Functional and cognitive decline in hospitalized elderly

Declínio funcional e cognitivo em idosos hospitalizados

Deterioro funcional y cognitivo en ancianos hospitalizados

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ABSTRACT

Aim – Understand if functional and cognitive decline is accentuated during hospitalization in elderly patients.

Method – It was design a descriptive and correlational study. The Functional Independence Measure (FIM) and the Mini-Mental State Examination (MMSE) were used.

Results – Were evaluated at admission and discharge 51 elderly (75.53 ± 7.16 years), 53% women, admitted in an internal medicine unit with a length of stay of 14.27±6.45 days. For FIM and MMSE were found statistically significant differences with lower scores from admission to discharge. Negative correlations between age and length of stay and the scores of all measures were found. Except for the Cognitive FIM at admission, all elderly residents at home fared better than the institutionalized in all measures.

Conclusions – The hospitalization contributes to a greater weakness/frailty of the elderly and is considered high risk for decline in physical fitness and cognitive function.

Key Words: Cognitive impairment, Elderly, Functionally impaired elderly, Hospitalization, Institutionalization

RESUMO

Objetivo – Compreender se o declínio funcional e cognitivo é acentuado durante a hospitalização em pacientes idosos.

Método – Desenhou-se um estudo descritivo correlacional. Foram utilizados a Medida de Independência Funcional (FIM) e o Mini Exame do Estado Mental (MMSE).

Resultados - Foram avaliados na admissão e alta 51 idosos (75,53 ± 7,16 anos), 53% dos quais eram mulheres, admitidos numa unidade de medicina interna com demora média de internamento de 14,27 ± 6,45 dias. Para a FIM e o MMSE foram encontradas diferenças estatisticamente significativas com pontuações mais baixas na alta que na admissão. Correlações negativas entre idade e demora média e as pontuações de todas as medidas foram encontrados. Exceto para o FIM Cognitiva na admissão, todos os idosos residentes em casa pontuaram melhor do que os institucionalizados em todas as medidas.

Conclusões - A hospitalização contribui para uma maior fraqueza/fragilidade dos idosos e é considerada fator de alto risco para o declínio na aptidão física e função cognitiva.

Palavras-chave: Comprometimento cognitivo, Idoso, Idoso Fragilizado, Hospitalização, Institucionalização

INTRODUCTION

Functional capacity refers to the autonomy of the person for performing tasks that are part of their everyday lives and ensure the possibility of living alone in their own home. This results not only from the physical capacity as well from cognitive capacities and psychosocial factors.

The reduction of functional capacity observed in elderly has several implications in their quality of life, making it gradually less active, less autonomous and more dependent on, affecting the ability to exercise and perform activities. Aging decrease skills and may influence cognitive performance. All this varies according to the individual characteristics, context and personal experiences (Sequeira, 2010; Spar & La Rue, 2005).

Consequences of cognitive changes may arise at longer term and compromise a person's ability to live independently by interfering in their autonomy or, at short term, making it impossible for them to take part in decisions relating to their treatment and hospitalization.

Hospitalization, although necessary in cases of acute or chronic disease, can lead to a series of complications not related to the initial health problem. Many of these complications lead to increase length of hospital stay (increasing functional and cognitive decline, often irreversible), changes in quality of life and increased morbidity and mortality (Boltz, Resnick, Capezuti, Shuluk, & Secic, 2012),(Sales, Silva, Gil Jr., & Filho, 2010). One third of the hospitalized elderly evolves with loss of ability to perform basic activities of daily living and at least 20% develops delirium during hospitalization(Sales et al., 2010).

Kawasaki and Diogo reported functional deterioration rates in about eighty percent of the elderly during hospitalization (Kawasaki & Diogo, 2005). Among the risk factors predisposing to functional decline of elderly inpatients, literature highlights the advanced age (Cunha, Cintra, Cunha, Couto, & Giacomin, 2009), severe cognitive deficits, confusion states (Inouye et al., 1993), iatrogenic , severity of illness and history of falls (Cunha et al., 2009). Several studies conducted in hospitals indicated that older patients with tendency to fall have a higher risk of present functional decline during the hospitalization (Anpalahan & Gibson, 2008; Cornette et al., 2006; Siqueira, Cordeiro, Perracini, & Ramos, 2004). The highest rates are found when more risk factors are present. Four or more risk factors rises the rate to 47% (de Vos et al., 2012).

