

Prevalence of Urgency and Urge Incontinence in Elderly Male and Female Population

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ABSTRACT

Aim: To determine the prevalence of urinary incontinence and its associated factors in elderly individuals.

Study design: Prospective cross-sectional study

Place and duration of study: Department of Urology and Department Obstetrics & Gynaecology, Khairpur Medical College, Khairpur Mirs from 1st December 2014 to 31st December 2016.

Methodology: Three hundred and ten elderly patients aged 60 years and above of either gender attending outpatient department (OPD) were consecutively enrolled. The presence of urinary urgency and urge incontinence was assessed. Those individuals who reported leakage, severity of the urinary incontinence were assessed.

Results: The frequency of urinary urgency and urge incontinence in 74 (23.9%) patients. Among patients who have incontinence, 35 (47.3%) reported occasional urinary leakage while 39 (52.7%) reported frequent urinary leakage. The odds of urinary incontinence were 2 times significantly higher among females as compared to males (OR 2.06, 95% CI 1.01-4.17), The odds of urinary incontinence were 4 times significantly higher among urban residents as compared to rural residents (OR 4.67, 95% CI 2.41-9.04). The odds of urinary incontinence were 4 times significantly higher among individuals with comorbidities as compared to non-comorbid individuals.

Conclusion: Urinary incontinence was observed in considerable number of elderly populations and large populations of the individuals with urinary incontinence were females.

Keywords: Urinary incontinence, Urgency, Urge incontinence, Elderly, Gender, Epidemiology

INTRODUCTION

In elderly individuals, involuntary loss of urine is a common issue.¹ In particular, due to the increase in the life expectancy rate as well as the morbidity and disability issues in aged population, a rapid increase in the involuntary loss of urine problem is reported in literature.^{2,3} Since last two decades, a small number of studies have been conducted on urinary incontinence in individuals with musculoskeletal disorder, arterial hypertension, diabetes mellitus, chronic obstructive pulmonary disease, patients having depression or anxiety related issues, and other health related problems.⁴⁻⁶ However, the common findings noticed in most of the studies are same, i.e. older age individuals. In particular, among aged females, the prevalence is reportedly high.^{7,8} A study has reported almost half of the older aged women having urinary incontinence issue.⁹ Specifically, menopause and gynecological surgeries and disorders are reported as significant contributing factors.

The occurrence of urinary incontinence issue in elderly individuals, not only create problem for the patient but the caregiver as well. Moreover, the urinary incontinence issue also affects the quality of life of the individual and increase financial burden too.^{10,11} Though reasonable number of international studies are available on the prevalence of urinary incontinence and its related factors. However, limited number of studies was available from Pakistan, particularly on elderly population, which also highlight the need of the current estimates of burden and its associated factors in this at-risk population. Therefore, this

study was planned to determine the prevalence of urinary incontinence and its associated factors in elderly individuals

MATERIALS AND METHODS

This prospective cross-sectional study was conducted at Department of Urology and Obstetrics & Gynaecology, Khairpur Medical College, Khairpur Mirs from 1st December 2014 to 31st December 2016 and comprised 310 patients. All elderly patients aged 60 years and above of either gender were consecutively enrolled. The known case of chronic liver disease neurological disorders such as Parkinson, Alzheimer, cognitively impaired individuals, men with benign prostrate hyperplasia and prostate cancer, using diuretics, female with gynecological related disorders like utero-vaginal prolapse and pelvic and lower urinary tract surgeries and urinary tract infection (confirmed by urine culture and sensitivity) were also excluded.

The presence of urinary urge incontinence was assessed by asking the question: "Do you have trouble (to hold the urine more than 30 minutes) with leaking some urine and accidentally wetting yourself?" Those individuals who reported leakage, 1-3 times per month were labelled as having occasional urine loss while those with leakage at least once a week were labelled as having frequent urine loss. This information like age, gender, height, weight, BMI, residence, marital status, socioeconomic status, educational status, current occupational status, and presence of comorbidity (HTN, DM) were noted. The data was entered and analyzed through SPSS-24. Inferential

statistics were explored using independent t-test and chi-square test. P-value ≤ 0.05 considered as significant.

