Original Article

Prevalence of Urinary Incontinence in a Random Sample of the Urban Population of Pouso Alegre, Minas Gerais, Brazil

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This study determines and analyzes the prevalence of Urinary Incontinence (UI) and its demographic and clinical predictors. This epidemiological and cross-sectional study was approved by the Research Ethics Committee of the University of São Paulo, Nursing School. The sample was randomly selected by cluster technique and included 519 individuals aged ≥18 years, living in 341 houses in urban areas. Data were analyzed through Chi-Square, Hosmer Lemeshow's test and multivariate logistic regression (stepwise). Prevalence rates were standardized by gender and age. Of the 519 people composing the sample: 20.1% had UI, 32.9% were women and 6.2% were men. Longer duration of losses (OR = 29.3; p<0.001), diabetes mellitus (OR = 17.7; p<0.001), stroke (OR = 15.9; p<0.001), and cystocele (OR = 12.5; p <0.001) were the factors most strongly associated with UI. This study enabled the identification of UI epidemiology and can contribute to the development of public policies for its primary and secondary prevention and treatment, even if such measures are initially implemented at the city level.

Descriptors: Urinary Incontinence; Epidemiology; Nursing.

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Prevalência da incontinência urinária em amostra randomizada da população urbana de Pouso Alegre, Minas Gerais, Brasil

Os objetivos deste trabalho foram conhecer a prevalência da incontinência urinária (IU), dos fatores demográficos e clínicos preditores da presença de IU. Estudo epidemiológico, corte transversal, aprovado pelo Comitê de Ética da Escola de Enfermagem da Universidade de São Paulo. A amostragem, estratificada por conglomerado, foi composta por 519 indivíduos com idade ≥18 anos, residentes em 341 domicílios da área urbana, sorteados aleatoriamente. Os testes utilizados foram qui-quadrado, Hosmer Lemeshow e regressão logística multivariada (stepwise). As prevalências foram padronizadas por sexo e idade, portanto, das 519 pessoas que compuseram a amostra, 20,1% dessas tinha IU numa população total; 32,9% eram mulheres e 6,2% homens. Maior tempo de perdas (OR=29,3; p<0,001), diabetes mellitus (OR=17,7; p<0,001), acidente vascular encefálico (OR=15,9; p<0,001) e cistocele (OR=12,5; p<0,001) foram os fatores mais fortemente associados à IU. O estudo permitiu conhecer a epidemiologia da IU e pode contribuir para o desenvolvimento de políticas públicas para a sua prevenção primária e secundária, seu tratamento, ainda que inicialmente em nível municipal.

Descritores: Incontinência Urinária; Epidemiologia; Enfermagem.

Prevalencia de la incontinencia urinaria en muestra aleatoria de la población urbana de Pouso Alegre, Minas Gerais, Brasil

El estudio tiene por objetivo conocer la prevalencia de la incontinencia urinaria (IU), de los factores de predicción demográficos y clínicos de la presencia de IU. Se trata de un estudio epidemiológico de corte transversal, aprobado por el Comité de Ética de la Escuela de Enfermería de la Universidad de Sao Paulo. Muestreo estratificado por conglomerado compuesto de 519 individuos con edad ≥18 años, residentes en 341 domicilios del área urbana, sorteados aleatoriamente. Las pruebas utilizadas fueron Chi-cuadrado, Hosmer Lemeshow y regresión logística multivariante (stepwise). Las prevalencias de IU fueron estandarizadas por sexo y edad, en una muestra de 519 personas, siendo 20,1 % en la población general - 32,9% eran mujeres y 6,2% hombres. Los factores más fuertemente asociados a la IU fueron: mayor tiempo de pérdidas (OR=29,3; p<0,001), diabetes mellitus (OR=17,7; p<0,001), accidente vascular encefálico (OR=15,9; p<0,001) y cistocele (OR=12,5; p<0,001). El estudio permitió conocer la epidemiologia de la IU y puede contribuir para el desarrollo de políticas públicas para su prevención primaria y secundaria, su tratamiento, inclusive considerando su inicio en el ámbito municipal.

Descriptores: Incontinencia Urinaria; Epidemiología; Enfermería.

