi 1.2.25 software. Statistical analysis was performed descriptively using means and standard deviation for continuous variables, and absolute frequencies and percentages for categorical variables. Bivariate analysis was also performed to assess the association between urinary symptoms and UI severity (ISI and KHQ severity measures). For bivariate analyses, Mann-Whitney (non-parametric) tests were performed for continuous variables of up to two groups, Kruskal-Wallis (non-parametric) to assess the difference between 3 or more groups, and Chi-square or Fisher's Exact for the categorical variables. Spearman correlation test was used between ISI and KHQ scores. Post hoc analysis using the Dwass-Steel-Critchlow-Fligner method was also used. Missing data are presented on the tables once there was no imputation technique for missing data. The assumed significance level was 5%.

RESULTS

The initial query to the database presented a sample of 586 women assisted by the Pelvic Physiotherapy service at MEAC, of which 51 were excluded for not presenting any type of UI as the main complaint and one for not meeting the age requirements, the 535 women remaining were screened based on the exclusion criteria resulting in a final sample of 400 participants (Figure 1).

The sample profile consists of multiparous women, 3.2 (± 2.7) deliveries, with a mean age of 55 (± 12.2). Most of this population has schooling up to elementary school (47.7%), perform some type of paid activity (48.7%), and have a partner (56.7%). These women have a high rate of history of gynecological surgeries (71%), 64.5% are postmenopausal, however 91.5% are not using hormone replacement therapy (Table 1).

In the analysis of the clinical profile of these women, it was possible to observe that the most prevalent type of UI was Mixed UI (44.5%) and that the bladder storage symptoms are the most predominant in this condition. Urinary loss before urination, nocturia, urge incontinence and loss on exertion are present in 70-85% of the sample. In addition, more than half of women experience symptoms of incomplete emptying and post-void dribbling. It is also observed that almost half (46.8%) of these

women presented the severity of UI as moderate according to the ISI and had an average of 40.1 points (± 22.9) in the severity measure of the KHQ.

Table 3 shows the association between LUTS and the measure of severity. We found that all symptoms of the bladder storage symptoms, in addition to the symptoms of incomplete emptying, post-voiding dribbling and intermittent flow that refer to the phase of emptying the bladder, showed a statistically significant difference ($p < 0.05$). Women who present these symptoms have a greater severity associated with the condition when compared to women of this profile who do not report them. When associated with the ISI, it is observed that women who report having urinary symptoms more frequently report that the severity of their symptoms is moderate, in a percentage that varies from about 37-50% depending on the type.

Table 4 shows the mean and standard deviation of the KHQ severity measure scores according to the ISI classification. Mean scores increase with increasing ISI severity ($p < 0.001$). In addition, there is a positive correlation between the total ISI score and the KHQ severity measures scores (rho de Spearman= 0,28, $p < 0.001$). The pair-by-pair post-hoc analysis (Table 5) shows a significant result when comparing symptom severity between mild and severe; mild and very severe; moderate and severe; and moderate and very severe.

Figure 1. Flowchart of the participants included in the research sample.

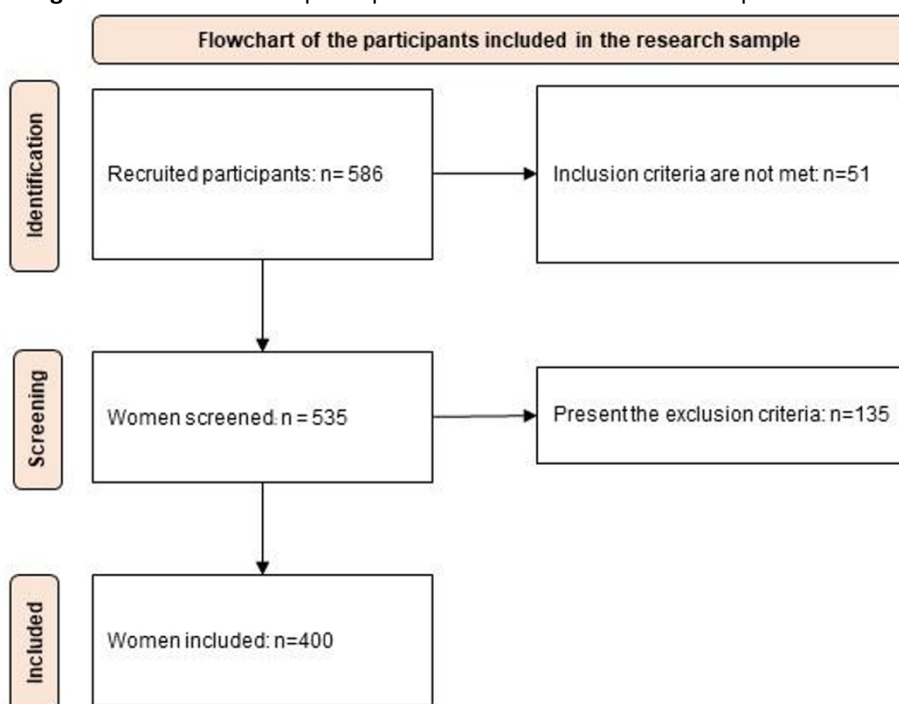


Table 1. Sociodemographic, gynecological and obstetrical profile of women with urinary incontinence (n=400).

