FACTORS ASSOCIATED WITH URINARY INCONTINENCE IN ELDERLY INDIVIDUALS WHO MEET FRAILTY CRITERIA

Vanessa Abreu da Silva[1], *Maria José D'Elboux*[2]

[1] Mestranda do Programa de Pós-Graduação em Enfermagem da Faculdade de Ciências Medicas (FCM) da Universidade Estadual de Campinas (Unicamp). Enfermeira da Unidade de Terapia Intensiva do Hospital das Clínicas da Unicamp. São Paulo, Brasil. E-mail: vanisabreu@hotmail.com

[2] Livre Docente em Enfermagem. Professora Associad0 do Departamento de Enfermagem da FCM/Unicamp. São Paulo, Brasil. E-mail: mariadio@uol.com.br

ABSTRACT: This study presents an analysis of factors associated with Urinary Incontinence among elderly individuals who meet frailty criteria (pre-frail and frail). It is a cross-sectional and quantitative study. One hundred elderly patients from a geriatric outpatient clinic at a university hospital in Campinas, SP, Brazil were interviewed. A total of 65.0% of the participants reported Urinary Incontinence, 40 (61.4%) of which reported loss of small quantities of urine several times a day. The multivariate regression analysis showed a statistically significant relationship among gender (OR=3.67), urinary tract infection (OR=6.16), and scores on the Functional Independence Measure (mobility), (OR=0.85). The results show that urinary tract infection, loss of mobility, and gender are factors associated with Urinary Incontinence in elderly patients who meet frailty criteria. These factors are susceptible to interventions designed to prevent and even reduce episodes of Urinary Incontinence.

DESCRIPTORS: Urinary incontinence. Frailty elderly. Risk factors.

FATORES ASSOCIADOS À INCONTINÊNCIA URINÁRIA EM IDOSOS COM CRITÉRIOS DE FRAGILIDADE

RESUMO: Este estudo teve como objetivo analisar os fatores associados à incontinência urinária entre idosos, com critérios de fragilidade (pré-frágeis e frágeis). Trata-se de um estudo transversal, de natureza quantitativa. Foram entrevistados 100 idosos no ambulatório de geriatria de um hospital universitário do município de Campinas, São Paulo. Referiram incontinência urinária 65,0% dos idosos; destes, 40 (61,4%) relataram perda de urina diversas vezes ao dia e em pequena quantidade. A análise de regressão multivariada apontou relação estatisticamente significativa entre sexo (OR=3.67), infecção do trato urinário (OR=6.16) e escore da Medida de Independência Funcional (mobilidade) (OR=0.85). Os resultados mostraram que a infecção do trato urinário, a perda de mobilidade e o sexo são fatores associado á incontinência urinária em idosos com critérios de fragilidade. Esses fatores são passiveis de intervenções, visando à prevenção, e até mesmo, a redução dos episódios de queixa de incontinência urinária.

DESCRITORES: Incontinência urinária. Idoso fragilizado. Fatores de risco.

FACTORES ASOCIADOS CON INCONTINENCIA URINARIA EN ANCIANOS CON CRITERIOS DE FRAGILIDAD

RESUMEN: Este estudio tiene como objetivo analizar los factores asociados con la incontinencia urinaria en los adultos mayores con criterios de fragilidad (pre-frágil y frágil). Se trata de un estudio transversal y cuantitativo. Fueron entrevistados cien ancianos en el ambulatorio de geriatría de un hospital universitario del municipio de Campinas, São Paulo, Brasil. Refirieron incontinencia urinaria 65,0% de los ancianos, de estos 40 (OR=61,4%) relataron pérdidas de orina varias veces al día en pequeñas cantidades. El análisis de regresión multi-variado apuntó una relación estadísticamente significante entre los sexos (OR=3.67), e infección del tracto urinario (6,16) con índices de medida de independencia funcional (movilidad) (OR=0.85). Los resultados muestran que la infección del tracto urinario, la pérdida de movilidad y el sexo son factores de riesgo para la incontinencia urinaria en ancianos con criterios de fragilidad. Estos factores son susceptibles a la intervención visando la prevención y los episodios de incontinencia urinaria.

DESCRIPTORES: Incontinencia urinaria. Anciano frágil. Factores de riesgo.