Hospital can be a strange environment and sometimes hostile to elderly patients and that will accrue in the same individual the effects of normal aging and the effects of bed rest and hospitalization (Almeida, Abreu, & Mendes, 2010; Creditor, 1993).

METHODS

Design and setting

This descriptive and correlational study, aimed to assess the impact of hospitalization on functional decline in elderly patients, was conducted between March 19 and May 5, 2012 in the Internal Medicine unit of the Centro Hospitalar de Trás-os-Montes e Alto Douro, EPE – Portugal (CHTMAD) in cooperation with the School of Health of the Polytechnic Institute of Bragança – Portugal (ESSa/IPB).

The study was approved by the Ethics Committee

of the CHTMAD and by the Scientific Committee of the Rehabilitation Nursing Master Degree of the ESSa/IPB.

Procedure

Data collection was made individually in two different moments, 24 hours after admission and 24 hours previous discharge. Informed consent was obtained in both moments before assessment. The presence of family or caregivers was permitted but all data was provided by the participants. All data was collected by the same investigator.

Participants

This study enrolled all patients aged 65 years and older who were acutely admitted in the Internal Medicine unit of the CHTMAD for at least 3 days. Were deemed ineligible all patients with severe cognitive impairment, those who were unable to answer questions or follow instructions and those with visual or hearing loss not compensated by glasses or hearing aids. Figure 1 shows details of participant recruitment and participation rates.

Instruments

Demographic data including age, gender, marital status and residence was gathered on admission. Functional and cognitive status was measured at two moments, admission and discharge, using Functional Independence Measure (FIM) and the Mini-Mental State Examination (MMSE). Length of stay was calculated on discharge day.

Functional Independence Measure

Functional Independence Measure (FIM) is a uniform system of measurement for disability based on the International Classification of Impairment, Disabilities and Handicaps which contains 18 items composed of 13 motor tasks (FIM motor) and 5 cognitive tasks (FIM cognitive) and measures the level of a person's disability and quantifies the assistance required for carry out activities of daily living. Dimensions assessed include: eating, grooming, bathing, upper body dressing, lower body dressing, toileting, bladder management, bowel management, bed to chair transfer, toilet transfer, shower transfer, locomotion (ambulatory or wheelchair), stairs, cognitive comprehension, expression, social interaction and problem solving.

Each task is rate on a 7 point ordinal scale that range from total assistance, or complete dependence, to complete independence. Scores range from 18 (lowest) to 126 (highest) indicating level of function.

Several studies showed FIM as the most valid and reliable way of assessment of elderly functional status for activities of daily living (Glenny & Stolee, 2009; Hsueh, Lin, Jeng, & Hsieh, 2002; MacNeill & Lichtenberg, 1997; Nagano, 2002).

In this study FIM was used to measure global functional capacity, FIM cognitive to measure cognitive function and FIM motor to motor function.

Mini-Mental State Examination (MMSE)

In order to evaluate cognitive function we use the Portuguese version (Guerreiro et al., 1994) of the Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975). MMSE is a brief screening tool that provides a quantitative assessment of cognitive impairment. A possible score of 30 is used to provide a picture of an

individual's present cognitive performance based on direct observation of completion of the 11 test items/tasks grouped into 7 cognitive domains: orientation to time, orientation to place, registration of three words, attention and calculation, recall of 3 words, language and visual construction.

Although different cutoff points had been considerate in several studies (Rami et al., 2009; Siqueira et al., 2004), a score of <24 is the generally accepted cutoff indicating the presence of cognitive impairment (Siqueira et al., 2004).

Data Analysis

The Statistical Package for the Social Sciences (SPSS) 18.0 version (SPSS, Inc.) was used for all data analyses. Descriptive statistics were obtained for demographic characterization of the participants. The FIM, FIM cognitive, FIM motor and MMSE variance were examined using the Independent T test. Spearman's r was used to assess the relationship between age and length of stay and the FIM, FIM cognitive, FIM motor and MMSE. Paired Sample T test was used to analyze the influence of the type of residence on the scores obtained, in both assessment moments, on the FIM, FIM cognitive, FIM motor and MMSE.

