

THE PRACTICE OF PHYSICAL EXERCISE IS A MODIFIABLE FACTOR FOR URGE URINARY INCONTINENCE IN OLDER WOMEN



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ABSTRACT

Introduction: The literature suggests that some risk factors for urinary incontinence can be modified by a healthy lifestyle; however, little is known about the factors associated with urge urinary incontinence (UUI), whose prevalence increases with age. **Objective:** To examine the modifiable risk factors of UUI in older women. **Method:** The sample consisted of 200 elderly (60 years or older) with a mean age of 69.06 ± 6.26 years. We identified the presence of UUI and behavioral risk factors (consumption of coffee, alcohol consumption, smoking and presence of constipation). Was also applied to the Domain 4 for International Physical Activity Questionnaire (IPAQ) to identify the level of physical activity and measured body mass index and waist circumference. The data were processed using descriptive and inferential statistics with a significance level of 5%. **Results:** The prevalence of UUI in the sample was 15,5%. Among the modifiable factors, only the level of physical activity was associated with the occurrence of UUI, and the physical exercise appeared as a protective factor among very active women (OR = 0.288) and less active (OR = 0.356). **Conclusion:** The symptoms of urgency can be softened by regular physical exercise. Through a healthy lifestyle can minimize a number of modifiable factors in the genesis of urge urinary incontinence.

Keywords: physical activity, risk factors, aging.

INTRODUCTION

Urge urinary incontinence (UUI) is considered all the involuntary urine loss immediately followed or preceded by urgency¹. Stress Urinary incontinence (SUI) is usually the commonest type in the general population; however, it is observed that among the elderly the values are higher for the UUI symptoms. In a study conducted by Parazzini *et al.*², the prevalence of UUI in women older than 62 years was of 34%, while for the EUI it was of 23%.

There are many factors associated with the development of urinary incontinence (UI) in older women^{3,4}. Therefore, some studies mention that a healthy lifestyle through regular physical activity practice and balanced diet, may alter some factors, such as constipation and overweight^{5,6}. These risk factors are considered changeable in the genesis of the urinary incontinence.

Grewar and McLean⁵ developed a model based on evidence termed "Continence Integrated System". The authors suggest that motor control, musculoskeletal and behavioral factors are considered modifiable and may influence on the function of the urinary continence system. However, there is little research which analyses the correlation between UI incidence and a healthy lifestyle, since this behavior has been recommended by physicians and other health professionals. This research becomes less frequent when the UUI genesis is concerned. Thus, the aim of this study is to analyze the modifiable risk factors of the urge urinary incontinence in older women.

METHODS

This transversal and descriptive study was performed with older women (60 years or older), who are engaged in formal groups of

physical exercises for the elderly or who participate in interaction groups for the elderly in Florianópolis, Santa Catarina (SC).

Women aged above 60 years were selected in this study due to the scientific information that the female gender as well as age advance are important risk factors for the genesis of urinary incontinence (UI)^{7,8}. Moreover, in this age group there is a series of other associated risk factors, such as the menopause arrival and the delivery effects over the musculature of the pelvic floor⁸.

In this study, the elderly dependent on any function, who have reported any injury of the lower urinary tract, presence of pain to urinate or any other indication of urinary infection, were excluded. Thus, 200 older women, mean age of 69.06 ± 6.26 years, engaged in formal groups of physical exercise programs for the elderly or participating in interaction groups for the elderly in Florianópolis, SC participated in this study.

In order to identify the presence of urinary incontinence in the sample, the report of the symptoms of urinary loss was used through one question: "During the last year, have you lost urine (unintentionally, in your underwear) for at least once a month?". Urge urinary incontinence was identified by the question: "Do you lose urine before reaching the bathroom after feeling urge to urinate or without realizing it?". The presence of symptoms of urge urinary incontinence was verified when the answer to this question was positive, and of absence of symptoms, when it was negative.

The modifiable risk factors identified from data on frequent use of caffeine, alcohol consumption, smoking and presence of constipation. Age, number of pregnancies and deliveries data were collected to adjust these risk factors among women with and without UUI.

