

Female urinary incontinence and the practice of physical activity

Incontinência urinária feminina e a prática de atividade física

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ABSTRACT | OBJECTIVE: To estimate the prevalence of urinary incontinence in women who perform physical activity and associated factors. **METHODS:** Research with a quantitative and cross-sectional approach. Women aged over 18 years and who perform some type of physical activity participated in the research. In data collection, a structured questionnaire was applied, consisting of sociodemographic and clinical data. For analysis, the chi-square test and Fisher's exact test were used. **RESULTS:** The prevalence of female urinary incontinence, which perform physical activity was 21.9% and the preeminent exercise of involuntary loss of urine was jumping (55%). The prevalent age group was 30 to 39 years old (40.2%), single (47.6%), complete higher education (56.1%), white race (46.3%). The associated and significant risk factor was urinary infection ($p=0.005$) and the practice of physical activity ($p=0.001$). **CONCLUSION:** It was detected that women who practice physical activities, with a higher prevalence with jumps or impacts, have urinary incontinence. And the factor associated with involuntary elimination of urine was urinary tract infection.

KEYWORDS: Urinary Incontinence. Prevalence. Women. Exercise. Nursing. Enterostomal Therapy.

RESUMO | OBJETIVO: Estimar a prevalência de incontinência urinária em mulheres que realizam de atividade física e os fatores associados. **MÉTODOS:** Pesquisa de abordagem quantitativa e transversal. Participaram da pesquisa mulheres com idade acima de 20 anos e que realizam algum tipo de atividade física funcional. Na coleta de dados aplicou-se um questionário estruturado composto por dados sociodemográficos e clínicos. Para análise utilizou-se o Teste do Qui-Quadrado e Teste exato de Fisher. **RESULTADOS:** A prevalência de incontinência urinária feminina, as quais realizam atividade física foi de 21,9% e o exercício preeminente de perda involuntária de urina foi pular (55%). A faixa etária prevalente foi de 30 a 39 anos (40,2%), solteiras (47,6%), ensino superior completo (56,1%), raça branca (46,3%). O fator de risco associado e significativo foi a infecção urinária ($p=0,005$) e a prática de atividade física ($p=0,001$). **CONCLUSÃO:** Detectou-se que mulheres que praticam atividades físicas, em maior prevalência com pulos ou impactos, apresentam incontinência urinária. E o fator associado a eliminação involuntária de urina foi a infecção urinária.

PALAVRAS-CHAVE: Incontinência Urinária. Prevalência. Mulheres. Exercício Físico. Enfermagem. Estomaterapia.

1. Introduction

Worldwide, urinary incontinence (UI) is a morbidity that affects an average of 200 million individuals; a high prevalence rate, representing 26% of the adult female population in developing countries.¹ In Brazil, around 40,8% suffer from the disease at some point in their lives. However, these estimates do not reflect reality, as the condition is still underdiagnosed and undertreated.²

UI, according to the International Continence Society, is conceptualized as any involuntary elimination of diuresis and can be named according to etiology and symptomatology³, as urge urinary incontinence (UUI), stress urinary incontinence (SUI), or mixed urinary incontinence (MUI).

SUI is determined by the complaint of involuntary leakage of urine due to increased intra-abdominal pressure, such as exertion (coughing, sneezing or physical exertion). Urge urinary incontinence (UUI), is referred to as the involuntary deletion of urine preceded or promptly accompanied by urinary urgency or incontinence. MUI is the aggregation of SUI and UUI.⁴

UI, especially SUI, is prevalent in the female population due to their physiology and anatomy. One of the main causes is the reduction in the levels of the hormone estrogen in the bloodstream, which leads to atrophy of the pelvic muscles, due to the attenuation of local vascularization.⁵

Other factors that lead to female UI include advanced age, obesity, parity, pregnancy, childbirth, weight of the newborn, pelvic surgery, constipation, chronic diseases, smoking, caffeine consumption, drug use, menopause and high-impact, strenuous physical activity.^{6,7}

Different theories are described in the literature as to the correlation between UI in women and physical activity, especially impact exercise. The exacerbated practice of exercise can lead to increased abdominal pressure and involuntary urine loss. In addition, the use of excessive weights can lead to muscle stretching and weakening of the pelvic floor muscle.^{8,9}

The presence of UI compromises a woman's daily life, as it impacts on different areas of life, from sexual activity to social and work interactions.

