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Evaluation of factors associated with urinary incontinence in elderly people in long-term care homes

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ABSTRACT. The aim of this study was to assess the factors associated with the occurrence of urinary incontinence (UI) in elderly people living in long-term care homes. Reports on Urinary Incontinence coupled to clinical-functional and socio-demographic data were retrieved from the medical records of elderly people. In addition, the application of the protocols: Mini-Mental State Examination, Katz Index, Short Physical Performance Battery. It was considered a significance level of 5%. It was noted that the UI occurred in 80.6% of elderly people, with average age 76.5 years (± 8.3) and average time at the care home reaching 5.2 years (± 6.4). Significant UI association was reported with gender, education and disease. A discrete increase in scores occurred in protocols for elderly people without UI occurrence. It is concluded that sample was characterized by elderly females with less than five years living in homes. The elderly with UI were similar to elderly people in general with regard to protocols.

Keywords: aging, urinary system, care home for the elderly.

Avaliação de fatores associados à ocorrência de incontinência urinária em idosos institucionalizados

RESUMO. O objetivo deste estudo foi avaliar os fatores associados à ocorrência de Incontinência Urinária (IU) em idosos institucionalizados: Foram coletados nos prontuários médicos de idosos a presença de IU, dados sociodemográficos e clínico-funcionais. Além disso, houve a aplicação dos protocolos: O Mini-Exame do Estado Mental, Índice de Katz, Teste *Short Physical Performance Battery*. Foi considerado um nível de significância de 5%. Constatou-se que a IU esteve presente em 80,6% dos idosos, com média de idade de 76,5 anos ($\pm 8,3$) e tempo médio de institucionalização de 5,2 anos ($\pm 6,4$). Houve associação significativa de IU com sexo, escolaridade e doenças. Foi observada uma discreta superioridade dos escores nos protocolos para os idosos sem IU. Conclui-se que a amostra foi caracterizada por mulheres, de idade avançada e menos de cinco anos de institucionalização. Nos protocolos, os idosos incontinentes se assemelharam com os idosos em geral.

Palavras-chave: envelhecimento, sistema urinário, instituição de longa permanência para idosos.

Introduction

Urinary Incontinence (UI), characterized as the involuntary emission of urine, is one of the chronic conditions triggered by the aging process (Haylen et al., 2010). It affects all elderly people, with greater prevalence in elderly females (Lazari, Lojudice, & Marota, 2009).

Its occurrence greatly increases with age due to functional and structural changes in the urinary system. In fact, it occurs in approximately 50% of elderly people in specialized care homes and double that number in elderly people in the community (Boyington et al., 2007).

The main causes that may contribute towards UI in elderly people comprise hormonal and cognitive alterations, intestinal constipation, immobility,

atrophy of the muscles and tissues, slowing down of the functional response of the nervous and circulatory systems, decrease in bladder size, chronic diseases and obesity (Haylen et al., 2010). The permanence of elderly people in long-term care homes may be a risk factor for UI (Hasegawa, Kuzuya, & Iguchi, 2010).

A census-analysis on Long-Term Institutions for the Elderly (LTIEs) in Brazil developed by the Institute for Applied Economic Research (IPEA) identified 3,549 homes with approximately 84,000 elderly people. Most LTIEs were charities (65.2%) and only 6.6% were government-run. In fact, the former category consisted of small-sized homes run as charities, sometimes with half-board facilities (Camarano & Kanso, 2010).

It is expected that there is a high increase in LTIEs in which social assistance, help in chronic diseases and UI are provided (Menezes, Bachion, Souza, & Nakatani, 2011). Involuntary issue of urine may be conceived as a geriatric syndrome due to its high prevalence in the elderly and to the negative impact in their life quality (Honório & Santos, 2009).

Investigation on the characteristics of elderly people with UI in care homes is crucial for the planning of its prevention and treatment to reduce its occurrence and health problems caused by the disease and to improve life quality and decrease health costs. Since the occurrence of UI and its factors in Brazil are poorly known, studies on the population suffering from this ailment will bring great benefits.

Physiotherapy is one of the intervention strategies to reduce UI occurrences and its possible risk factors which may bring about hospitalization, dependences and death (Prochet & Silva, 2008).

Current investigation assesses the factors associated with UI in elderly people in long-term care homes.

Material and methods

Current observation and transversal research has been undertaken in three care homes for elderly people in a town in the central region of the state of Rio Grande do Sul, Brazil. Data were collected between August 2013 and January 2014, after approval of the project by the Standing Committee for Ethics in Research (322.139/13) and written consent (TCLE) by the elderly people involved. In the case of some elderly people could not sign, the signature of the director of the home care was required.