Additionally, sociodemographic data, marital status, educational background and current occupation were collected to characterize the sample. This information was obtained from the older women with questions structured and applied as an individual questionnaire.

In order to have the Body Mass Index (BMI) and waist circumference verified, body mass was checked on a digital scale (Plenna Wind MEA 07710), and stature with stadiometer WCS 217 cm with a platform (Cardiomed) and the circumferences with a round measure tape with 1.50 m (ISP). The BMI is calculated by the division of body mass (in kg) by the square of the stature (m²), and waist circumference by the mathematical mean of the circumferences of the last rib and the iliac crest (cm).

Physical activity level was identified using the Domain 4 of the International Physical Activity Questionnaire (IPAQ), adapted for older individuals from the studies by Mazo and Benedetti⁹. This domain is composed of three questions and refers to the recreational, sports, physical exercises and leisure activities the elderly does in a normal/habitual week. The physical activities considered had minimum duration of ten continuous minutes and moderate or vigorous intensity. After the application of this questionnaire, the older women of this study were divided in three levels of physical activity (PA): Very Active (VAG), with 600 at 1,500 METs/minutes per week of PA; Little Active (LAG) with up to 600 METs/minutes per week; and Sedentary (SEG), with zero (0) METs/minutes per week.

Data collection occurred with an initial contact with the older women for presentation of the aims of the research, the importance of their participation, the used instruments, the information secret and the invitation to participate in the study. Those who accepted were individually interviewed before the physical exercise program classes or the activities proposed by the Interaction groups, in the premises where these activities take place.

The variables of the study were: presence of symptoms of urge urinary incontinence (dependent variable), frequent coffee consumption (yes/no), alcohol consumption (yes/no), smoking (yes/no), presence of constipation (yes/no), physical activity level (very active/little active/sedentary), Body Mass Index (normal/overweight) and waist circumference (normal/increased) (independent variables).

Statistical analysis was performed in the SPSS – Statistical Package for Social Sciences statistical package (version 17.0). The category variables were descriptively analyzed by simple frequency and percentages and the number ones by measurement of position and dispersion. A chi-square test was used for inferential analysis between the modifiable risk factors and the presence/absence of UUI, while those with $p \leq 0.200$ were inserted in the binary logistics regression model. The significance level adopted was of 5%.

This research followed the ethical principles according to the resolution 196 from the National Health Board. The study was sent to the Ethics in Research Committee of the University of Santa Catarina State (UDESC) and approved under the protocol number 03/2010. After having agreed on participating in the research, the older women signed the free consent form in two copies; one copy stayed with the older woman and the other with the researcher in charge.

RESULTS

Two hundred (200) older women with mean age of 69.06 ± 6.26 years were interviewed. Concerning sociodemographic data, they

were mostly married (50.5%) or widowed (36.0%), retired (53.0%) and did not finish elementary school (31.0%) or finish high school (27.5%).

The incidence of urge urinary incontinence (UUI) in the sample was of 15.5%. As can be observed in table 1, the majority of the older women frequently ingest coffee (83.0%), but does not drink alcohol (95.5%) or smoke (97.0%). Moreover, 60.6% do not present constipation.

Concerning the physical activity level, association with the UUI onset was observed, and the sedentary older women presented higher frequency of urge incontinence symptoms (45.2%).

In the anthropometric variables, (table 1) high overweight incidence (77.5%) and increased waist circumference (88.5%) are observed among the older women of the sample, without association with UUI though.

In the logistic regression model three variables which presented $p \leq 0.200$ were added: frequent coffee consumption, physical activity level and Body Mass Index.

As can be observed in table 2, only the physical activity level associated with the UUI onset, and the practice of physical exercises was a protection factor among very active (OR = 0.288) and little active women (OR = 0.356).

Table 1. Association between modifiable risk factors and presence/absence of UI in elderly women (n = 200).