The consequences are physical, psychological and economic changes, leaving them susceptible to various problems due to the warnings that the pathology imposes, and it becomes a major public health adversity, sometimes characterized as a camouflaged epidemic.^{8,9}

Thus, public policies specific to women's health are imperative, with assertive interventions concerning the prevention and rehabilitation of UI, so that the responsible agencies train health professionals to establish competencies that contribute to resolving a pathology that has a major impact, especially on the lives of women.²

Given this scenario, which highlights the female population as prone to involuntary urinary leakage, combined with the scarce studies on the prevalence of the pathology in women, the aim of this study was to estimate the prevalence of urinary incontinence in women who practice physical activity and its associated factors.

2. Methods

2.1 Study design

A quantitative, cross-sectional study was carried out in the city of Campo Grande, capital of the state of Mato Grosso do Sul, Brazil.

2.2 Population, location and selection criteria

Women over the age of 20 who practiced physical activity regularly, i.e. at least twice a week, took part in the study. Women who were physically or mentally unable to complete the questionnaire and women with current urinary tract infections were excluded from the study. The sample was by convenience.

2.3 Data collection

In order to collect the data, authorization to carry out the research was requested in advance from the gyms. The choice of gyms was made through a random draw.

On site, the women were invited to take part in the research and if they agreed to participate, they signed the Informed Consent Form (ICF). Afterwards, the instrument was applied by means of an interview or filled by hand, depending on the interviewee's choice.

The research instrument was designed by the researchers and consists of the following social variables: initials of name, age, gender, education, marital status, as well as variables of health conditions, consisting of the following variables: presence of UTIs, smoking, use of alcoholic beverages, body mass index (BMI), reports of urinary infection, bowel habits, pregnancies, practice and type of physical activity.

Regarding the variable of interest, it is important to highlight that the participants were asked about involuntary loss of urine during physical activity, which activity and whether they noticed involuntary loss of urine. This variable was self-reported and perceived.

The entire research instrument was built based on scientific evidence from previous studies related to the risk factors present in women with UI.

2.4 Data analysis

The data was entered into an Excel 2016 spreadsheet and evaluated using *Jamovi software* (version 2.2). Standard deviation and mean were used for continuous variables, while relative and absolute

frequency were used for variables classified as categorical. The chi-square test (χ^2) and Fisher's exact test were used to verify the existence of an association between categorical variables, when necessary.

2.5 Ethical aspects

The study followed the conditions established by Resolution No. 466/2012, which emphasizes ethics in research with human beings. Ethical issues relating to anonymity and autonomy were respected. The research was approved by the Research Ethics Committee with substantiated opinion number 5.511.685.

3. Results

The study sample consisted of 82 women who performed physical activities in gyms located in the city of Campo Grande-MS.

Table 1 shows the women's sociodemographic data. As for the age group of the participants, it can be seen that the majority were between 30 and 39 years old (40.2%) and single (47.6%). With regard to schooling, complete higher education was the most common (56.1%). With regard to race, the sample was predominantly white (46.3%).

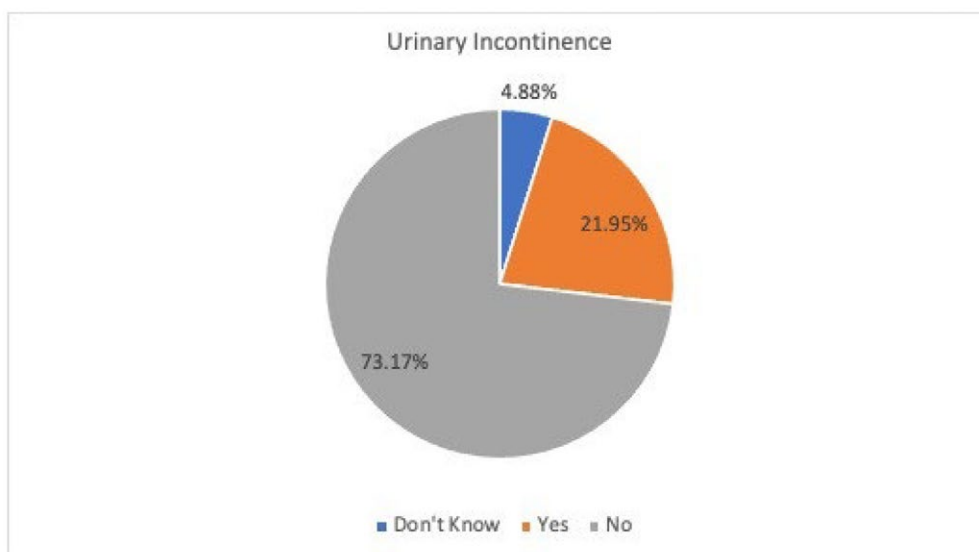
Table 1. Sociodemographic data of women practicing physical activity (n=82), Campo Grande-MS /Brazil