INTRODUCTION

Urinary Incontinence (UI) is a common condition that may affect people in any age range. However, its occurrence is greater among women and elderly individuals,[1] especially after the age of 70, according to studies conducted in diverse regions in the world.[2]

Accelerated growth in the elderly population has been observed in recent years, particularly among those older than 80 years of age. The prevalence of frailty in this age range, in addition to UI, is about 20% to 26% greater than that observed among individuals older than 65 years old. The prevalence for the latter range is between 3% and 7%.[3]

UI may be a warning sign of frailty in old age and is associated with an increased risk of functional decline.[4] It is defined as "a complaint of any involuntary leakage of urine".[5:5] It is estimated that about 15.0% of elderly individuals living in the community and 50% of those living in long-stay institutions experience UI.[6] Although aging is an important risk factor because it leads to functional and structural changes in the urinary system, which in turn predispose individuals to UI, it is not, by itself, the cause of such a disorder.[7]

Other factors associated with UI stand out among elderly individuals, such as: being a woman, number of pregnancies, vaginal birth, multiparity, smoking, obesity, menopause, impaired mobility hindering access to bathroom, and cognitive impairment, in addition to undergoing surgeries and receiving medication that may reduce the pelvic muscle tonus or lead to damage to the nervous system.[8-10]

Frailty is a "syndrome characterized by decreased energy levels and reduced resistance to stressors."[11:147] Three physiological changes related to age occur. These underlie the syndrome of frailty and are known as the frailty tripod: neuromuscular disorders, disruption of the endocrine system, and immunological dysfunction.[2,11]

Researchers developed a frailty phenotype, based on the frailty tripod, composed of five criteria: unintentional weight loss in the last year, exhaustion, slowness, muscle weakness, and a low level of physical activity. According to this phenotype, an elderly individual should present three or more of these criteria to be considered frail. Individuals presenting one or two criteria are considered to be pre-frail and are at a great risk of developing frailty syndrome.[11]

The early identification of pre-frail and frail elderly individuals is important to preventing adverse events such as worsening of chronic diseases, falls, institutionalization, incapacity and death.[11] Additionally, studies show that frailty can be reversed when identified in the pre-frailty phase.[3]

This study's purpose, considering the scarcity of studies addressing the subject in the literature and the presence of UI among frail elderly individuals, is to analyze the factors associated with UI among elderly individuals meeting frailty criteria (pre-frailty and frailty).

MATERIAL AND METHOD

This s a cross-sectional study of a quantitative nature. Data were collected in the Geriatric Ambulatory of the *Hospital das Clinicas* at the State Federal University of Campinas (UNICAMP) in Campinas, SP, Brazil. This ambulatory cares for elderly individuals 80 years old or older or individuals older than 60 years old with physical or cognitive dependence. A non-probabilistic convenience sample composed of a hundred patients was assessed from February to August 2009. Data were collected by the researchers, who approached the elderly patients individually while they waited in line for a consultation; their place in line was retained.

Inclusion criteria were: being 60 years old or older; being in a condition to establish oral communication to answer the interview; scoring ≥13 (illiterate) on the Mini-Mental State Exam (MEEM), ≥18 (one to seven years of education), ≥26 (eight years or more of education)[12]; presenting at least one frailty criterion, according to the adapted model.[11]

The following criteria, based on the frailty phenotype, were used to evaluate frailty:[11]

Involuntary weight loss in the last year, that is, more than 4.5 kg or above 10% of body weight (the frailty model consider weight loss above 5%).

Exhaustion, which was assessed through two statements from the depression screening scale, The Center for Epidemiological Studies – Depression (CES-D), validated in Brazil for the elderly population[13]: "you felt that everything you did was an effort" and "I had trouble keeping my mind on what I was doing", These questions permitted identifying whether the individual presented these symptoms for three or more days in the last week.

Slowness is verified by decreased gait speed. The time spent to walk a distance of four meters

at normal speed was measured. The individuals walked in one direction and then back; the shortest time was considered. A distance of 4.6 meters is used in the original model; thus, we made the required adjustments for gender and height. We verified whether the walking time was equal to or greater than seven and six seconds for men and women, respectively: 1.73m of height was considered for men and 1.59m was considered for women. These changes were necessary due to a lack of physical space in the room where data would be collected.