Modifiable factors	Presence of UUI f (%)	Absence of UUI f (%)	Total f (%)	χ^2	p
Coffee consumption					
Yes	29 (93.5)	137 (81.1)	166 (83.0)	2.893	0.089
No	2 (6.5)	32 (18.9)	34 (17.0)		
Alcohol consumption					
Yes	2 (6.5)	7 (4.1)	9 (4.5)	0.325	0.569
No	29 (93.5)	162 (95.9)	191 (95.5)		
Smoking					
Yes	2 (6.5)	4 (2.4)	6 (3.0)	1.502	0.220
No	29 (93.5)	165 (97.6)	194 (97.0)		
Constipation					
Yes	10 (32.3)	68 (40.7)	78 (39.4)	0.784	0.376
No	21 (67.7)	99 (59.3)	120 (60.6)		
PA level					
Very active	9 (29.0)	72 (42.6)	81 (40.5)	6.588	0.037*
Little active	8 (25.8)	58 (34.3)	66 (33.0)		
Sedentary	14 (45.2) [‡]	39 (23.1)	53 (26.5)		
Body mass index					
Overweight	27 (87.1)	128 (75.7)	155 (77.5)	1.938	0.164
Normal	4 (12.9)	41 (24.3)	45 (22.5)		
Increased waist					
Circumference	29 (93.5)	148 (87.6)	177 (88.5)	0.919	0.338
Normal	2 (6.5)	21 (12.4)	23 (11.5)		

UUI = urge urinary incontinence; PA = physical activity; f = frequency; χ^2 = statistics of the Chi-square test; p = significance level. [‡] Residual adjustment ≥ 2.0 ; * $p \leq 0.05$.

Table 2. Analysis of logistic regression of the modifiable factors in the onset of UUI in elderly women (n = 200).

Variables	B	OR	CI95% OR	p
PA level				
Very active	-1.245	0.288	0.111 0.749	0.011*
Little active	-1.033	0.356	0.133 0.953	0.040*

PA = physical activity; B = logistic coefficient; OR (odds ratio) = risk ratio for UUI; CI 95% OR = confidence interval for the risk ratio; p = significance level. *p ≤ 0.05.

DISCUSSION

Concerning the typology of the urinary incontinence, the effort urinary losses (EUI) are usually the most prevalent in the general population; however, among the elderly, the values are higher for the urge symptoms. Tannenbaum *et al.*¹⁰ pointed out incidence of urge urinary incontinence (UUI) of 22% among women aged 55 years or older, while Zhu *et al.*¹¹ found only 5.7% of older women (60 years old or older) with these symptoms. In the present study, intermediate incidence between the studies mentioned above was found. This kind of alteration may be due to the different diagnostic instruments of the symptoms. In this study, the self-report of urinary loss immediately followed or preceded by urge was selected.

It is known that with the aging process, structural alterations of the detrusor muscle, such as development of fibrosis and hypersensitivity to noradrenaline, result in reduction of vesical capacity and development of involuntary contractions¹², causing symptoms of urinary urge and/or UUI. A study developed with 20,000 Chinese women¹¹ demonstrated that age older than 60 years increases 2.329 (CI 95% = 1.419 to 3.821) times the chance to develop UUI and post-menopause status in 2.285 (CI 95% = 1.535 to 3.402).

Concerning the modifiable risk factors (behavioral) of urinary incontinence, it is observed that constipation, alcohol consumption, caffeine, tea, are risk factors for development of UUI among the older women in the present study. A study by Zerati *et al.*¹³ demonstrated that the alterations of the intestinal rhythm have been associated with increase of the urinary symptoms and incontinence episodes. Song *et al.*³ mention that constipation is an important risk factor for UUI (OR = 2.3; CI 95% = 1.4 to 3.7), since when feces fills up the rectum, the bladder bottom and urethra are pressed, causing non-inhibited contraction of the detrusor and consequently, involuntary urine leaking.

Alcohol also plays a relevant role in the genesis of the urinary symptoms, both for its diuretic effect and a possible direct irritation of the vesical mucosa¹³. Song *et al.*³ found association between alcohol consumption and UUI presence (OR = 4.7; CI 95% = 1.1 to 20.2); however, this relation does not usually occur in the older population^{4,8,11}.

Intake of caffeinated drinks as a risk factor for UUI is demonstrated in some studies. Arya *et al.*¹⁴ observed that daily consumption of caffeine is significantly higher among women with involuntary contraction of the detrusor (484 mg/day) than among those without contractions (194 mg/day). The risk to develop UUI may increase 25% in adult women who intake high amount of caffeine daily.