Inclusion criteria comprised age equal to or over 60 years old and living in a charity home; exclusion criteria involved neurological changes, deficiency in judging, language, cognition or dementia impeding understanding of the procedures necessary for the evaluation of the variable in the study, or refusing to participate in the study or to sign the TCLE.

The convenience and consecutive sample was composed of 142 elderly people. Forty-four were excluded due to the fact that they did not reach the 11 scores in the Mini-Mental State Examination (MMSE) for verbal understanding and communication, following Folstein, Folstein, and McHugh (1975). Due to information deficits on schooling in the elderly people's charts and due to the wide-score bands for dementia in the classification by Folstein, Folstein, and McHugh

(1975), current analysis employed this classification. The final sample was composed of 98 elderly people, comprising 32 males and 66 females.

MMSE (Folstein, Folstein, & McHugh, 1975) verified the cognitive function and identified as non-diagnosed cognitive deficiency. It is divided into five sessions (guidance, immediate memory, attention and calculation, evocation and language) and classifies the elderly without any cognitive deficiency when score is equal to or higher than 24; slight cognitive decrease when score are between 19 and 23; moderate cognitive decline between 11 and 18 scores.

Sample characterization initially comprised UI and socio-demographic (gender, age, civil status, schooling and duration in the care home), clinical and functional (falls, broken limbs per fall, gait help, physical activity, depression, number of diseases and medicines) data retrieved from the elderly people's clinical charts.

The following protocols were then applied: Katz Index to evaluate the functional capacity for the performance of Basic Activities of Daily Living (BADL) involving taking a shower, putting clothes, going to the toilet, rising from bed and going to the chair and vice-versa, sphincter continence and taking food. Scores are the result of the sum of positive responses, or rather, six scores mean independence in BADL; four scores mean partial dependency; two scores mean high dependency (Katz, Downs, Cash, & Grotz, 2006).

The Short Physical Performance Battery (SPPB) (Guralnik et al., 1994) was further applied to 75 elderly people. The physical test was not possible for the remaining 23 elderly people who used wheel chairs.

SPPB comprises three tests: the first evaluates static equilibrium in three positions (feet together; one foot slightly in front of the other; one foot in front of the other); the second test evaluates gait speed in which the time spent to walk three meters in normal gait is registered; the third test evaluates the strength of the lower members and the time taken to rise up and sit down on a chair for five consecutive times without holding on the hands is registered. Scores 0-4 are given for the three tests according to the time taken for each task. Score 0 is given in the case of impossibility to perform any of the tasks. Total scores is the sum of results of equilibrium, gait speed and strength of lower members, ranging between 0 (worst performance) and 12 scores (best performance). Result may range between 0 and 3 scores for inability or bad

performance; 4-6 scores for low performance; 7-9 scores for moderate performance; 10-12 scores for good performance (Guralnik et al., 1994; Ferrucci et al., 2000; Penninx, Ferruci, & Leveille, 2000).

Data were analyzed by Statistica 9.1, with calculations of descriptive measures and frequency distributions. Odds ratio and confidence interval at 95 were employed at 5% significance. Mann-Whitney non-parametric U test was applied to compare scores of the two groups.

Results and discussion

The samples comprised 98 elderly people in long-term care homes, average age 76.3 years (± 8.5), ranging between 60 and 94 years old. Mean duration at the care home was 5.6 years (± 6.9), ranging between 0.1 and 42 years. UI occurred in 79 (80.6%) elderly people in the care home, average age 76.5 years (± 8.4), ranging between 61 and 94 years old. Mean duration at the care home was 5.1 years (± 6.4), ranging between 0.16 and 42 years. UI was significantly associated with gender and schooling.

Table 1. Distribution of frequencies and association measurements of socio-demographic aspects of urinary incontinence of elderly people in care homes.

Variable	Categories	Elderly people (%)	Elderly people with UI (%)	p valor	OR (IC95%)
Gender	Male	32 (32.7)	21 (26.6)	0.012	1
	Female	66 (67.3)	58 (73.4)		3.8 (1.3 – 10.7)
Age (years)	Between 60 and 70	25 (25.5)	19 (24.0)	0.630	1
	Between 71 and 80	42 (42.9)	34 (43.1)		1.3 (0.4 – 4.4)
	81 or over	31 (31.6)	26 (32.9)		1.6 (0.4 – 6.2)
Civil status	Bachelor	50 (51.0)	41 (51.9)	0.302	1
	Widower	39 (39.8)	32 (40.6)		0.4 (0.1 – 2.1)
	Others	09 (9.2)	06 (7.5)		1.0 (0.3 – 3.0)
Schooling*	Illiterate	14 (14.3)	08 (10.1)	0.023	1
	Incomplete basic schooling or above	84 (85.7)	71 (89.9)		4.1 (1.2 – 13.8)
Years at care home (years)	0.1 - 4.9	55 (56.1)	45 (57.0)	0.351	1
	5 - 9.9	29 (29.6)	26 (32.9)		1.9 (0.5 – 7.6)
	10 or more	14 (14.3)	08 (10.1)		0.3 (0.1 – 1.0)
Total		98 (100.0)	79 (100.0)		