Muscle weakness was assessed through handgrip strength measured for the dominant hand by a portable dynamometer. The elderly individual would stand with arms extended alongside the body. Three measurements were taken over an interval of approximately five minutes; the highest value was used. The results were stratified by gender and Body Mass Index (BMI). The following criteria were considered for men: ≤ 29.0kgf for BMI ≤24.0kg m2; ≤30.0kgf for BMI from 24.1 to 26.0; and ≤32.0kgf for BMI ≥28.0. And the following were considered for women: ≤17.0kgf for BMI ≤23.0; ≤17.3kgf for BMI from 23.1 to 26.0; ≤18.0 kgf for BMI from 26.2 to 29.0; and ≤ 21.0kgf for BMI >29.0.

Low level of physical activity: criteria were either 'frequency of two or more times per week' or 'no exercise'. An assessment of weekly energy expenditure adjusted by gender and based on the individuals' self-reporting of exercise is performed in the original model, based on the Minnesota Leisure Time Activities Questionnaire.

The data collection instruments were as follows. 1) socio-demographic characterization, including self-reported variables such as gender, age, race, marital status, educational level, with whom the individual lives, whether the individual works or is retired; self-reporting of coffee consumption, Urinary Tract Infection (UTI) in the last month, bowel function, and straining at stool, in addition to factors associated with UI verified in the individuals' medical files, such as use of medication, comorbidities, and previous surgeries. This instrument was submitted to content validity and was evaluated by a committee of experts from the fields of urinary incontinence, geriatrics and gerontology. 2) The Functional Independence Measure (FIM)[14-15], composed of five items, was used only as a subscale of the mobility of motor skills domain. Each item is scored from 1 (total dependence to perform a given task) to 7 (complete independence to perform a given task, doing it safely within normal time and without help). Hence, the mobility subscale's scores range from 5 to 35 points; 3) The International Consultation on Incontinence Questionnaire – Short Form (ICIQ-SF)[16], used to assess UI, is composed of six questions addressing frequency, severity of urinary loss, and the impact of UI in daily life. It includes a sequence of eight self-diagnosed items related to UI causes or situations; these are not scored. The sum of the scores of questions 3, 4, and 5 ranges from zero to 21. An individual has to present a score equal to or higher than 3 to be considered incontinent, while the higher the total score, the more severe the UI. Impact of UI on daily life is defined according to the score for question five: (0) nothing; (1-3) mild; (4-6) moderate; (7-9) severe; and (10) very severe.

Two groups were formed after the frailty criteria were evaluated: the first group included 41 pre-frail elderly individuals (≤ two criteria) and the other group included 59 frail individuals (≥ three criteria).

The following statistical analyses were performed: descriptive for socio-demographic variables (gender, age, race, marital status, educational level, with whom the individual lived, whether the individual worked or was retired), for the ICIQ-SF scores, frailty criteria, FIM (mobility) and factors associated with UI. The Chi-square test or Fisher's exact test and the Mann Whitney test were used to compare individuals with and without UI and the variables considered to be associated with UI: gender, age, medication, comorbidities, coffee consumption, UTI in the last month, bowel functioning, straining at stool, previous surgeries, and FIM (mobility) score. Univariate and Multivariate Logistic Regression (with Stepwise criterion to select variables) verified the relationship among variables concerning factors associated with UI, FIM (mobility), and UI among frail and pre-frail elderly individuals. The level of significance was fixed at 5%, i.e. $p<0.05$.

The study project was approved by the Ethics Research Committee at FCM-UNICAMP (protocol No. 240/2003).

RESULTS

The studied individuals presented the following predominant characteristics: 74.0%

were women; 78.0% were older than 70 years of age (76.6 years old (±7.8) on average); 65.0% were Caucasian; 59.0% had no partner/spouse; 49.0% had a low level of education; 75.0% lived with family members; and 71.0% were retired (Table 1).

Table 1 – Socio-demographic characterization and frailty of studied elderly individuals. Campinas, SP, Brazil – 2009

Variable	Category	n (%)
Gender	Male	26 (26.0)
	Female	74 (74.0)
Age Range (years)	60 to 69 years old	22 (22.0)
	70 to 79 years old	37 (37.0)
	80 years old or older	41 (41.0)
Race	Caucasian	65 (65.0)
	Afro-Brazilian/Mixed	35 (35.0)
Marital Status	Partner/spouse	41 (41.0)
	No partner/spouse	59 (59.0)
Education	≤ 4 years	49 (49.0)
	> 4 years	9 (9.0)
	Functionally illiterate	42 (42.0)
With whom they live	With family member(s)	83 (83.0)
	Alone	17 (17.0)
Is currently working	Yes	3 (3.0)
	No	97 (97.0)
Retired	Yes	71 (71.0)
	No	29 (29.0)
Frailty	1 to 2 criteria (pre-frail)	41 (41.0)
	3 or more criteria (frail)	59 (59.0)