Variable		n	%
Sex	Female	82	100%
Age group	20-29 years	15	18.3%
	30-39 years	33	40.2%
	40-49 years	25	30.5%
	50 + Years	9	11.0%
Marital status	Single	39	47.6%
	Married	31	37.8%
	Separated/divorced	10	12.2%
	Widowed	2	2.4%
Education	elementary school incomplete	1	1.2%
	complete high school education	13	15.9%
	technical education	4	4.9%
	incomplete higher education	6	7.3%
	complete higher education	46	56.1%
Race	postgraduate	12	14.6%
	White	38	46.3%
	Brown	28	34.1%
	Black	5	6.1%
	Yellow	10	12.2%
	Indigenous	1	1.2%

Source: the authors (2024).

With regard to the prevalence of urinary incontinence in women who perform physical activities, a frequency of 21.9% was found. As shown in Graph 1.

Graph 1. Prevalence of female urinary incontinence in women who practice physical activity (n=82), Campo Grande - MS (Brazil)



Source: the authors (2024).

With regard to associated factors, table 2 outlines the factors associated with UI in women who do physical activity. No significant correlation was found between the use of tobacco (p=1.00), alcohol (p=0.153), body mass index (BMI) (p=0.166) and constipation (p=0.251).

However, the existence of urinary infection (p=0.005) and physical activity (p<0.001), were factors that showed a significant association with urinary incontinence. It is noteworthy that 34% of women with UI reported a previous urinary infection. It is also important to note that the average amount of physical activity practiced by the women was 3.9 times a week.

Table 2. Factors associated with urinary incontinence. Campo Grande- MS (n=78), 2022

Variables	without UI	with UI	Total**	<i>p-value*</i>
	n(%)	n(%)	n(%)	
Smoking				
No	57(77.0)	17(23.0)	74(100)	1.000
Yes	3(75.0)	1(25.0)	4(100)	
Total	60(76.9)	18(23.1)	78(100)	
Alcoholic beverages				
No	22(68.8)	10(31.3)	32(100)	0.153
Yes	38(82.6)	8(17.4)	46(100)	
Total	60(76.9)	18(23.1)	78(100)	
BMI				
Normal	23(88.5)	3(11.5)	26(100)	0.166
Overweight	25(73.5)	9(26.5)	34(100)	
Obesity	12(66.7)	6(33.3)	18(100)	
Total	60(76.9)	18(23.1)	78(100)	
Previous urinary infection				
No	29(93.5)	2(6.5)	31(100)	0.005
Yes	31(66.0)	16(34.0)	47(100)	
Total	60(76.9)	18(23.1)	78(100)	
Constipation				
No	45(80.4)	11(19.6)	56(100)	0.251
Yes	15(68.2)	7(31.8)	22(100)	
Total	60(76.9)	18(23.1)	78(100)	
Loss of urine during physical activity				
No	58(86.6)	9(13.4)	67(100)	< .001
Yes	2(18.2)	9(81.8)	11(100)	
Total	60(76.9)	18(23.1)	78(100)	

*Significance level <0.05 (5%).

**field total ignored for 4 cases that answered "don't know" for UI
Source: the authors (2024).

Table 3 shows the association between age and the presence of UI. There was no statistically significant discrepancy between the age ranges.

Table 3. Age associated with urinary incontinence. Campo Grande-MS (n=78), 2022

Variable	without UI	with UI	Total**	<i>p-value*</i>
	n(%)	n(%)	n(%)	
Age group				
20-29 years	12(85.7)	2(14.3)	14(100)	0.902
30-39 years	24(75.0)	8(25.0)	32(100)	
40 to 49 years old	18(75.0)	6(25.0)	24(100)	
50 years+	6(75.0)	2(25.0)	8(100)	
Total	60(76.9)	18(23.1)	78(100)	

Notes:

*Significance level set at (<0.05).

** had its field ignored for 4 cases that answered "don't know" to the question about having a UI

Source: the authors (2024).