RESULTS

The mean age of the patients was 71.49 ± 7.01 years and 125 (40.3%) were males and 185 (59.7%) were females. The mean weight, height, and BMI of the patients were 59.98 ± 5.04 kg, 1.53 ± 0.05 m and 27.59 ± 4.82 kg/m² respectively. There were 154 (49.7%) patients who were from rural area while 156 (50.3%) were from urban area. Marital status showed 118 (38.1%) married. Majority of the patients belonged to lower middle socioeconomic status, i.e., 164 (52.9%) whereas educational status of majority of the patients was less than or equal to matric, i.e., 167 (53.9%). There were 134 (43.2%) retired individuals. Hypertension was observed in 216 (69.7%) and diabetes mellitus in 190 (61.3%) patients. The frequency of urinary incontinence was observed in 74 (23.9%) patients. A significant association of urinary incontinence was observed with gender (p-value < 0.001), residence (p-value < 0.001), socioeconomic status (p-value 0.015), retired (p-value < 0.001), and diabetes mellitus (p-value < 0.001) (Table 1).

Regression analysis showed that the odds of urinary incontinence were 2.83 times significantly higher among females as compared to males (OR 2.83, 95% CI 1.55-5.15). The urinary incontinence was 3.37 times significantly higher among females as compared to males (OR 3.37, 95% CI 1.91-5.94). The urinary incontinence was 85%

significantly lower among patients who were retired as compared to the patients who were not retired (OR 0.15, 95% CI 0.07-0.29). The urinary incontinence was 5.59 times significantly higher among hypertensive patients as compared to non-hypertensive patients (OR 5.59, 95% CI 2.32-13.45), whereas it was 2.65 times significantly higher among diabetic mellitus patients as compared to non-diabetics (OR 2.65, 95% CI 1.56-4.54). Similar findings were observed in multivariable analysis as well (Table 2)

Gender wise stratification was done to see the association of urinary incontinence with baseline characteristics. The findings showed that among males, urinary incontinence was significantly associated with age (p-value 0.005), residence (p-value 0.019), marital status (p-value 0.035), educational status (p-value 0.009), and hypertension (p-value 0.002). Whereas among females, urinary incontinence was significantly associated with residence (p-value < 0.001), socioeconomic status (p-value 0.001), retired (p-value 0.001), and diabetes mellitus (p-value < 0.001) (Table 3)

The severity of the urinary incontinence showed that out of 74 patients who reported urinary incontinence, 35 (47.3%) reported occasional urinary leakage while 39 (52.7%) reported frequent urinary leakage. A significant association of severity of urinary incontinence was observed with gender (p-value 0.001), retired individuals (p-value 0.006), and diabetes mellitus (p-value 0.001) (Table 4).

Table I. Comparison of urinary incontinence (UI) with baseline characteristics of patients (n=310)

Variable	Total	UI	No UI	P value
Age, years	71.49 \pm 7.01	71.21 \pm 6.17	71.58 \pm 7.26	0.697†
Weight, Kg	59.98 \pm 5.04	60.19 \pm 5.13	59.91 \pm 5.03	0.684
Height, m	1.53 \pm 0.06	1.54 \pm 0.06	1.53 \pm 0.06	0.512
BMI, kg/m²	27.59 \pm 4.82	27.39 \pm 5.04	27.66 \pm 4.75	0.667
Gender				
Male	125	17 (13.6%)	108 (86.4%)	$< 0.001^{\#}$
Female	185	57 (30.8%)	128 (69.2%)	
Residence				
Urban	154	53 (34.4%)	101 (65.6%)	$< 0.001^{\#}$
Rural	156	21 (13.5%)	135 (86.5%)	
Marital Status				
Married	118	29 (24.6%)	89 (75.4%)	0.819
Single	192	45 (23.4%)	147 (76.6%)	
Socioeconomic Status				
Low	75	14 (18.7%)	61 (81.3%)	0.015
Lower Middle	164	34 (20.7%)	130 (79.3%)	
Upper Middle	71	26 (36.6%)	45 (63.4%)	
Educational Status				
Illiterate	53	11 (20.8%)	42 (79.2%)	0.809
\leq Matric	167	40 (24.0%)	127 (76.0%)	
\geq Intermediate	90	23 (25.6%)	67 (74.4%)	
Retired				
Yes	134	7 (5.2%)	127 (94.8%)	< 0.001
No	176	67 (38.1%)	109 (61.9%)	
Hypertension				
Yes	216	58 (26.9%)	158 (73.1%)	0.062
No	94	16 (17.0%)	78 (83.0%)	
Diabetes Mellitus				
Yes	120	42 (35.0%)	78 (65.0%)	< 0.001
No	190	32 (16.8%)	158 (83.2%)	