Introduction

The International Continence Society (ICS) defines Urinary Incontinence (UI) as "any involuntary urine loss" and classifies it into the following basic categories: Stress Urinary Incontinence (SUI), Urge Incontinence (UUI), Mixed Incontinence (MUI), Continuous Urinary Incontinence (CUI) and Post Micturition Symptoms (PMS)[1]. According to these concepts, the terms 'urinary incontinence' and 'urinary loss' are interchangeable and are so used by ICS researchers and specialists.

UI has a multi-factor origin; studies have shown that its occurrence is associated with gynecological surgeries and the female sex[2], advanced age and multiple births[3], hypertension, diabetes mellitus, childbirth carried out at home, and infections in the urinary tract[4]. Some

medications have also been associated with it such as diuretics[5], vasodilators, antihistamines, sedatives, tranquilizers and narcotics[6].

Given the epidemiological relevance of UI among women, several international studies specifically addressing this population in different age ranges and situations have been carried out in various countries. A prevalence of UI of 31% was found in Bergen, Norway in women six months after birth[7], with an increased risk in the cases of vaginal birth and perineal laceration[8]. A longitudinal study also investigated an elderly female population over the course of nine years and found a UI incidence of 14%, showing that associated factors are pelvic organ prolapse, urinary tract infection, obesity, multiple births and surgery such as a hysterectomy[9].

In addition to these conditions, studies have also shown that UI might also be associated with gynecological surgeries and advanced age, infection in the urinary tract, being female[2], hypertension, diabetes mellitus, childbirths carried out at home[4], multiple births, and obesity[3].

There are few population studies in Brazil[4], using different methodologies and in general addressing specific groups such as women during pregnancy or in distinct periods postpartum[10], elderly individuals[11] or institutionalized chronic patients[12], and patients in the postoperative phase of radical retropubic prostatectomy; this last group has an incidence of 62% of UI in 13 studied patients[13]. These facts confirm the need and relevance of this study[13].

Therefore, this study identifies and analyzes the prevalence of urinary incontinence and verifies the following demographic (age, ethnicity, gender, schooling, family income) and clinical factors (pregnancy/multiple births, urogynecologic and rectal surgery, rectal and genital prolapse, medication, menopause, urinary infection, dysuria and nocturia symptoms, diabetes mellitus and hypertension), predictors of UI in adults residing in the urban area of Pouso Alegre, MG, Brazil.

Method

This is an epidemiological, exploratory, descriptive, and cross-sectional study, population-based where correlations are tested. The study was developed in Pouso Alegre, MG, Brazil. The target population was composed of people 18 years old or older, resident of the urban area of Porto Alegre. The city's population was estimated at 120,467 in 2007* for the purpose of sampling.

The sample, composed of 341 houses distributed over five regions, with the level of precision at 5%, was established from a stratified cluster sampling in a single stage. The houses were randomly selected. The selected individuals had to meet the following criteria in order to be included in the study: being 18 years old or older, being of a physical and mental condition to answer the interview questions and to give consent to participate in the study. Finally, 519 people composed the sample. About 30.3% of the male individuals refused to participate. The study was limited to the urban area of the city due to the difficulties in obtaining addresses in the rural area.

The project was approved by the Research Ethics Committee at the University of São Paulo (process 673/2007/CEP/EEUSP) and complied with the requirements of Resolution nº 196/96 of the National Council of Health.

Two instruments were used to collect data[2]. The first addressed socio-demographic data (gender, ethnicity, schooling, marital status, occupation and family income) and clinical information (previous urogynecologic surgery, number and type of childbirths, dysuria, previous urinary infection, anal and genital disorders, medications, menopause, hypertension, diabetes mellitus, e UI); the second instrument included UI characteristics (duration and condition, urge leakages, waking up during the night to urinate, UI during sexual intercourse, frequency and quantity of urinary leakage, use and frequency external collection devices were changed).

UI prevalence was adjusted by gender and age range using the population of Pouso Alegre as the standard. Hence, the standardized prevalence of UI was obtained in this study. Variables were analyzed through the Chi-square test before the logistic regression process and only those with statistically significant differences were included in the multivariate regression model (stepwise method). The verification of model adjustment was performed using the Chi-square test and the Hosmer Lemeshow test.

In relation to the logistic regression procedure, the univariate model was used to identify any association between each of the independent variables and the dependent variable (the presence of UI or not).