Table 4 shows the obstetric and gynecological variables associated with urinary incontinence. There was no significant association between the variables pregnancy ($p= 0.526$), number of pregnancies ($p= 0.077$), type of delivery ($p= 0.778$) and the presence of episiotomy ($p=0.727$).

Table 4. Obstetric and gynecological variables and their association with female urinary incontinence. Campo Grande, (n=78), 2022

Variables	without UI	with UI	Total**	<i>p-value*</i>
	n(%)	n(%)	n(%)	
Pregnancy				
No	25(80.6)	6(19.4)	31(100)	0.526
Yes	35(74.5)	12(25.5)	47(100)	
Total	60(76.9)	18(23.1)	78(100)	
No. of pregnancies				
0	25(80.6)	6(19.4)	31(100)	0.077
1	20(90.9)	2(9.1)	22(100)	
2	8(61.5)	5(38.5)	13(100)	
3 or +	7(58.3)	5(41.7)	12(100)	
Total	60(76.9)	18(23.1)	78(100)	
Type of delivery				
None	26(81.3)	6(18.8)	32(100)	0.778
Cesarean section	24(75.0)	8(25.0)	32(100)	
Vaginal	10(71.4)	4(28.6)	14(100)	
Total	60(76.9)	18(23.1)	78(100)	
Episiotomy				
No	50(78.1)	14(21.9)	64(100)	0.727
Yes	10(71.4)	4(28.6)	14(100)	
Total	60(76.9)	18(23.1)	78(100)	

* significance level <0.05 (5%).

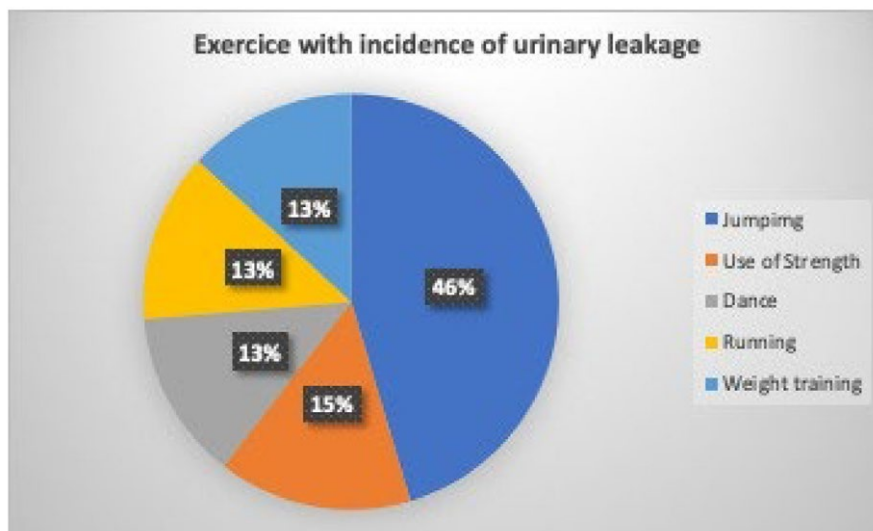
** total had its field ignored for 4 cases that answered "don't know" to the question about having a UI

Source: the authors (2024).

All participants practiced some form of regular physical activity, including functional exercise, which includes CROSSFIT, RPM (Raw Power in Motion) and JUMP (20.5%), dance (20.5%), weight training (38.5%) and others (20.5%).

Graph 2 shows the exercises with the highest incidence of urine leakage at the time of data collection. Of these, 55% lose urine when jumping and 18% in exercises that require strength.

Graph 2. Exercises with incidence of urinary leakage, Campo Grande - MS (Brazil)



Source: the authors (2024).

4. Discussion

The study found a prevalence of UI of 21.9% in women who practice physical activity. Urinary leakage was found to be recurrent in movements such as jumping and in exercises that require strength. Urinary infection was found to be an associated factor for involuntary urine loss. A previous study with a sample of 306 women found a prevalence of 40.8% (125) complaining of involuntary urine loss. Of those, 30.4% were aged between 20 and 39 years, 53.6% between 40 and 59 years and 16.0% between 60 and 83 years.¹⁰

Middle-aged women are primarily affected by mixed incontinence when compared to older women. This scenario is justified by the female anatomy and physiology, related to hormonal changes, pregnancies, childbirth, among other lifestyle factors, which can weaken the perineum muscle.¹¹