RESULTS

The 51 participants had a mean age of 75.53 (SD 7.16). The 53% were women, 45.1% were married or cohabiting and 39.2% widowed and 74.8% lived at home. The mean duration of length of stay was 14.27 (SD 6.45) days (range 4-42). This patients were admitted to this Internal Medicine unit with mainly because cardio respiratory diseases (66.4%), gastrointestinal disease (27.2%) and for other causes (11.4%). There were no associations between medical diagnosis and other variables.

To analyze FIM, FIM cognitive, FIM motor and MMSE variance within admission and discharge was used the Paired Sample T test (table 1).

The results show a significant decrease of scores from admission to discharge in FIM (t=3.78; p=0.00), FIM cognitive (t=4.14; p=0.00), FIM motor (t=3.24; p=0.041) and in Mini-Mental State Examination (t=5.47; p=0.00).

Spearman's r was used to analyze correlation between age and length of stay and the scores obtained in both assess moments in all measures (table 2).

Positive correlation was found between age and length of stay (r = .397**, p < .01). Negative correlation was found between age and FIM at admission (r = -.569**, p < .01) and at discharge (r = -.602**, p < .01), FIM cognitive at admission (r = -.491**, p < .01) and at discharge (r = -.541**, p < .01), FIM motor at admission (r = -.602**, p < .01) and at discharge (r = -.585**, p < .01) and on Mini-Mental State Examination at admission (r = -.618**, p < .01) and at discharge (r = -.603**, p < .01).

Negative correlation was also found between length of stay and FIM at admission (r = -.410**p < .01) and at discharge (r = -.435**, p < .01), FIM cognitive at admission (r = -.292*, p < .01) and at discharge (r = -.290*, p < .05), FIM motor at admission (r = -.411**, p < .01) and at discharge (r = -.432**, p < .01) and on Mini-Mental State Examination at admission (r = -.427**, p < .01) and at discharge (r = -.435**, p < .01).

To analyze differences between mean scores in all measures by type of residence of the participants an Independent T test was performed (table 3).

The results show for FIM scores significant differences between means at admission (t= 2.30; p= 0.039), with better scores obtained by the participants living at home (106.85±18.40) when compared with institutionalized ones (87.36±26.36). Also at discharge (t= 2.45; p= 0.03) participants living at home fared better (105.70±18.93) than institutionalized ones (84.73±26.65).

For FIM cognitive there was no statistical differences (t= 1.76; p= 0.085), despite better scores obtained by the residents at home (31.48±3.54) when compared with institutionalized ones (29.27±4.17). At discharge the difference between means was significant (t= 2.22; p= 0.031); participants living at home fared better (30.93±3.82) than institutionalized ones (27.91±4.59).

FIM motor show significant differences between means at admission (t= 2.14; p= 0.007), with better scores obtained by the participants living at home (75.38±15.57) when compared with institutionalized ones (58.09±25.49). Also at discharge (t= 2.92; p= 0.005) participants living at home fared better (74.78±15.84) than institutionalized ones (56.82±24.85).

Differences between means on Mini-Mental State Examination scores are significant at admission (t= 3.26; p= 0.002); participants living at home fared better (25.45±3.83) when compared with institutionalized ones (20.82±5.31) likewise at discharge (t= 3.42; p= 0.001), with better scores obtained by the participants living at home

(24.03±4.79) when compared with institutionalized ones (18.00±6.48).

Spearman's r was used to analyze correlation between FIM cognitive and MMSE in both assess moments (table 4). Positive correlation was found between FIM cognitive and MMSE at admission (r = .654**, p < .01) and between FIM cognitive and MMSE at discharge (r = .662**, p < .01).

DISCUSSION

The present study aimed to assess functional and cognitive decline in elderly patients hospitalized in an internal medicine unit. There were 51 participants, out of which 53% were women, with a mean age of 75.53 years, mostly married or cohabiting and reside in 74.8% of cases in their own home. Assessment was taken, 24 hours after admission and 24 hours previous discharge, using the same instruments in order to understand the variance in scores and thus infer the impact of hospitalization on the dimensions analyzed.