With regard to urinary loss, 65.0% of the elderly individuals presented a score equal to or higher than 3 on the ICIQ-SF, that is, complaint of involuntary loss of urine. Among those with UI, 61.4% reported small quantities of urinary loss several times a day. The impact of UI on the daily life of these individuals was assessed by question 5 of the ICIQ-SF. This scale's total score ranges from 0 to 10 and the average score was 4.85, though most individuals (49.2%) considered it to be very severe. Among the reported UI causes or situations, the following stood out: urinary loss before reaching a bathroom (50.0%) and urinary loss with effort or physical exertion, when coughing or sneezing (37.0%). The individual can check more than one option in this question since urinary loss may occur in different circumstances. The score of the FIM mobility subscale ranges from 7 to 35 and an average of 31.2 (SD=6.3) was observed.

Statistically significant differences were observed when the presence of the factors associated with UI selected for this study was compared between elderly individuals with UI and without UI only for UTI and mobility (Table 2).

Table 2 – Presence of factors associated with urinary incontinence regarding elderly individuals with (n=65) and without urinary tract infection (n=35). Campinas, SP, Brazil – 2009

UI associated factors	with UI* n (%)	Without UI* n (%)	Total n(%)	*p-value*
Gender				**0.019**†
Female	53(72.0%)	21(28.0%)	74(74.0%)	
Male	12(46.0%)	14(54.0%)	26(26.0%)	
Age range				0.090†
60–69 years old	16(73.0%)	6(27.0%)	22(22.0%)	
70–79 years old	19(52.0%)	18(48.0%)	37(37.0%)	
80 years old or older	30(73.0%)	11(27.0%)	41(41.0%)	
Comorbidities				
DM	21(32.0%)	8(23.0%)	29(29.0%)	0.320†
SH	52(80.0%)	26(74.0%)	78(78.0%)	0.510†
Depression	10(15.0%)	3(9.0%)	13(13.0%)	0.534‡
Arthritis and Arthrosis	11(17.0%)	2(6.0%)	13(13.0%)	0.132‡
CVA	6(6.0%)	4(4.0%)	10(10.0%)	0.736‡
Medication				
Diuretics	34(52.0%)	16(45.0%)	50(50.0%)	0.529†
Antidepressant	11(17.0%)	4(11.0%)	15(15.0%)	0.464†
Calcium channel blockers	10(15.0%)	10(29.0%)	20(20.0%)	0.116†
ACE inhibitors	26(40.0%)	13(37.0%)	39(39.0%)	0.780†
Coffee consumption	54(83.0%)	30(86.0%)	84(84%)	0.731†
UTI in the last month	19(29.2%)	2(5.7%)	21(21.0%)	**0.006**†
Previous surgeries				
Abdominal	24(37.0%)	15(43.0%)	39(39.0%)	0.562†
Gynecologic	22(68.7%)	10(31.2%)	32(32.0%)	0.632†
Prostatic	3(25.0%)	2(1.4%)	5(5.0%)	0.635‡
Bowel functioning				
Daily	32(49.0%)	19(54.0%)	51(51.0%)	0.859‡
Alternate days	8(12.0%)	5(14.0%)	13(13.%)	0.859‡
Once a week	10(15.0%)	3(9.0%)	13(13.0%)	0.859‡
Three times a week	15(24.0%)	8(23.0%)	23(23.0%)	0.859‡
Straining at stool				
Yes	35(53.8%)	18(51.4%)	53(53.0%)	0.817†
No	30(46.2%)	17(48.6%)	47(47.0%)	0.817†
Mobility				**0.0004**§

* UI – Urinary Incontinence; † Chi-square test; ‡ Fisher's exact test; §Mann-Whitney test.

Tables 3 and 4 present the relationship of UI factors associated between frail and pre-frail elderly individuals.