†Independent t-test applied, $\#$ Chi-square test applied, p-value < 0.05 taken as significant

Table 2: Regression analysis of factors associated with urinary incontinence

Variable	OR (95% CI%)	p-value	aOR (95% CI%)	p-value
Gender				
Female	2.83 (1.55-5.15)	0.001	2.06 (1.01-4.17%)	0.046
Male	Ref		Ref	
Residence				
Urban	3.37 (1.91-5.94)	<0.001	4.67 (2.41-9.04%)	<0.001
Rural	Ref		Ref	
Socioeconomic Status				
Upper Middle	1.20 (0.56-2.55)	0.631		
Lower Middle	1.31 (0.58-2.96)	0.515		
Low	Ref			
Retired				
Yes	0.15 (0.07-0.29)	<0.001	0.18 (0.08-0.38)	<0.001
No	Ref		Ref	
Hypertension				
Yes	5.59 (2.32-13.45)	<0.001	4.29 (1.89-9.71)	<0.001
No	Ref		Ref	
Diabetes Mellitus				
Yes	2.65 (1.56-4.54)	<0.001	4.36 (2.06-9.26)	<0.001
No	Ref		Ref	

Table 3: Comparison of urinary incontinence (UI) with baseline characteristics of patients (n=310)

Variable	Male			Female		
	UI	No UI	p-value	UI	No UI	p-value
Age (years)	66.41 ±3.67	70.82 ±7.09	0.014†	72.65 ±6.06	72.21 ±7.35	0.699†
Weight (Kg)	59.23 ±5.21	59.72 ±4.95	0.709†	60.47 ±5.12	60.07 ±5.10	0.627†
Height (m)	1.53 ±0.05	1.53 ±0.05	0.973†	1.54 ±0.06	1.53 ±0.05	0.635†
BMI (kg/m²)	27.55 ±5.23	27.84 ±4.65	0.816†	27.34 ±5.02	27.51 ±4.84	0.821†
Residence						
Urban	14 (20%)	56 (80%)	0.019*	39 (46.4%)	45 (53.6%)	<0.001†
Rural	3 (5.5%)	52 (94.5%)		18 (17.8%)	83 (82.2%)	
Marital Status						
Married	2 (4.7%)	41 (95.3%)	0.035*	27 (36%)	48 (64%)	0.207†
Single	15 (18.3%)	67 (81.7%)		30 (27.3%)	80 (72.7%)	
Socioeconomic Status						
Low	8 (16.3%)	41 (83.7%)	0.352†	6 (23.1%)	20 (76.9%)	0.001†
Lower Middle	8 (15.1%)	45 (84.9%)		26 (23.4%)	85 (76.6%)	
Upper Middle	1 (4.3%)	22 (95.7%)		25 (52.1%)	23 (47.9%)	
Educational Status						
Illiterate	2 (11.1%)	16 (88.9%)	0.009*	9 (25.7%)	26 (74.3%)	0.2949†
≤matric	4 (6.1%)	62 (93.9%)		36 (35.6%)	65 (64.4%)	
≥Intermediate	11 (26.8%)	30 (73.2%)		12 (24.5%)	37 (75.5%)	
Retired						
Yes	3 (3.7%)	78 (96.3%)	<0.001†	8 (14.0%)	49 (86.0%)	0.001†
No	14 (31.8%)	30 (68.2%)		49 (38.3%)	79 (61.7%)	
Hypertension						
Yes	17 (20.2%)	67 (79.8%)	0.002*	41 (31.1%)	91 (68.9%)	0.908†
No	-	41 (100%)		16 (30.2%)	37 (69.8%)	
Diabetes Mellitus						
Yes	12 (15.2%)	67 (84.8%)	0.497†	20 (18.0%)	91 (82.0%)	<0.001†
No	5 (10.9%)	41 (89.1%)		37 (50%)	37 (50%)	

†Independent t-test applied, *Chi-square test applied, p-value <0.05 taken as significant

Table 4: Comparison of severity of urinary incontinence with baseline characteristics (n=310%)