Regarding the assessment of functional independence, it was found that the elderly inpatients showed differences in mean total scores between admission and discharge with a statistically significant decrease. The same results were found in several studies with similar populations (Buurman, van Munster, Korevaar, de Haan, & de Rooij, 2011; Glenny & Stolee, 2009). Negative correlations were found between the FIM score, age and length of stay in both moments, which is consistent with the literature. Significant differences were found at admission and at discharge, when compared mean scores by type of residence with the elderly who live in their own home with mean scores higher than

those living in institutions although both groups show a decrease from the first moment to the second. This result is consistent with the findings that identified the loss of functional capacity as the main reason of the decision for institutionalization of the elderly (Rosa, Benício, Latorre, & Ramos, 2003).

FIM cognitive also showed differences between the two time points. The analysis allows realizing that the FIM cognitive mean scores were found statistically significant lower at discharge when compared with admission. Negative correlation for both moments with age and length of stay were also found. Were identified significant differences among the elderly living in their own home, with mean scores higher than those living in institutions, although both groups have decreased from the first to the second moment. Identical results were found in the literature (Forrest et al., 2012).

Statistical significant changes were observed when comparing the two moments of evaluation of the FIM motor. As equal as with FIM cognitive, negative correlations were found for both moments with age and length of stay. The elderlies living in their homes had higher scores than those living in institutions. These results are corroborated in several studies (Forrest et al., 2012).

FIM results indicate the occurrence of functional ability and cognitive performance decline during hospitalization. This is directly related to the risk of falling. In a study conducted in Rehabilitation facilities was found an association between 1 point increase in total FIM or in any of its subscales (motor or cognitive) and the reduction between 0.955% and 0.925% of risk of falling

(Forrest et al., 2012). In another study was demonstrated that patients with good scores in mobility and troubleshooting assessed by FIM had a lower risk of falling (Gilewski, Roberts, Hirata, & Riggs, 2007).

Cognitive assessment by MMSE allows realizing statistically significant decrease on the average score from admission to discharge. Analyzing the results based on the cutoff point 24, it was found that at discharge individuals were below the threshold indicating a progression towards functional cognitive impairment. Negative correlation was observed between the results of both assessments (admission and discharge) and age and length of stay allowing to realize that, in this sample, older individuals and those who remained more time hospitalized had lower scores on the MMSE. These findings are consistent with the results of other studies (Cornette et al., 2006; Siqueira et al., 2004).

Also participants living in institutions had lower scores in both time points than those who lived in their own home, confirming that also in our study, like others (Whitney, Close, Jackson, & Lord, 2012), it seems evident that the cognitive impairment, even though mild, is one of the causes of institutionalization of the elderly.

The present study evidences the importance of assessment of functional capacities of elderly patients. Functional and cognitive decline during hospitalization is often neglected and its consequences on the independent performance of activities of daily living are frequently the line between an independent and healthy life and institutionalization.

Rates of functional decline after acute hospitalization found in literature ranged between

25-80% (Asmus-Szepesi et al., 2011; Buurman, Hoogerduijn, et al., 2011; Buurman et al., 2012; Courtney et al., 2011; Kawasaki & Diogo, 2005; Vidan Astiz et al., 2008). In this study functional decline was observed in all participants. With this pioneer study in this region of Portugal, it stays clearly demonstrated the need of rehabilitation interventions to minimize and, in some cases, prevent risk factors associated with cognitive and functional decline during hospitalization.