The presence of certain risk factors in women, such as age, natural childbirth, forceps delivery and the high weight of the newborn, increase the likelihood of developing SUI.¹² However, in this study, there was no significant association between those and the sample of women who perform physical activity. This context is corroborated by authors who emphasize that women who engage in physical activity are more likely to develop UI, even when risk factors are not present.^{11,13,14}

Of the 78 women, 47 reported a urinary infection, a finding that was reinforced by a study carried out with physiotherapy students comprising 79 participants, of whom 16 (20.3%) had UTIs and urinary infection alone ($p=0.020$) was the main risk factor. Of the 16 incontinent women, 13 reported one or more previous urinary infection events, totaling 81.25%, a factor which may have influenced involuntary urine loss until treatment.¹⁵

It is worth noting that in the survey, 34% of women with UI reported a previous urinary infection. Urinary infection can be caused by bacteria, viruses or fungi and causes the detrusor muscle to become voluble and reduce the closing pressure of the urethra, predisposing to the onset of UI. Due to the pathophysiology of urinary tract infection, this leads to an increase in the demand for urinary frequency, greater urgency and incomplete emptying of the bladder, events which favor the involuntary elimination of urine.^{14,16}

Documentary research corroborated this by showing that, fifty patients aged between 5 and 80 years, predominantly female (84.0%), all diagnosed with UI, reported a history of previous urinary infection (90.0%), making an association between UI and urinary infection.¹⁷

Physical activity was another piece of evidence, and it is worth noting that previous studies have been carried out to identify the association between physical activity and UI. The results found that the prevalence of UI was predominantly related to high-impact activities, with an emphasis on jumping, running and exercises that combine abdominal and pelvic movements.^{18,20}

Among the modalities practiced by the women interviewed, there was a predominance of UI in those who practiced exercises that included jumping and physical straining. Research has shown that when comparing types of training, active women have a high probability of involuntary elimination of urine, primarily related to high-impact activities.^{18,19}

SUI is commonly described in female athletes, followed by MUI and SUI.¹⁹ The scientific literature points to an increased risk in women who do weight training, either separately or in combination.^{21,22}

SUI is the most common form of incontinence in women aged between 20 and 40. Although it has not been confirmed, there are reports in the literature that physical activity and sports may be risk factors for SUI in women who are athletes or not.²³

High-impact activities such as jumping and straining pose a greater risk of urinary leakage, since the ground reaction forces during the maximum vertical landing can reach 16 times the body weight. These activities are therefore associated with the presence of UI.²⁴ In similar sports activities, the impact force is between five and twelve times the body weight when referring to jumping.²⁵ This situation causes the muscle to strain and stretch, weakening the PFM.

The presence of SUI in these activities is justified because the contractions of the pelvic floor muscles, due to recurrence, caused by the impact, negatively

influence the use of the pelvic floor, in which the consequent failure incites dysfunctions related to the three physiological functions: evacuation, sexual and urinary.²⁴

In this context, women who have symptoms of involuntary loss of urine and seek special treatment from a health professional, obtain satisfactory results with reduced surgical rates in cases which are not indicated, as well as have their symptoms alleviated. However, most individuals are unaware of this information, as it is an unknown condition with little publicity in the health sector and in the media, which makes.²

The number of professionals, specifically nurses, with technical scientific knowledge on the treatment of patients with UI is still scarce. Scientific production on the subject of UI management is also scarce, although there are probabilities of specialization related to its care, as in the case of Stomatherapy, which can work directly with incontinent clients.²⁶

A limitation of the study was the small sample size, which could affect the generalizability of the data. Also noteworthy is the lack of sample calculation, the absence of standardized scales to check whether patients have incontinence, which was assessed only by self-report.

5. Conclusion

The prevalence of UI was 21.9% in women who practice physical activity. Urinary leakage was found to be prevalent in movements such as jumping and in exercises that require strength. A significant associated factor was previous urinary infection and regular physical activity. It should be emphasized that 34% of women with UI reported a previous urinary infection.

Author contributions

The authors have declared having made substantial contributions to the work in terms of the conception or design of the research; the acquisition, analysis or interpretation of data for the study; and the writing or critical review of relevant intellectual content. All authors approved the final version to be published and agreed to take public responsibility for all aspects of the study.

Conflicts of interest

No financial, legal or political conflicts involving third parties (government, private companies and foundations, etc.) have been declared for any aspect of the work submitted (including but not limited to grants and funding, participation in advisory boards, study design, manuscript preparation, statistical analysis, etc.).

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