Table 3 – Results of the Univariate Logistic Regression analysis for UI in frail and pre-frail elderly individuals (n=100). Campinas, SP, Brazil – 2009

Variable	Categories	p-value	OR*	CI 95% OR†
Age	60-69 years old (ref.)	---	1.00	---
	70-79 years old	0.111	0.40	0.13 – 1.24
	≥80 years old	0.970	1.02	0.32 – 3.28
Gender	Male (ref.)	---	1.00	---
	Female	**0.022**	2.94	1.17 – 7.40
UTI in the last month	No (ref.)	---	1.00	---
	Yes	**0.014**	6.82	1.48 – 31.29
Score obtained in the FIM (mobility)	Continuous variable (at each 1 point)	**0.007**	0.84	0.74 – 0.95

* OR (Odds Ratio) (n=35 without incontinence and n=65 with incontinence); †CI 95% OR = Confidence Interval of 95% for Odds Ratio; Ref.: level of reference.

Table 4 – Results of the Multivariate Logistic Regression analysis for UI (n=100). Campinas, SP, Brazil – 2009

Selected variables	Categories	p-value	OR*	CI 95% OR†
FIM score (mobility)	Continuous variable (at each 1 point)	**0.009**	0.85	0.75 – 0.96
UTI in the last month	No (ref.)	---	1.00	---
	Yes	**0.022**	6.16	1.30 – 29.23

* OR (Odds Ratio) (n=35 without incontinence and n=65 with incontinence); †CI 95% OR = Confidence Interval of 95% for Odds Ratio; Ref.: level of reference. Stepwise criterion for the selection of variables.

The results from the multivariate analysis revealed that the UTI variables and FIM score (mobility) were selected and significantly associated with UI. Considering the risk for UI, elderly individuals with UTI have 6.2 times more chance of being affected by UI than those without UTI. In terms of mobility, those who obtained the lowest FIM scores are also at a greater risk of being affected by UI, that is, for every one point decrease in the FIM score, the risk of UI increases 1.18 times, i.e. 18%.

Considering that gender was a statistically significant variable in the comparative and univariate analysis, we opted for multivariate analysis and to verify the relationship of the UI associated factors, adjusting for gender and age (Table 5), keeping in mind that the literature reports that age is a relevant variable for the occurrence of UI: the older the individual, the greater the occurrence of UI.

Table 5 – Results of the Multivariate Logistic Regression for UI (n=100), adjusted for gender and age. Campinas, SP, Brazil – 2009

Variable	Categories	p-value	OR*	CI 95% OR†
Age range	60-69 years old (ref.)	---	1.00	
	70-79 years old	0.057	0.29	0.08 – 1.04
	≥80 years old	0.731	0.79	0.20 – 3.05
Gender	Male (ref.)	---	1.00	
	Female	**0.025**	3.67	1.17 – 11.50
UTI in the last month	No (ref.)	---	1.00	
	Yes	0.051	4.99	0.99 – 24.92
FIM score	Continuous variable	**0.022**	0.85	0.74 – 0.98

* OR (Odds Ratio) (n=35 without incontinence and n=65 with incontinence); †CI 95% OR = Confidence Interval of 95% for Odds Ratio; Ref.: level of reference.

A significant relationship was observed after

adjustments between UI and gender and between UI and FIM (mobility) score were implemented, that is, elderly women and those who obtained low FIM scores (mobility) were at a greater risk of presenting UI, OR=3.67 and OR=0.85, respectively.

DISCUSSION

The occurrence of UI in this study's sample was higher (65.0%) than that observed in studies addressing elderly individuals living in the community. A study conducted in São Paulo, Brazil reports an occurrence of UI in 11.8% of men and 26.2% of women[17] while a study conducted in Japan reports UI was observed in 25.0% of the studied elderly individuals.[18] It is known that the prevalence of UI among institutionalized individuals is greater due to their greater vulnerability. A study addressing institutionalized elderly individuals was conducted in the USA where an occurrence of UI in 58.6 of the studied individuals was found.[19] In Brazil, UI was reported by 57.3% of the elderly individuals institutionalized in the cities of Blumenau and Itajaí.[20]

A lack of studies addressing UI in elderly individuals meeting the criteria for frailty hinders comparison with the studied population. Studies focusing on the occurrence of UI in elderly individuals vary and a consensus concerning UI definition, population, and type has not been reached. The elderly individuals from this study are highly vulnerable to the occurrence of adverse events and were classified as frail and pre-frail, which may explain the high occurrence of UI in this sample.

With regard to the characteristics of UI, reports of urinary loss in small quantities several times a day predominated (61.5%). The frequency of urinary loss is lower among elderly individuals living in the community: once a week or less (26.4%), also in small quantities.[21] The frequency and quantity of urinary loss are caused by several factors, such as type of UI, the individual's overall health condition, comorbidities, and level of functional dependence, among others.