Variables	N (%)
<i>Marital status</i>	
With partner	227 (56.7)
Without partner	164 (41)
Did not inform	9 (2.2)
<i>Scholarity</i>	
Unlettered	19 (4.8)
Elementary School	191 (47.7)
High school	135 (33.7)
Graduation	36 (9.0)
Did not inform	19 (4.8)
<i>Remunerated activity</i>	
Yes	195 (48.7)
No	180 (45.0)
Did not inform	25 (6.2)
<i>Diabetes mellitus</i>	
Yes	91 (22.7)
No	305 (76.2)
Did not inform	4 (1.0)
<i>Arterial hypertension</i>	
Yes	153 (38.2)
No	243 (60.7)
Did not inform	4 (1.0)
<i>Abortion</i>	
Yes	174 (43.5)
No	226 (56.5)
<i>Vaginal delivery</i>	
Yes	313 (78.2)
No	87 (21.8)
<i>Cesarean section</i>	
Yes	158 (39.5)
No	242(60.5)
<i>Gynecological surgery</i>	
Yes	284 (71.0)
No	111(27.8)
Did not inform	5 (1.2)
<i>Post menopause</i>	
Yes	258 (64.5)
No	131 (32.8)
Did not inform	11 (2.7)
<i>Hormone Replacement Therapy</i>	
Yes	24 (6.0)
No	366 (91.5)
Did not inform	10 (2.5)

Table 2. Clinical profile of sample participants.

Variable	N (%)
Severity measurement (ISI)	
mild	30 (7.7)
Moderate	182 (46.8)
Severe,	107 (27.5)
Very severe	70 (18.0)
Did not inform	6 (1.5)
Urinary symptoms	
UUI	
Yes	82 (20.5)
No	318 (79.5)
SUI	
Yes	140 (35.0)
No	260 (65.0)
MUI	
Yes	178 (44.5)
No	222 (55.5)
Loss before urination	
Yes	315 (78.7)
No	72 (18.0)
Did not inform	13 (3.2)
Enuresis	
Yes	129 (32.2)
No	270 (67.5)
Did not inform	1 (0.2)
Nocturia	
Yes	316 (79.0)
No	83 (20.7)
Did not inform	1 (0.2)
Urgency	
Yes	319 (79.7)
No	81 (20.2)
Urge-incontinence	
Yes	292 (73.0)
No	108 (27.0)
Stress urinary incontinence	
Yes	343 (85.7)
No	56 (14.0)
Did not inform	1 (0.2)
Dysuria	
Yes	111 (27.7)
No	287 (71.7)
Did not inform	2 (0.5)
Incomplete emptying	
Yes	267 (66.7)
No	131 (32.7)
Did not inform	2 (0.5)
Hesitation	
Yes	91 (22.7)
No	306 (76.5)
Did not inform	3 (0.7)
Post micturition dribbling	
Yes	237 (59.2)

Table 2 (continued)

No	159 (39.7)
Did not inform	4 (1.0)
Intermittent flow	
Yes	123 (30.7)
No	274 (68.5)
Did not inform	3 (0.7)
Straining to urinate	
Yes	82 (20.2)
No	315 (78.7)
Did not inform	3 (0.7)

Legend: ISI: Incontinence Severity Index; UUI: Urgent Urinary Incontinence; SUI: Stress Urinary Incontinence; MUI: Mixed Urinary Incontinence; SD: Standard deviation.

Table 3. Association between lower urinary tract symptoms and UI severity measures (ISI and KHQ severity measures).

Variables	KHQ		ISI (%) ^b			(p) ^c
	(p) ^a	Mild	Moderate	Severe	Very severe	
Loss before urination	<0.001**	5.7	45.1	27.9	20.6	<0.001**
Enuresis	<0.001**	5.4	37.2	27.9	28.7	0.001*
Nocturia	0.040*	6.3	44.9	28.5	18.4	0.043*
Urgency	0.003*	6.0	43.3	29.8	20.1	<0.001**
Urge-incontinence	<0.001**	4.8	42.8	29.8	22.3	<0.001**
Stress urinary Incontinence	<0.001**	7.9	46.1	28.3	17.5	<0.001**
Dysuria	0.625	5.4	44.1	30.6	17.1	0.900
Incomplete emptying	0.030*	4.5	45.3	29.6	18.0	0.038*
Hesitation	0.244	7.7	49.5	24.2	14.3	0.714
Post micturition dribbling	0.003*	5.9	46.0	25.7	20.3	0.443
Intermittent flow	0.044*	6.5	50.4	25.2	13.8	0.561
Straining to urinate	0.382	7.3	50.0	24.4	12.2	0.300

Legend: *p<0.05; **p<0.001; ^aMann-Whitney test; ^b Qui-Quadrado test; ^c Fisher's exact test.