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* http://www.ibge.gov.br/cidadesat/topwindow.htm?1

Independent variables were incorporated into the multivariate models when significant (p<0.05). The models 1, 2, 3 and 4 were used to model, respectively, the relation between socio-demographic, clinical and reproductive life variables, and characteristics of urinary leakage with urinary incontinence . Model 5, considered the final model, was used to model the relation between all the significant variables that were kept in the models 1 through 4. The level of statistical significance adopted was 5% (p≤0.05).

Results

The sample was predominantly composed of women (342/65.9%); age between 40 and 59 years (197/38.0%); white (436/84.0%); with primary school and illiterate (321/61.8%); unpaid work (263/50.7%); married (298/57.4%), with income up to three times the minimum wage (321/61.8%). Hypertension (192/37.0%) and hypotensive drugs (185/35.6%) were more frequent. In relation to clinical conditions, cystocelo (29/8.5%) and perineoplasty (26/7.6%) in women, and (7/4.0%) hemorrhoids and hemorrhoidectomy (5/2.9%) in men were the most frequent co-morbidities and surgeries. In relation to reproductive life, 237 (69.3%) women had from one to four children and 149 had from one to four normal deliveries.

The following prevalence of UI was found in the sample of 519 people: 20.1% in the entire sample; 32.9% in women; and 6.2% among men.

Table 1 – Characteristics of UI in residents of Pouso Alegre, MG, Brazil – 2008

Characteristics of urinary leakage	UI (N= 154)	
	N	(%)
Duration		
≤ 1 year	25	16.2
1 to 3 years	65	42.2
4 to 5 years	19	12.4
≥ 6 years	45	29.2
Get to the bathroom in time		
Always	59	38.3
Most of times	36	23.4
Sometimes	58	37.7
Never	1	0.6
Wake during the night to urinate		
Yes, wake up and go to the bathroom	128	83.1
Yes, wake up but do not go to the bathroom	4	2.6
No	22	14.3

continue...

Table 1 – (continuation)

Characteristics of urinary leakage	UI (N= 154)	
	N	(%)
Conditions under which leakage* occurs		
Only with great effort	40	26.0
When coughing, laughing, or sneezing	133	86.4
When walking fast or running	44	28.6
When walking on a flat surface or standing up	26	16.9
With light movements, even lying	8	6.0
Leakage during sexual intercourse		
Yes	10	6.5
No	144	93.5
Frequency of leakage		
Sporadic	52	33.7
Weekly	76	49.4
Daily	26	16.9
Quantity of leakage		
Feeling of being moisten	49	31.8
Feeling of being wet	95	61.7
Feeling of being drenched	10	6.5
Use resources to contain urine		
Yes	47	30.5
No	107	69.5

*This question had more than one answer.

Table 1 presents the characteristics of UI among residents of the urban population of Pouso Alegre in which the following predominate: 65 (42.2%), urinary leakage that occur from one to three years; people who always reach the bathroom in time (59/38.3%) or only sometimes (58/37.7%); who wake up during the night to urinate (128/83.1%); who do not experience urine leakage during sexual intercourse (144/93.5%) but leak when coughing, laughing or sneezing (133/86.4%); weekly (76/49.4%); and with a feeling of being wet (95/61.7%). Only 47 (30.5%) of these wear some external collection device, 28 (18.2%) of them only when going out.

In relation to the predictors of UI, only variables that presented statistically significant differences in the Chi-square test were included in the multivariate logistic regression models (stepwise). Hence, the first logistic regression model included the demographic variables, which indicated that women older than 60 years of age presented 5 and 4 times respectively greater probability of having UI (p<0.001). For clinical factors, that is, chronic diseases (i.e. diabetes mellitus, hypertension, and stroke) in addition to cystocele, anal laceration and medication (diuretics, hypoglicemiants and hypotensive), even though all the factors in the model were significantly associated with UI, women with cystocele had approximately 15 times more

probability of having UI compared to those who did not have the condition (p<0.001). In the model that included variables of reproductive life, only number of vaginal births was a significant predictor of UI; women with the largest number of childbirths had almost three times more probability of having UI (p<0.001). Finally, for the characteristics of UI (duration and condition of UI in addition to change of habits), duration of UI was the most important characteristic in the third model of logistic regression, that is, the longer individuals experienced urine loss, the higher the probability (33.1 times) of having UI compared to those who do not experience urine loss (p<0.001). All the variables with statistically significant performance in the partial models were tested in the final regression model and their results are presented in the Table 2.