Another characteristic of UI is related to the causes or situations in which urinary loss occur: 50.0% of the individuals report it occurs before reaching a bathroom and 37.0% report it occurs when coughing or sneezing, which suggests urge incontinence and effort incontinence, respectively. These are the most common types observed in old age.[22]

Statistical significance, among the studied factors associated with UI, was observed only for UTI and the FIM score (mobility) at an initial point. Many conditions are reported in the literature as being important factors associated with UI,[23-24] however, UTI stands out because it worsens the behavior of an already unstable bladder, causing symptoms of bladder irritation, and urgency and frequency of urination.[25] Frail and pre-frail elderly individuals are a greater risk of UI if they report UTI in the last month. This fact was also confirmed by researchers who found an association between UI and UTI in frail elderly individuals (OR= 2.05).[25-26]

These authors suggest that the mechanisms that possibly explain the connection between UTI and UI are a change in immunity and lower levels of estrogen, which are related to the aging process and frailty; UTI is seen as an indicator of a weakened health condition among hospitalized elderly individuals.[25] Additionally, UTI is also relatively common among elderly individuals due immunological changes, malnutrition, and to changes in mobility,.[27] Atrophic mucosal changes in the vagina and urethra, observed in elderly women, also favor the colonization of pathogenic organisms, which leads to an increased occurrence of bacteriuria and UTI.[28]

Impaired mobility hinders bathroom access for elderly individuals and contributes to an involuntary loss of urine, especially in situations of urinary urgency, and is an important predictor of UI.[29-31] In fact, elderly individuals with more extensive limitations on their mobility are more affected by UI, according to the results observed in this study and those reported by other authors.[17,19-20,32,33]

Nonetheless UTI was no longer a factor associated with UI when a Multivariate Logistic Regression Analysis, adjusted for gender and age, was performed. The p-value is on the limit of significance (0.051) and the gender variable becomes significant together with the score obtained in FIM (mobility). As a result, elderly women are at a risk 3.7 times greater of becoming affected by UI than men, which corroborates Brazilian and international studies.[26,34] These results also confirm findings in the literature concerning the occurrence of UI: 11.8% of men and 26.2% of women,[16] and a prevalence of 62% of UI in women and 45% in men.[20] In Japan, UI affects approximately 34.2% of women and 15.5% of men.[18] Another study conducted in Istanbul, Turkey shows that UI affects 43.0% of women and 20.9% of men.[35]

The greater risk of UI associated with the female gender is explained in the literature by the differences in the female urethral length, decreased urethral closure pressure that is associated with hypermobility of the bladder neck and weakening in the pelvic floor muscles due to the effects of pregnancy and delivery. Additionally, there are effects related to the continence mechanism and hormonal changes resulting from menopause.[17,34,36]

Even though it is known that the occurrence of UI increases with age[28,34], age was not a significant variable in this study. There is no consensus among authors concerning aging as a factor associated with UI. This difference is not reported by some studies,[20,37] but the authors of a study conducted in São Paulo, Brazil observed this association.[17]

Association between aging and urinary symptoms, especially irritative ones, such as urgency and urge-incontinence, can be partially explained by structural changes in the detrusor muscle as the development of fibrosis and hypersensitivity to noradrenaline, which leads to the development of detrusor hyper activity. Additionally, elderly individuals present a high risk of UI due to a large variety of other factors such as cognitive, physical, motivational, and functional impairment, as well as the presence of comorbidities and the use of multiple medications.[17,23,29]

The remaining factors associated with UI, highlighted by various authors, did not present statistical significance, perhaps due to the studied individuals' profile: elderly individuals using multiple medications and with a high level of comorbidities and the frequent occurrence of irregular bowel functioning (49.0%), showing a tendency to constipation.

CONCLUSION

This study's results show that, among the factors associated with UI and reported in the literature, UTI stands out among frail and pre-frail elderly individuals, along with mobility impairment and gender. These are factors subject to intervention, seeking to prevent and reduce episodes of UI.

Health workers, family members, and caregivers should optimize the access of elderly individuals to the bathroom through measures that improve their mobility, and also implement structural interventions at home and in institutions. UTI preventive measures and early treatment should be conducted due to its strong relationship with UI in elderly individuals with frailty criteria observed in this study.