OR = Odds Ratio; IC = Confidence Interval; *Incomplete Basic schooling = 1-4 years of schooling; Complete Basic schooling or over = 5 or more schooling years; UI = Urinary Incontinence.

Table 2. Clinical and functional characteristics of elderly people in care homes and the association with UI occurrence.

Variables	Categories	Number of elderly people (%)	Number of elderly people with UI (%)	p valor	OR (IC 95%)
Falls*	No	25 (25.5)	18 (22.7)	0.212	1
	Yes	73 (74.5)	61 (77.3)		2.0 (0.7 – 5.8)
Limb-breaking per fall	No	72 (73.5)	58 (73.5)	0.981	1
	Yes	26 (26.5)	21 (26.5)		1.0 (0.2 – 3.2)
Gait help	No	44 (44.8)	33 (41.7)	0.209	1
	Yes	54 (55.2)	46 (58.3)		1.9 (0.7 – 5.3)
Physical activity	No	06 (6.1)	05 (6.3)	0.853	1
	Daily	25 (25.6)	20 (25.3)		0.8 (0.1 – 8.5)
	Weekly	32 (32.6)	24 (30.4)		0.6 (0.1 – 6.0)
	Fortnightly or more	35 (35.7)	30 (38.0)		1.2 (0.1 – 12.5)
Depression	No	18 (18.3)	14 (14.0)	0.737	1
	Yes	80 (81.7)	65 (66.0)		1.2 (0.4 – 4.3)
Diseases	≤ 2	11 (11.2)	06 (7.6)	0.029	1
	3 or more	87 (88.8)	73 (92.4)		4.3 (1.2 – 16.2)
Medicines	1 ou 2	07 (7.1)	04 (5.0)	0.164	1
	3 ou 4	14 (14.3)	12 (15.2)		4.5 (0.5 – 37.4)
	5 or more	77 (78.3)	63 (79.8)		3.4 (0.7 – 16.8)
Total		98 (100.0)	79 (100.0)		

OR = Odds Ratio; IC = Confidence Interval; *During stay at care home; UI = Urinary Incontinence.

Table 1 shows distribution of the elderly according to socio-demographic variables and UI occurrence.

One may note that elderly females have approximately three times as much the risk of having UI when compared to elderly males, while males with more schooling are three fold more prone to the disease when compared to illiterate ones.

Table 2 shows the prevalence of possible factors related to UI such as gait help, limb breaking per fall, physical activity, depression, number of diseases, medicines and the association of the variables with UI.

Elderly people with three or more diseases had three times more chance of having UI when compared with people with two diseases at the most.

In the case of the number of medicines, mean was 8.0 per elderly (± 3.6), with 17 as the highest number of medicines. It should be underscored that all elderly people took medicines.

Table 3 displays comparative results of the application of protocols among elderly people in care homes, with or without UI.

Table 3. Comparison between protocol scores of elderly people in care homes with regard to the occurrence of UI.

Variables	Elderly people without UI		Elderly people with UI		p valor
	Min-Max	Mean ($\pm$ SD)	Min-Max	Mean ($\pm$ SD)	
Equilibrium	0 - 4	2.9 ($\pm$ 1.36)	0 - 4	2.8 ($\pm$ 1.15)	0.636
Gait	0 - 4	2.3 ($\pm$ 1.39)	0 - 4	2.2 ($\pm$ 1.18)	0.589
Strength	0 - 4	2.3 ($\pm$ 1.12)	0 - 4	1.7 ($\pm$ 1.35)	0.103
SPPB	3 - 11	7.6 ($\pm$ 2.82)	1 - 12	6.6 ($\pm$ 2.85)	0.195
Katz	1 - 6	4.6 ($\pm$ 1.83)	0 - 6	4.4 ($\pm$ 1.82)	0.598
MEEM	13 - 28	20.0 ($\pm$ 5.10)	12 - 29	20.5 ($\pm$ 4.85)	0.665

Mann-Whitney U test; SD = standard deviation; SPPB: Short Physical Performance Battery; MMSE: Mini-Mental State Examination; UI = Urinary Incontinence.