Variable	Total	Occasional	Frequent	P value
Age, years	71.21±6.17	71.97±6.36	70.53±6.01	0.322†
Weight, Kg	60.18±5.13	60.20±5.10	60.17±5.22	0.986†
Height, m	1.54±0.06	1.53±0.06	1.54±0.06	0.839†
BMI, kg/m²	27.38±5.03	27.31±4.99	27.44±5.14	0.912†
Gender				
Male	17	14 (82.4%)	3 (17.6%)	0.001†
Female	57	21 (36.8%)	36 (63.2%)	

Residence				
Urban	53	22 (41.5%)	31 (58.5%)	0.113 [‡]
Rural	21	13 (61.9%)	8 (38.1%)	
Marital Status				
Married	29	14 (48.3%)	15 (51.7%)	0.892 [‡]
Single	45	21 (46.7%)	24 (53.3%)	
Socioeconomic Status				
Low	14	6 (42.9%)	8 (57.1%)	0.381 [‡]
Lower Middle	34	19 (55.9%)	15 (44.1%)	
Upper Middle	26	10 (38.5%)	16 (61.5%)	
Educational Status				
Illiterate	11	7 (63.6%)	4 (36.4%)	0.461 [‡]
≤matric	40	17 (42.5%)	23 (57.5%)	
≥Intermediate	23	11 (47.8%)	12 (52.2%)	
Retired				
Yes	11	1 (9.1%)	10 (90.9%)	0.006 [‡]
No	63	34 (54%)	29 (46%)	
Hypertension				
Yes	58	24 (41.4%)	34 (58.6%)	0.052 [‡]
No	16	11 (68.8%)	5 (31.3%)	
Diabetes Mellitus				
Yes	32	22 (68.8%)	10 (31.3%)	0.001 [‡]
No	42	13 (31%)	29 (69%)	

Independent t-test applied, ‡Chi-square test applied, p-value <0.05 taken as significant

DISCUSSION

The present study analyzed and reported the burden of urinary incontinence in aged individuals. The calculated prevalence of incontinence from our analysis was 23.9%. Somewhat similar findings were reported in previous studies as well. In a study conducted by Kessler et al, the reported prevalence of urinary incontinence was 20.7%.³ Sims et al in their study reported urinary incontinence as 28% among older adults.¹¹ The possible explanation for high prevalence in our aged individuals favors several existing literatures that in older individuals, significant relation of breathlessness was observed with urinary incontinence.^{5,12,13} This could be due to the disrupted neurophysiological system associated with continence mechanism. The imbalance between the two autonomic systems results in the induction of unconscious urine loss as stated by Burge et al in their study culminating in the feeling of urgency.¹⁴ In addition, it is reported that increased intra thoracic and intra-abdominal pressure is associated with coughing and imbalance between neurological systems in older age individual.¹⁵ Hence people with complain of leakage have markedly decrease urine hold capacity.

Marked difference of prevalence amongst various literature is reported as a result of inclusion of both male and female subjects, as association of urinary incontinence with gender discrimination prevails.^{7,17,18} Researchers support that female community outweighs men showing significantly high prevalence with 74.6% out of 59 reported incontinence in contrast to 51% of males out of 49 which is consistent with the findings of Hrisanfow et al¹⁹ who reported the prevalence difference between males and females with COPD suffering with urge incontinence. In the current study, 13.6% males while 30.8% females reported urinary incontinence. In particular, urinary incontinence was found two times higher in females as compared to males. The study by Hirayama et al²⁰ among 668 male participants

estimated the prevalence of urinary continence in 7.6% males. A cross sectional study from Manchester reported the pervasiveness of about 68% of urinary incontinence associated among female population with cystic fibrosis.²¹ It is predicted in a study stated that a total of 134,000 females with COPD over the age of 70 years will have had complain of urinary incontinence by 2025.²⁰

Additional factors such as diabetes and hypertension were also assessed, and the results were found significant. In particular, hypertensive and diabetic patients were four times significantly more likely to have urinary incontinence as compared to non-hypertensive or non-diabetic patients. When populations were stratified based on gender, all hypertensive males reported urinary incontinence. Similar findings were reported in previous study as well.^{4,22,23} Thus, by far co-morbidities were reported as the major inducing factors for urinary incontinence both in males and females.