The frailty phenotype was used in this study with some adaptation. Such adaptations limited assessment of frailty in relation to energy expenditure. The ICIQ-SF was used to evaluate UI, which despite being widely used both in Brazilian and in international studies, does not exempt the use of other methods in clinical practice, such as detailed anamnesis, general and specific physical examinations, daily urinary reports, and urodynamic evaluations.

REFERENCES

1. Caldas CP, Conceição IRS, José Rita MC, Silva BMC. Terapia comportamental para incontinência urinária da mulher idosa: uma ação do enfermeiro. Texto Contexto Enferm. 2010 Out-Dez; 19(4):783-88.
2. Kocak I, Okyay P, Dundar H, Erol H, Beser E. Female urinary incontinence in the west of Turkey: prevalence, risk factors and impact on quality of life. Euro Urol. 2005 Oct; 48:634-41.
3. Ahmed N, Mandel R, Fain M. Frailty: an emerging geriatric syndrome. Am J Med. 2007 Jul;120:748-53.
4. Coll-Planas L, Denkinger MD, Nikolaus T. Relationship of urinary incontinence and late-life disability: implications for clinical work and research in geriatrics. Z Gerontol Geriat. 2008 Aug;11:283-90.
5. Haylen BT, Ridder D, Freeman RM, Swit SE, Berghmans B, Lee J, et al. An international urogynecological association (IUGA)/International continence society (ICS) joint report on the terminology. Neurol Urodyn. 2010 Dec; 29:4-7.
6. Tanaka Y, Nagata K, Tanaka T, Kuwano K, Endo H, Otani T, et al. Can an individualized and comprehensive care strategy improve urinary incontinence among nursing home residents? Arch Gerontol Geriatr. 2008 Dec; 10(16):1-6
7. Du Moulin MF, Hamers JPH, Ambergen AW, Halfens RJG. Urinary incontinence in older adults receiving home care diagnosis and strategies. Scand J Caring Sci. 2009 Jun; 23:222-30.
8. Offermans MPW, Du Moulin MFMT, Hamers JPH, Dassen T, Halfens RJG. Prevalence of urinary incontinence and associated risk factors in nursing home residents: a systematic review. Neurourol Urodyn. 2009 Feb; 28:288-94.
9. Kincade JE, Dougherty MC, Carlson JR, Wells EC. Factors related to urinary incontinence in community-Dwelling women. Urol Nurs. 2007 Aug; 27(4):307-17.