Table 4. Association between severity measures (ISI and KHQ severity measures) using the Kruskal-Wallis test.

Variables	ISI	KHQ Mean ± SD
		<0.001
	Mild	28.4±24.6
	Moderate	35.8±20.6
	Severe	45.2±23.3
	Very severe	51.0± 21.0

Table 5. Post hoc analysis using the Dwass-Steel-Critchlow-Fligner method to compare ISI classifications.

Variable	mild vs Moderate	mild vs. Severe	mild vs. Very severe	Moderate vs. Severe	Moderate vs. Very severe	Severe vs. Very severe
Severity measure	0.119	0.002	<0.001	0.010	<0.001	0.322

DISCUSSION

The main objective of this study was to evaluate the associations between urinary symptoms and UI severity, through two validated and translated instruments widely used and recommended worldwide¹⁴⁻¹⁸. There was an association between lower urinary tract symptoms (LUTS) and UI severity in the study population, as well as between the KHQ severity measure and the ISI questionnaire. The sociodemographic and clinical characteristics of the studied women are similar to those found in other national publications referring to UI. This profile of women, with an average age of 55 years and multiparous, have already been reported as risk factors for the development of UI, worse degrees of UI severity, quality of life, sexual function and functionality¹⁹⁻²⁴.

According to the results obtained in the KHQ severity measure, all bladder storage symptoms, in addition to incomplete emptying, post-void dribbling and intermittent flow are associated with increased UI severity. Similarly, in the ISI, there was an association between the presence of bladder storage symptoms and the feeling of incomplete emptying with the moderate severity index. These findings complement the evidence that points to a strong positive correlation ($r=0.7-0.9$) of urinary symptoms in women, especially bladder storage symptoms, with the King's Health Questionnaire scores, showing good reliability and validity. However, Okamura, Nojiri and Osuga (2009) did not collect UI severity data²⁵, for this reason, the subscale of severity measures was not included. Still, our analysis achieved similar results that confirm these findings²⁶.

The use of pads and the shame associated with UI were associated with a worse quality of life, which negatively influences the well-being of this population²⁷. The relationship between UI severity and urinary symptoms in women has also been previously described in the literature, including the impact on quality of life, active search for treatment, satisfaction with treatment and well-being^{2,3,28,29}.

From this, it is pertinent to investigate what the behavioral changes are acquired in order to minimize the symptoms and losses of UI^{27,30}. This investigation is essential to adopt effective clinical measures through programs that address health education as a treatment component, aiming at providing guidelines for changing habits and controlling comorbidities. It is noteworthy that women with erroneous beliefs about their health condition have inadequate management of these conditions, with negative impacts, dissatisfaction with treatment and reduced active search for health services^{12,31}.

Currently, there is no consensus on which measurement instruments to use in clinical research, which can be a barrier to compare and disseminate results in order to implement in clinical practice^{18,32,33}. However, this range of validated instruments available allows us to evaluate similar skills and in a complementary way, in multiple contexts and populations, considering the particularities and domains of each questionnaire, as well as the severity measure of the KHQ and the ISI, which offer a good perspective of intensity in its gradations^{16,34}. In an attempt to alleviate these difficulties, some authors correlated different instruments/domains and developed ways to compare UI severity scores from different instruments, which allows us to establish associations with greater precision^{16-18,33}.

There was an association evidenced by the mean KHQ severity scores, which tend to increase as the ISI severity levels increase. The findings corroborate the study by Brandt et al. (2021), who analyzed the correlations of the two questionnaires, finding significance ($p<0.01$) between the ISI and the KHQ severity measure and a positive correlation between the increase in the degree of UI severity and the overall KHQ score³⁵.

We emphasize that the issues addressed in both questionnaires, although correlated, are complementary, as they address issues that stem from different objectives. The items on frequency of loss and quantity of urine from the ISI are unable to cover the particularities of the items on use of absorbent pads, water intake and shame associated with UI, addressed by the KHQ subscale that was used.^{16,33}

The present study has limitations related to the use of only the King's Health Questionnaire subscale (related to UI severity), which limits the broader understanding of the impact of UI on quality of life. However, we included validated measures of UI severity, which is in line with the objective of the present study, given the specificity of the research focus. Other limitations of the study include loss of information, lack of stratification by age or duration of symptoms and recall bias associated with the use of questionnaires. However, as highlighted earlier, there is evidence to support the use of this scale. The strengths of this study are in the sample size, which is composed of a profile that is consistent with more robust studies carried out with women who seek care in specialized centers and stands out for suggesting an association between LUTS and UI severity with appropriate measuring instruments.

CONCLUSION

Women with UI referred to specialized Physiotherapy care have MUI as the most prevalent type and classify the severity of incontinence as moderate. We conclude that it is possible to establish a relationship between the presence of associated urinary symptoms, mainly bladder storage symptoms with the severity of UI in the studied population. The studied severity measures were also associated. We suggest the use of these measures for a broader and more complete evaluation, facilitating the adoption of follow-up measures for the treatment of patients in this context.

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