There is a need not only healthcare providers, but the caregivers or household member of older individuals should inquire about the urinary incontinence issue from older individuals. Lacking general awareness of interventional possibilities and embarrassment in discussing urinary incontinence acts as barriers for availing care for incontinence and its primary causes. To date many interventional strategies have been designed and implemented worldwide to treat and prevent urinary incontinence comprising of pelvic floor muscle strengthening techniques, bladder training regimes, behavioral modifications, pharmaceutical remedies, certain devices, and surgical procedures.²⁴ Nevertheless, physical therapy is considered as the treatment of choice.²⁵⁻²⁷ Therefore, the physiotherapy specialist could be acquired to assess for the implementation of rehabilitation exercise at least to ensure and improve the timely contraction and strength and stability of pelvic floor muscles.²⁸

The finding of this study is important as it has reported the current estimates of urinary incontinence issue in older individuals. The underlying cause of the urinary

incontinence issue in aged population should not be diagnosed as it may be due to the alteration in the urinary structures. This issue could not be ignored and studied in comparison with other inducing factor. Limited resources were a limitation due to which certain important predictor variables were not studied in this study. The current study was also limited due to the inclusion of the single center.

CONCLUSION

The urinary incontinence in considerable number of elderly populations was observed in our study. Moreover, despite of age-related changes to the structures maintaining continence, incontinence depends on multiple factors like working status and presence of comorbidities rather solely on advancing age. Lastly, despite of the exclusion of elderly females with gynecological disorder or surgeries in the current study, a large cohort of the individuals with urinary incontinence were females.