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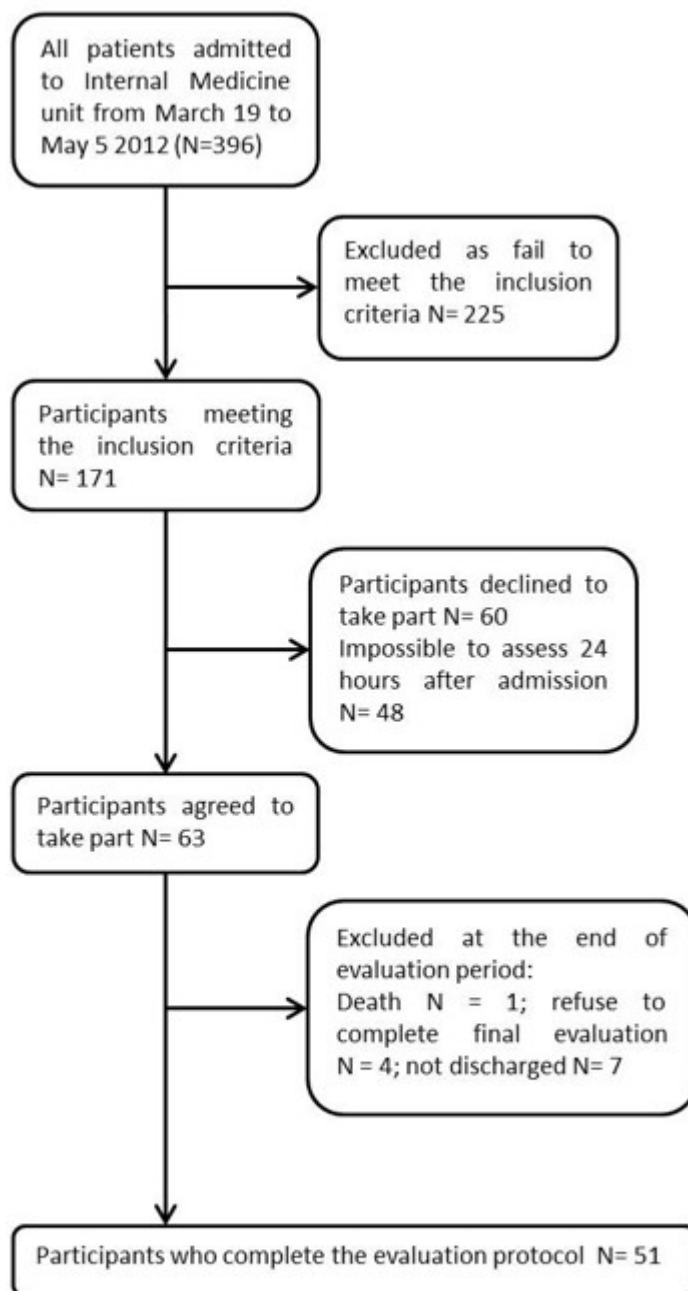
Figure 1 - Recruitment flow chart

Table 1 – Paired Sample T test for variance within admission and discharge

	Admission Mean (SD)	Discharge Mean (SD)	t	P
Functional Independence Measure (FIM)	102.65 (21.65)	101.18 (22.30)	3.78	0.00
FIM Cognitive	31.00 (3.76)	30.27 (4.14)	4.14	0.00
FIM motor	71.65 (19.25)	70.90 (2.71)	3.24	0.041
Mini-Mental State Examination	24.45 (4.56)	22.73 (5.70)	5.47	0.00

Table 2 – Spearman Correlation for age and length of stay and all measures at admission and discharge

	Age	Length of stay
Length of stay	.397**	-
FIM – admission score	-.569**	-.410**
FIM cognitive – admission score	-.491**	-.292*
FIM motor – admission score	-.548**	-.411**
Mini-Mental State Examination – admission score	-.618**	-.427**
FIM – discharge score	-.602**	-.435**
FIM cognitive – discharge score	-.541**	-.290*
FIM motor – discharge score	-.585**	-.432**
Mini-Mental State Examination - discharge score	-.603**	-.435**

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

Table 3 – Differences on mean scores by type of residence

	Residence	N	Mean	SD	t	P
FIM – admission score	Home	40	106.85	18.40	2.30	0.039
	Institution	11	87.36	26.36		
FIM – discharge score	Home	40	105.70	18.93	2.45	0.03
	Institution	11	84.73	26.65		
FIM cognitive – admission score	Home	40	31.48	3.54	1.76	0.085
	Institution	11	29.27	4.17		
FIM cognitive – discharge score	Home	40	30.93	3.82	2.22	0.031
	Institution	11	27.91	4.59		
FIM motor – admission score	Home	40	75.38	15.57	2.14	0.007
	Institution	11	58.09	25.49		
FIM motor – discharge score	Home	40	74.78	15.84	2.92	0.005
	Institution	11	56.82	24.85		
MMSE – admission score	Home	40	25.45	3.83	3.26	0.002
	Institution	11	20.82	5.31		
MMSE – discharge score	Home	40	24.03	4.79	3.42	0.001
	Institution	11	18.00	6.48		

Table 4 – Spearman Correlation for FIM cognitive and MMSE

	FIM cognitive admission score	FIM cognitive discharge score
MMSE admission score	.654**	
MMSE discharge score		.662**