A slight rise in scores may be observed in elderly people without UI, albeit statistically insignificant, except for MMSE.

Current analysis revealed a high percentage (80.6%) of elderly people with UI in care homes. Lower percentages were reported in research in two cities in southern Brazil, or rather, 57.3% of elderly people in care homes suffered from UI (Busato & Mendes, 2007). Although percentages are high for the population, UI among the elderly should not be considered a natural occurrence of the age bracket since there are several causes that may trigger the event (Torrealbra & Oliveira, 2010). According to Boyington et al. (2007), elderly people in care homes are more prone to have urine emissions than elderly people of the community due to co-morbidities and the health care processes such as pharmacological treatment, nutrition, reduced mobility, caretakers' overload.

Current investigation corroborates reports by researchers on the high occurrence of UI in females, average age 76.5 years and low schooling rates (Silva, Souza, & D'Elboux, 2011). Specialized literature mentions the weakening of the pelvic floor muscles due to aging and multiparity as the main factors that may trigger urine emission (Vieira, 2004). In the case of low schooling rates, the study claims that females with few years of schooling have a precarious understanding of the conditions that provoke urine emission (Knorst et al., 2013). In fact, elderly people involved in the study had difficulties in attending school when young (Paskulin & Vianna, 2007).

Current study shows that 51.9% of females in care homes were single. It corroborates a similar study with 54.6% of the single elderly females with UI (Lazari et al., 2009). The authors of current study are of the opinion that urinary incontinence in female elderly people constitutes a predictor factor for entering care homes due to lack of family support with regard to the care of the elderly.

Current analysis shows that there is a higher occurrence of UI associated with less time in the care home corroborating results of a research underscoring that care homes may increase the UI prevalence after a certain period in the home (Boyington et al., 2007; Martínez-Agulló et al., 2009).

Further, 77.3% of elderly people with UI have already experienced some type of fall. An international study has revealed that urinary emission may cause falls through several modalities such as slipping on wet floors; moving fast to the toilet, causing slips; symptoms of infections in the urinary tract that makes the elderly prone to falls, such as delirium, sleepiness, urinary frequency; and nocturia, coupled to eyesight and equilibrium defects and hypotension due to medicines (Lord, Sherrington, Menz, & Close, 2007). Results demonstrate the need for multiprofessional and intersector interventions that would contribute towards the decrease in risks of falls in the elderly population (Abreu, Reiners, Azevedo, Silva, & Abreu, 2014).

A discrete increase (58.3%) in UI was detected in people who employed walking aids when compared to the other elderly people with UI (55.2%). This result corroborated a research with elderly people in care homes by the Brazilian Network for Continuous Integrated Care which underscored that 33.3% of urinary incontinent elderly people make use of walking aids, whilst 42.9% of elderly people with UI did not need nay walking aid (Fontes, Botelho, & Fernandes, 2011).

In current study, a high percentage (79.8%) of urinary incontinent elderly people took five or more drugs. The authors underline that drugs for UI control are a relevant conservation treatment although they may cause difficulties in eliminating catabolites and causing an accumulation of toxic substance and adverse reactions due to medicine interactions (Lazari et al., 2009). According to Berlezi, Fiorim, Bilibio, Kirchner, and Oliveira (2011), drugs may be a risk factor in UI onset by increasing urinary frequency and urgency. In fact, several anti-hypertension drugs affect the functioning of the lower urinary tract causing involuntary urine emission (Higa, Lopes, & Reis, 2008).

Moreover, 92.4% of the elderly people with UI in care homes suffered from three or more diseases, contrastingly to 57.4% of the elderly without UI in the community (Alencar, Bruck, Pereira, Câmara, & Almeida, 2012). Higa and Lopes (2005) underscored that UI was 3.8 times higher in cases of Systemic Arterial Hypertension (SAH). According to the

author the associated HAS and UI are due to diuretic drugs, one of the causes that most contributed towards involuntary urine emissions in hypertensive females. After treatment with diuretics, an excessive load occurs in the bladder which causes urgent UI and effort-caused UI since the drugs act on the lower urinary tract and alter the vesicular function with an increase in the frequency of urinary emissions.

Another research revealed that microvascular changes that affect the pelvic-vesicle floor complex, increase in urinary frequency due to hyperglycemia, changes in the neuro-physiological mechanisms of the genital-urinary system may contribute towards a higher UI rate among people with diabetes mellitus (Danforth, Townsend, Curhan, Resnick, & Grodstein, 2009). Further, Cavalcante et al. (2014) insist that neuro-muscular diseases may trigger UI.