It is known that the amount of caffeine in tea is approximately one third of the amount in coffee; however, in the study developed

by Hannestad *et al.* (2003), the intake of three or more cups of tea was considered a risk factor for UI (OR = 1.3; CI 95% = 1.2 to 1.5), while caffeine was not. The authors believe that tea presents other components which aggravate UI. According to Reis *et al.* (2003), caffeine and alcohol cause polyuria, increasing urinary frequency and urge.

Smoking can also promote UI onset due to chronic increase of intra-abdominal pressure when coughing^{17,18}. Danforth *et al.*¹⁹ found association between smoking and UI onset (OR = 1.34; CI 95% = 1.25 to 1.45); however, as mentioned above, this relation is not usually frequent in the older population^{4,8}. Regarding UUI, nicotine presents a direct effect in the muscular contractions of the bladder, causing symptoms of urinary urge²⁰.

As age progresses, there are alterations in women's body dimensions, especially height and weight and body composition²¹. These alterations include alterations in the Body Mass Index (BMI) and in the Waist Circumference (WC) perimeter, anthropometric factors analyzed in this study.

The presence of overweight is a common characteristic among women older than 60 years. According to Monteiro *et al.*²², environmental, cultural, economic and demographic alterations occurred in the last decades in the Brazilian society may have resulted in alterations in the patterns of food ingestion and energy expenditure, indicating hence a possible way to explain this process of nutritional transition. According to Krause *et al.*²³, both BMI and WC increase may negatively act on the structures of the pelvic floor, similarly to pregnancy, causing vascular damage and mechanical impact on the urethra²⁴.

Fenster *et al.*²⁵ complement this idea stating that obesity leads to disturb in the oxidative metabolism and resistance to insulin which, on its turn, may damage the vascular system of the pelvic floor and lead to dysfunction of the detrusor and of the urethral sphincter muscle. Song *et al.*³ found increase of BMI as a risk factor for symptoms of urinary urge (OR = 1.5; CI 95% = 1.2 to 2.0), while Zhu *et al.*¹¹ point out waist circumference above 80 cm as a risk factor in the adult population (OR = 1.431; CI 95% = 1.120 to 1.220).

Concerning practice of physical exercises, it was observed that higher level of physical activity is a protection factor for UUI onset. In a transversal study, Song *et al.*³ observed that women who exercised at least once a week were less prone to UUI. Townsend *et al.*²⁴ also found lower rates of UUI in women with higher level of physical activity (OR = 0.53; CI 95% = 0.31 to 0.90). These results demonstrate that the symptoms of urinary urge can also be alleviated with regular practice of physical exercises.

Studies developed by Masue *et al.*²⁶ associated lifestyle and UI presence in adult women. The results demonstrated overweight measured through the BMI. Smoking and low level of physical activity are risk factors for UI, but they can be altered by a healthy lifestyle. Therefore, physical inactivity is a modifiable behavioral factor of urinary continence.

Some studies state that increase of moderate physical activity reduces urine loss episodes^{15,24}. According to Bø²⁷, simultaneously to increase of intra-abdominal pressure during physical exercise, reflex contraction of the muscles of the pelvic floor occurs, which can justify the lower rates of UI among physically active women.

Besides reduction of the urinary loss episodes, there is a set

of indirect benefits promoted by regular practice of physical exercises, such as reduction of diabetes incidence and of the number of hypertensive medication, considered clinical risk factors of UI²⁸. Intestinal constipation and overweight can also be directly modified by regular practice of physical exercises^{29,30}. Thus, besides being a modifiable factor in the prevention of cardiovascular diseases physical activity practice appears also as a modifiable factor of urinary continence which may influence on the remaining behavioral factors.

CONCLUSION

The acknowledgement of these results will make it possible to the health professionals who deal with the older public to know that the urinary urge symptoms, common in the aging process, can be minimized with regular practice of physical exercises. Moreover, other modifiable factors can be reduced with a healthier lifestyle.

All authors have declared there is not any potential conflict of interests concerning this article.

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