Table 2 – Demographic and clinical factors associated with the occurrence of UI in residents of Pouso Alegre, MG, Brazil – 2008. (Final Model)

Multiple Regression	B	Odds Ratio (95%)	CI (95%)		P
			Lower	Upper	
Dysuria	1.356	3.880	3.371	4.466	0.000
Frequent urinary infections	1.886	6.594	4.934	8.813	0.000
Duration					
Less than 1 year	2.037	7.668	6.560	9.507	0.000
From 1 to 3 years	2.224	9.244	5.875	12.069	0.000
From 4 to 5 years	2.460	11.705	7.571	15.838	0.000
≥ 6 years	3.378	29.312	16.513	35.605	0.000
Conditions under which leakage occurs					
Great effort	0.428	1.535	1.241	1.898	0.000
Run or walk fast	1.466	4.332	3.524	5.326	0.000
Walk on flat surface or standing up	1.572	4.817	3.472	6.684	0.000
Changes in life habits					
Going out	0.695	2.004	1.371	2.663	0.000
Food and fluid intake	-0.804	0.448	0.299	0.670	0.000
Diseases					
Hypertension	1.157	3.181	2.770	3.652	0.000
Diabetes mellitus	2.875	17.728	14.742	21.320	0.000
Stroke	2.767	15.908	11.447	22.108	0.000
Clinical disorders					
Cystocele	2.527	12.517	9.003	17.402	0.000
Anal laceration	1.377	3.964	2.324	6.762	0.000
Female gender	0.139	1.149	1.120	1.942	0.005
Age					
20 to 39 years	0.951	2.587	1.120	5.979	0.026
40 to 39 years	0.989	2.687	1.166	6.191	0.020
≥ 60 years	0.417	1.517	0.655	3.510	0.331

R^2=0.863

Even though almost all demographic and clinical factors were significantly associated with the occurrence of UI in the final logistic regression (Table 2), a longer duration of loss, (OR=29.3; p<0.001), diabetes mellitus (OR=17.7; p<0.001), stroke (OR=15.9; p<0.001) and cystocele (OR=12.5; p<0.001) were the factors most strongly associated with UI. Other factors such as frequent urinary infections can be also included.

Discussion

Among all types of incontinence, UI is the one with largest number of studies though most studies address only specific groups such as women, older or institutionalized individuals. In this study, the standardized prevalence of UI was 21.1% in the population in general; 32.9% in women and 6.2% in

men, adults residents in the urban area of Pouso Alegre. A lower prevalence in women and similar in men was found in Portugal with 21.4% and 7.6%, respectively, in people 40 years old or older[14].

In Brazil, only two studies addressed groups from the population in general. A study carried out in Porto Alegre, RS, Brazil, identified detrusor overactivity in 18.9% among 448 individuals 15 to 55 years old. The authors verified that the highest prevalence was found in the same age groups for both men and women, though women were most affected[15]. The second national study verified a prevalence of 10.7% in a randomized community sample of 657 respondents, in a Family Health Program in the district Cidade Dutra, SP, Brazil. Being a woman, advanced age, gynecological and urinary surgeries, dysuria and urinary infection, were correlated with urinary leakage (r^2=0.572; $p<0.001$)[2].

Several studies have been carried out specifically with women from the population in general. One of them is a Chinese study that evaluated the urinary symptoms of 4,684 women 20 years old or older. The authors found a general prevalence of 19%, with 16.6% for SUI; 10% for UUI and 7.7% for MUI. Age, vaginal delivery, multiple births, hypertension, alcohol consumption, episiorrhaphy and high BMI were risk factors associated with SUI; while age, menopause, C-section, multiple births, constipation, high-weight fetus, episiorrhaphy and high BMI were associated with UUI[3].

A study conducted in Western Turkey with a sample of 1,585 women 20 years old or older reported a prevalence of 49.5% and the following associated factors: frequent urinary infections, diabetes mellitus, diuretic medication and advanced age[16].

In Europe, a multi-center study[17] carried out in France, Germany, Spain and the United Kingdom sent 29,500 questionnaires by mail and found that 2,953 women had UI. Another important study EPINCONT[18] also carried out in Europe, with 27,936 women between 1995 and 1997, detected a prevalence of 57% of moderate or severe UI; 50% SUI; 11% UUI; 36% MUI and 3% of other types of leakage. UIM was considered the most uncomfortable type of UI and rates increased with age.