10. Padrós J, Peres T, Salva A, Denkinger MD, Coll-Planas L. Evaluation of a urinary incontinence evaluation of a urinary incontinence unit for community-dwelling older adults in Barcelona: implementation and improvement of the perceived impact on daily life, frequency and severity of urinary incontinence. Z Gerontol Geriatric. 2008 Aug; 41:291-7.
11. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiner J et al. Frailty in older adults: evidence for a phenotype. J Gerontol. 2001 Mar; 5(3):146-53.
12. Bertolucci PHF, Brucki SMD, Capamacci S, Juliano Y. O mini-exame do estado mental em uma população geral. Impacto da escolaridade. Arq Neuropsiquiatr.1994 Mar; 52:1-7.
13. Batistoni SST, Neri AL, Cupertino AP. Validade da escala de depressão do Center for Epidemiological Studies entre idosos brasileiros. Rev Saúde Pública. 2007 Aug; 41: 598-605.
14. Riberto M, Miyazaki MH, Jorge Filho D, Sakamoto H, Battistella LR. Reprodutibilidade da versão brasileira da Medida de Independência Funcional. Acta Fisiatr Aug. 2001; 7(2):45-52.
15. Riberto M, Miyazaki MH, Jucá SSH, Sakamoto H, Pinto PPN, Battistella LR. Validação da versão brasileira da medida de independência funcional. Acta Fisiatr. 2004 Nov; 11(2):72-6.
16. Tamanini JTN, Dambros M, Dáncona CAL, Palma PCR, Netto Junior NR. Validação para o português do "International Consultation on Incontinence Questionnaire – Short Form" (ICIQ-SF). Rev Saúde Publica. 2004 Jun; 38(3):438-4.
17. Tamanini JT, Lebrão ML, Duarte YAO, Santos JLF, Laurenti R. Analysis of the prevalence and factors associated with urinary incontinence among elderly people in the municipality of São Paulo, Brazil: SABE study (Health, Wellbeing and Aging). Cad Saúde Pública. 2009 Aug; 25(8):1756-62.
18. Kikuchi A, Niu K, Ikeda Y, Hozawa A, Nakagawa H, Guo H, Ohmori-Matsuda K, Tsuji I, Nagatomi R. Association betwen physical activity and urinary incontinence in a community-based elderly population aged 70 years and over. Eur Urol. 2007 Mar; 52:868-75.
19. Anger JT, Saigal CS, Pace J, Rodriguez LV, Litwin MS. True prevalence of urinary incontinence among female nursing home residents. J. Urology. 2006 Feb; 67(2):281-7.
20. Busato WFS, Mendes FM. Incontinência urinária entre idosos institucionalizados: Relação com mobilidade e função cognitiva. Arq Cat Med. 2007 Abr; 36(4):49-55.
21. Sebben V, Tourinho Filho H. Incidência de incontinência urinária em participantes do Creati do município de Passo Fundo/RS. RBCEH. 2008 Jul/Dez; 5(2):101-9.
22. Kwong PW, Cumming RG, Chan L, Seibel MJ, Naganathan v, Creasey H, et al. Urinary incontinence and quality of life among older community-dwelling Australian men: the CHAMP study. Age Ageing. 2010 Mar:13-9.
23. Booth J, Kulien S, Zang Y. Promoting urinary continence with older people: key issues for nurses. Int J Older People Nurs. 2009 Mar; 4:63-9.
24. Lazari ICF, Lojudice DC, Marota AG. Avaliação da qualidade de vida de idosas com incontinencia urinaria: idosas institucionalizadas em instituição de longa permanência. Rev Bras. Geriatria Gerontologia; 2009 Dez;12(1):103-12.
25. Harari D, Ignedioh C. Restoring continence in frail older people living in the community: what factors influence successful treatment outcomes. Age Ageing. 2008 Dec; 6: 228-232.
26. Byles J, Millar CJ, Sibbritt DW, Chuiarelli P. Living with urinary incontinence: a longitudinal study of older women. Age Ageing. 2009 Mar; 38: 333-8.
27. Haris A. Providing urinary continence care to adults at the end of their life. Nurs times. 2009 Jul; 105(9):1-7.
28. Dubeau CE, Kuchel GA, Jhonson II T, Palmer MH, Wagg A. Incontinence in frail elderly: report from the 4th International Consultation on Incontinence. Neurourol Urodyn. 2010 Dec; 29:165-178.
29. Visnes AG, Harkless GE, Nyronning S. United-based intervention to improve urinary incontinence in frail elderly. Vard. Norden. 2007 Mar; 27(3): 53-56.
30. Hagglund D. A systematic review of incontinence care for persons with dementia: the research evidence. J Clin Nurs. 2010 Feb; 19: 303-312.
31. Goode PS, Burgio KL, Redden DT, Markland A, Richter HE, Sawyer P, et al. Population based study of incidence and predictors of urinary incontinence in black and white older adults. J Urol. 2008 Mar; 179:1449-1454.
32. Miu DKY, Lau S, Szeto SSL. Etiology and predictors of urinary incontinence and its effects on quality of life. Geriatr Gerontol Int. 2009 Nov: 1-6.
33. Chen YM, Hwang SJ, Chen LK, Chen DY, Lan CF. Urinary incontinence among institutionalized oldest old Chinese men in Taiwan. Neurourol Urodyn.2009 Dec; 28:335-8.
34. Teunissem TAM, Lagro-Janssen ALM, Van Den Bosch WJHM, Van Den Hoogen HJM. Prevalence of urinary, fecal and double incontinence in the elderly living at home. Int Urogynecol. 2004 Jan-Feb;15:10-13.
35. Aslan E, Beji NK, Erkan HA, Yalcin O, Gungor F. Urinary incontinence and quality life of the elderly residing in residential homes in Turkey. Arch Gerontol Geriatr. 2008 Apr:1-7.

36. Griebling TL. Urinary incontinence in the elderly. Clin Geriatr Med. 2009 Aug; 25:445-457.

37. Krause MP, Albert SM, Elsangedy HM, Krinski K, Goss FL, Silva SG. Urinary incontinence and waist circumference in older women. Age Ageing. 2010 Nov; 39:69-73.

Correspondence to: Vanessa Abreu da Silva
Rua Deoclésio Camara Mattos, 570.
13045-425 – Vila Carminha, Campinas, SP, Brazil
E-mail: vanisabreu@hotmail.com