Results in current analysis indicate that most elderly people (66%) in care homes are depressed since UI impacts psychologically and socially elderly people due to embarrassment, anxiety, social isolation and depression (Hajjar, 2004). The literature mentions that UI affects female psychology due to loss in self-esteem which causes depression (Souza et al., 2012).

A high percentage (38%) of elderly people with UI in care homes practiced physical activities fortnightly. Specialized literature recommends the voluntary contraction of the pelvic floor muscles to avoid effort-caused UI (Costa, Leal, Belo, Santos, & Rodrigues, 2012). In fact, there is an increase in intra-abdominal pressure during physical exercises. Elderly people should be aware on the importance of strengthening the pelvic floor muscles which may be done concomitantly to physical exercises. On the other hand, another study showed that the continuous physical activities may delay the onset of UI in elderly people (Silva et al., 2011).

Protocol variables reveal that UI coupled to equilibrium alterations and gait are associated with falls in elderly people (Abreu et al., 2014). Circumstances that cause pain, disorders in muscle strength, changes in equilibrium and stiffness in articulations contribute towards the onset of UI and decrease in mobility (Gorzoni & Pires, 2006).

High Independence of elderly people in care homes in current study may give a sample with a different profile. Or rather, the elderly with severe dementia, neurological alterations, language deficits and severe cognitive decrease were excluded, precisely those elderly with the highest probability of being dependent on BADL (Marra et al., 2007).

Frequently, however, in care homes, there is a trend to decrease the elderly people's independent activities to accelerate attendance. This may worsen their functional conditions and limitations. The above may impair the work of the multidisciplinary team in the assessment and treatment of the elderly (Alencar et al., 2012).

In the case of MMSE, elderly people in care homes showed a slight cognitive decline although there was no significant association between UI and MMSE, corroborating research that underscored UI occurrence in elderly people with some type of change in cognition (Busato & Mendes, 2007), and without any significant association between urine emission and functional independence and the mental state (Huebra et al., 2010).

Results of protocols in current analysis failed to show a statistically significant relationship with UI, corroborating the literature (Huebra et al., 2010; Roig, Souza, & Lima, 2013). A systematic revision analyzed 46 factors associated with UI, in particular, age, gender, mental status, dementia, mobility and bed state (Offermans, Du Moulin, Hamers, Dassen, & Halfens, 2009). It is highly relevant to note that UI is firmly associated with physical factors such as physical restrictions and limitations in daily activities rather than to mental factors (Offermans et al., 2009; Kwong et al., 2010). In current study, UI elderly people had lower averages in protocols, except MMSE than those of the elderly without involuntary urine emission. Consequently, urine incontinent elderly people are similar to elderly in general for the application of protocols.

It seems that the functional decline of the pelvic floor muscles in the elderly is the main factor in UI. Thus, the physiotherapist is the principle professional in UI prevention and rehabilitation through non-drug attitudes which may include training in the pelvic floor muscle, easy access to the toilet, adaptation to the height of the closet, installation of support bars, proper lights and the use of urinals or toilet seats close to the bed.

Behavior strategies such as feeding, water intake, use of cloths with easy unbuttoning and habits in urinating reduce UI (Silva et al., 2011).

The functional evaluation of the elderly is highly important especially in mobility, transference and capacity to go to the toilet, coupled to knowledge on UI causes and co-morbidities for the planning of behavior therapies such as early evacuation and programmed urination. Combined with exercises, the above items may decrease UI occurrences (Roig et al., 2013).

Conclusion

Elderly people suffering from UI in long-term care homes are in the main females within the 71-80 year-old bracket, single, with low schooling, and duration of at least five years at the home. Elderly females have an approximately three-fold risk in presenting UI when compared to elderly males. Elderly people with higher schooling have a three-fold risk in experiencing UI when compared to illiterate elderly people. Further, elderly people with three or more diseases have a three-fold chance in having UI when compared with elderly people with two or less diseases. UI elderly people were similar to elderly people in general in protocol applications.

Limitations in current study comprise only a small sample of elderly people in care homes. Since current study is an observational and transversal analysis, further conclusions on the phenomena studied, more specific tests for UI diagnosis or confirmation are impossible since research was restricted to complaints of elderly people registered in the clinical charts. Current research recommends further studies that associate clinical assessment to specific exams to evaluate the function and dysfunction of the urinary tract (urodynamic test) to investigate rather obscure aspects on UI determinants.

Current investigation recommends the deployment of novel practices that prevent and treat UI with an improvement in the life quality of elderly females in care homes and minimizing inconveniences caused by its symptoms.

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