Studies addressing this subject are more recent in Brazil. In Vassouras, state of Rio de Janeiro, a global prevalence of 15.7%, significantly increased with age, was found in a sample of 1,042 women older than 15 years of age. Of this global index, 31.3% were of the type SUI; 38.6% UUI; 26.4% MUI and 3.7% for other types of leakages[4]. In 2006, also with a female

population, half of the 340 women presented SUI in the third trimester of pregnancy in Campinas, state of São Paulo[10]. Finally, in 2008, a study addressing the prevalence of overactive bladder (OAB) in women older than 15 years of age and using a stratified cluster sample (368 visited households), in Sorocaba, state of São Paulo, a total index of 10.1% was found: 6.1% had wet OAB and 4% dry OAB. In this study, women with lower educational levels, lower income, older than 20 years of age, sedentary and smokers had a greater probability of developing OAB. Additionally, at each increase in the BMI unit, this probability increased by 6.6%[19].

Even though the identified studies have methodologies that differ among them and in relation to this study, a high predominance of women with UI, which varied according to age, was observed in most of the studies. These were also associated factors or predictors in this study. However, some other predictors such as duration of UI, which was the most important according to the final model of multivariate regression, were characterized in only some of the studies found[20-21]. Diabetes mellitus was also one of the most important factors in the occurrence of UI, which is also confirmed in other studies[22-23].

Relatedly, hypertension and stroke, which were also factors significantly associated with UI in this study, are confirmed in some other reviews[24]. The same occurred with cystocele, which was revealed to be one of the most important factors explaining UI[25], corroborating the intrinsic relation between pelvic organ prolapse and UI.

The only factor of reproductive life significantly associated with UI was the number of vaginal deliveries, which was also found in a study carried out in China with women 20 years old or older, also associated with SUI[26].

Since most of the older individuals use medication that may increase urinary frequency, increasing the need to go to the bathroom, many end up reducing their consumption of water and food, which may result in increased dysuria and urinary infections, ultimately worsening a UI condition. Hence, educating and supporting older individuals, whether they are institutionalized or not, as well as their family members and caregivers, are essential measures in reducing such occurrences. Another recommendation that results from this study is the targeting of women, a group badly affected by UI, compose another risk population, to whom prevention programs, both primary and secondary, addressing pregnancy, childbirth and postpartum.

During visits to the studied households, feelings such as shock, shame, and embarrassment were observed in some people over the fact that we were addressing urinary leakage, an issue related to intimacy and aspects of which, sometimes, even the spouse was not aware. This fact was also evidenced in a review that reported the psycho-cultural meanings women experiencing UI attributed to the condition[27].

Men were more afraid than women to answer the questions and most of them did not feel comfortable talking about the issue and that is why there was low adherence to the study (30% of them refused to participate in the study), which should be considered a limitation of the study. Another limitation is related to the fact the study was concentrated in an urban area. Even though we initially intended to include rural areas in the study, after unsuccessful attempts to obtain addresses from the city hall (real estate registration and the Family Health Program) and from the Energy Company of Minas Gerais, we decided to restrict the study to the population living in the urban area.

Recommendations refer not only to the need to extend and replicate this study but also to use its findings to support clinical practice as an important indicator in investigations addressing urinary loss, to implement prevention interventions to impede the worsening of incontinence and to reduce under-reporting.

Additionally, factors associated with UI such as diabetes mellitus, cystocele and longer duration of losses, were revealed to be important in the search for uro-rectal-gynecologic disorders and neuropathies. It is assumed that early identification of UI and promotion of treatment can be incorporated into the health services, easing the consequences of this condition.

Conclusions

This study carried out with adults from the urban population of Pouso Alegre, MG, Brazil allowed us to conclude that the standardized prevalence of UI, according to sex and age, in a sample of 519 people, was: 20.1% in the general population; 32.9% among women and 6.2% among men. The most important predictors of UI were duration of loss (OR=29.31; p<0.001); diabetes mellitus (OR=17.72; p<0.001); stroke (OR=15.90; p<0.001) and cystocele (OR=12.51; p<0.001).

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