REFERENCES

- Shaw C, Wagg A. Urinary incontinence in older adults. *Medicine* 2017;45(1):23-7.
- Lino VTS, Rodrigues NCP, Andrade MKN, Reis INC, Lopes LAE, Atie S. Association between visual problems, insufficient emotional support and urinary incontinence with disability in elderly people living in a poor district in Rio de Janeiro, Brazil: A six-year follow-up study. *PLoS One* 2019;14(5):e0217456.
- Kessler M, Facchini LA, Soares MU, Nunes BP, França SM, Thumé E. Prevalence of urinary incontinence among the elderly and relationship with physical and mental health indicators. *Rev Bras Geriatr Gerontol* 2018;21(4):397-407.
- Singh DKA, Shahar S, Vanoh D, Kamaruzzaman SB, Tan MP. Diabetes, arthritis, urinary incontinence, poor self-rated health, higher body mass index and lower handgrip strength are associated with falls among community-dwelling middle-aged and older adults: Pooled analyses from two cross-sectional Malaysian datasets. *Geriatr Gerontol Int* 2019;19(8):798-803.
- Battaglia S, Benfante A, Principe S, Basile L, Scichilone N. Urinary Incontinence in Chronic Obstructive Pulmonary Disease: A Common Co-morbidity or a Typical Adverse Effect? *Drugs Aging* 2019;36(9):799-806.
- Ströher RLM, Sartori MGF, Takano CC, de Araújo MP, Girão MJBC. Metabolic syndrome in women with and without stress urinary incontinence. *Int Urogynecol J* 2020;31(1):173-179.
- Moreno CRC, Santos JLF, Lebrão ML, Ulhôa MA, Duarte YAO. Sleep disturbances in older adults are associated to female sex, pain and urinary incontinence. *Rev Bras Epidemiol* 2019; 21: e180018.
- Kim KJ, Shin J, Choi J, Park JM, Park HK, Lee J, et al. Association of geriatric syndromes with urinary incontinence according to sex and urinary-incontinence-related quality of life in older inpatients: a cross-sectional study of an acute care hospital. *Korean J Fam Med* 2019;40(4):235-40.
- Hunskar S, Arnold EP, Burgio K, Diokno AC, Herzog AR, Mallett VT. Epidemiology and natural history of urinary incontinence. *Int Urogynecol J Pelvic Floor Dysfunct* 2000;11(5):301-19.
- Carsughi A, Santini S, Lamura G. Impact of the lack of integrated care for older people with urinary incontinence and their family caregivers: results from a qualitative pilot study in two large areas of the Marche Region. *Ann Ist Super Sanita* 2019;55(1):26-33.
- Sims J, Browning C, Lundgren-Lindquist B, Kendig H. Urinary incontinence in a community sample of older adults: prevalence and impact on quality of life. *Disabil Rehabil* 2011;33(15-16):1389-98.
- Bocquet L, Gravier FE, Smondack P, Prieur G, Combret Y, Muir JF, et al. Urinary incontinence in people referred for pulmonary rehabilitation: an undisclosed issue but a real problem. *Phys Ther* 2020; 217.
- Chin KS, Wilson C, Rose GE, Ervin CF, Goldin J, Whishaw DM, Bower WF. Does successful treatment of urinary urgency or sleep disordered breathing improve nocturia and centrally driven comorbidities? *Aust N Z Continence J* 2018;24(3).
- Burge AT, Lee AL, Kein C, Button BM, Sherburn MS, Miller B, Holland AE. Prevalence and impact of urinary incontinence in men with chronic obstructive pulmonary disease: a questionnaire survey. *Physiotherapy* 2017;103(1):53-8.
- Lee KK, Davenport PW, Smith JA, Irwin RS, McGarvey L, Mazzone SB, et al. Global physiology and pathophysiology of cough: part 1: cough phenomenology - chest guideline and expert panel report. *Chest* 2021;159(1):282-93.
- Mostafaei H, Sadeghi-Bazargani H, Hajebrahimi S, Salehi-Pourmehr H, Ghojzadeh M, Onur R, et al. Prevalence of female urinary incontinence in the developing world: A systematic review and meta-analysis - a report from the Developing World Committee of the International Continence Society and Iranian Research Center for Evidence Based Medicine. *Neurourol Urodyn* 2020;39(4):1063-86.
- Tsui A, Kuh D, Cardozo L, Davis D. Vascular risk factors for male and female urgency urinary incontinence at age 68 years from a British birth cohort study. *BJU Int* 2018;122(1):118-25.
- Tamanini JTN, Pallone LV, Sartori MGF, Girão MJBC, Dos Santos JLF, de Oliveira Duarte YA, van Kerrebroeck PEVA. A populational-based survey on the prevalence, incidence, and risk factors of urinary incontinence in older adults-results from the "SABE STUDY". *Neurourol Urodyn* 2018;37(1):466-77.
- Hrisanfov E, Häggglund D. The prevalence of urinary incontinence among women and men with chronic obstructive pulmonary disease in Sweden. *J Clin Nurs* 2011;20(13-14):1895-905.
- Hirayama F, Binns CW, Lee AH, Senjyu HJ, Jo PTS. Urinary incontinence in Japanese women with chronic obstructive pulmonary disease. *J Phys Ther Sci* 2005;17(2):119-24.
- Orr A, McVean RJ, Webb AK, Dodd ME. Questionnaire survey of urinary incontinence in women with cystic fibrosis. *BMJ* 2001;322(7301):1521.
- Northwood M, Ploeg J, Markle-Reid M, Sherifali D. Understanding the complexity of diabetes and urinary incontinence in older adults receiving home care services: Protocol for a mixed methods study. *Int J Qual Methods* 2019;18:1609406919852000.
- Mahishale A, Ambre P, Kantanavar KA. Prevalence of urinary incontinence in males with type 2 diabetes mellitus. *Diabetes Metab Syndr* 2019;13(5):2953-6.
- Abrams P, Andersson KE, Birder L, Brubaker L, Cardozo L, Chapple C, et al. Fourth international consultation on incontinence. fourth international consultation on incontinence recommendations of the international scientific committee: evaluation and treatment of urinary incontinence, pelvic organ prolapse, and fecal incontinence. *Neurourol Urodyn* 2010;29(1):213-40.
- Mazur-Bialy AI, Kołomańska-Bogucka D, Nowakowski C, Tim S. Urinary Incontinence in women: modern methods of physiotherapy as a support for surgical treatment or independent therapy. *J Clin Med* 2020;9(4):1211.
- Lausen A, Marsland L, Head S, Jackson J, Lausen B. Modified Pilates as an adjunct to standard physiotherapy care for urinary incontinence: a mixed methods pilot for a randomised controlled trial. *BMC Womens Health* 2018;18(1):16.
- Becher K, Bojack B, Ege S, von der Heide S, Kirschner-Hermanns R, Wiedemann A. Urinary incontinence in geriatric patients: behavioral therapy, toilet training and physiotherapy. *Aktuelle Urol* 2019;50(5):524-37.
- Tomasi AV, Santos SM, Honório GJ, Locks MO. Urinary incontinence in elderly people: care practices and care proposal in primary health care. *Texto Contexto-Enfermagem* 2017;26(2).