

Original Article

Association between functional disability and cognitive deficit in hospitalized elderly patients¹

Associação entre limitação funcional e deficit cognitivo em pacientes idosos hospitalizados

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How to cite: Santos, B. P., Amorim, J. S. C., Poltronieri, B. C., & Hamdan, A. C. (2021). Association between functional disability and cognitive deficit in hospitalized elderly patients. *Cadernos Brasileiros de Terapia Ocupacional*, 29, e2101. <https://doi.org/10.1590/2526-8910.ctoAO2101>

Abstract

Introduction: Hospitalization is recognized as a risk factor for the functional decline and cognitive decline of elderly people. However, the association between these variables is still well unestablished, especially in the hospital context.

Objective: To verify the association between cognitive deficit and functional disability in hospitalized elderly people. **Method:** Cross-sectional study with elderly patients admitted to two public hospitals. The presence of cognitive deficit was verified through the Mini-Mental State Examination screening test and the presence of functional disability through the Basic Daily Life Activities Scale. Descriptive sample analysis of the sample and logistic regression was made, estimating the odds ratio values and respective intervals of confidence (95%).

Results: The prevalence of cognitive deficit was 51.5% (IC95%, 41,6-61,4) and 37.6% of the elderly had one or more basic activities in their daily living. The results showed that either the number of compromised activities ($p=0,002$) and the final classification of the Katz index ($p=0.001$) were statistically different between the groups of elderly people with or without a cognitive deficit. Among the elderly who were partially dependents for activities, 14.9% had a cognitive deficit and 13.9% among those who were fully dependent elderly. Most dependents elderly are 5,08 times (IC95%, 1,84-14,01) more likely to have a cognitive deficit.

Conclusion: Cognitive deficits were associated with functional disability and the results collaborate in directing the systematization of early care, to minimize cognitive and functional losses in hospitalization.

Keywords: Hospitalization. Aged. Cognition. Aging. Activities of Daily Living.

¹ CEP Approval, CAAE 37380414.4.0000.0096.

Received on: May 14, 2020; 1st Review on: August 12, 2020; 2nd Review on: September 30, 2020; Accepted on: November 16, 2020.



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Resumo

Introdução: A hospitalização é reconhecida como um fator de risco para o declínio funcional do idoso, bem como para o declínio cognitivo. Entretanto, a associação entre essas variáveis ainda não é bem estabelecida, sobretudo no contexto hospitalar. **Objetivo:** Verificar a associação entre *deficit* cognitivo e limitação funcional em atividades básicas da vida diária entre idosos hospitalizados. **Método:** Estudo seccional, com idosos internados em dois hospitais públicos. Foi verificada a presença de *deficit* cognitivo por meio do teste de rastreio Mini Exame do Estado Mental e a presença de limitação funcional pelo Índice Katz para Atividades Básicas de Vida Diária. Foi realizada análise descritiva da amostra e regressão logística, estimando-se os valores de *odds ratio* e respectivos intervalos de confiança (95%). **Resultados:** A prevalência de *deficit* cognitivo foi de 51,5% (IC95%, 41,6-61,4) e 37,6% dos idosos apresentaram dependência em uma ou mais atividades básicas de vida diária. Os resultados mostraram que tanto o número de atividades comprometidas ($p=0,002$) quanto a classificação final do índice Katz ($p=0,001$) foram diferentes estatisticamente entre os grupos de idosos com e sem *deficit* cognitivo. Entre os idosos que eram dependentes parciais para as atividades, 14,9% apresentaram *deficit* cognitivo; já entre aqueles que eram dependentes totais, o valor foi de 13,9%. Os idosos dependentes nas atividades apresentaram 5,08 vezes (IC95%, 1,84-14,01) maior chance de *deficit* cognitivo. **Conclusão:** O *deficit* cognitivo foi associado à limitação funcional e os resultados colaboraram no direcionamento da sistematização da assistência precoce direcionada, a fim de minimizar perdas cognitivas e funcionais na hospitalização.

Palavras-chave: Hospitalização. Idoso. Cognição. Envelhecimento. Atividades Cotidianas.

1. Introduction

Population aging has been studied in the context of hospitalization. It is a complex event that occurs at a time of fragility, in which cognitive deficits and functional disability impact the performance of activities of daily living and have potential risk indicators for the fragility and associated with hospitalization of the elderly people (Pimenta et al., 2013; Lage et al., 2014; Andrade et al., 2017).

The difficulty of storing and processing new information for the constitution of long-term memory is the most common cognitive change, which is explained by the decline in the inhibitory mechanisms of attention and processing speed and may incur a deficit in working memory (Levy, 2014). Lower cognitive performance and the presence of hospitalization can contribute to the exclusion of the elderly person from living and have relationships with other people, favoring the spiral of functional decline (Santos et al., 2018). The acute health condition alone can compromise functional capacity, permanently, temporarily, or prolonged, and can also explain the cognitive, permanent or transient decline (Santos et al., 2018). In the United States, for example, at least 30% of elderly people hospitalized for acute illness were discharged with a functional disability that did not exist before their hospitalization (Andrade et al., 2017). In Italian elderly people with cognitive impairment during hospitalization, the

chances increase fifteen times to develop a functional disability in basic activities of daily living (Lage et al., 2014).

According to the American Occupational Therapy Association (AOTA), basic activities of daily living (BADLs) are daily activities related to a person's self-care such as performing hygiene and personal care, sexual activity, dressing, eating and swallowing, physical mobility, have a shower and use the toilet (American Occupational Therapy Association, 2020). In the hospital context, the elderly patients have a condition of partial or total dependence on BADLs due to their clinical condition, with activities such as having a shower, dressing and transferring as the most affected, and eating with less limitation (Martins et al., 2020). In a previous review study, hospitalization was considered a risk factor for worsening functional disability, which may generate or enhance cognitive deficit in the elderly person, either during hospitalization or even after discharge due to the risk of immobility, polypharmacy, infections, multiple comorbidities, and deprivation of sensory stimuli (Santos et al., 2018).

When the hospitalization of elderly people has together cognitive and functional deficits, their conditions are risk factors for early mortality (Andrade et al., 2017). On the other hand, elderly people with functional capacity disabilities are also at high risk for prolonged hospitalization and future readmissions (Mudge et al., 2011). The result frequently observed after hospitalization is the worsening of both functional and cognitive conditions, compromising the quality of life, and overburdening family members and other professionals in providing health care for these elderly people (Buurman et al., 2011; Hoogerduijn et al., 2012). However, the evidence is not consistent in determining the causal risk factors, either due to difficulty in the sample design or due to a clear definition of cognitive and functional disability, the interaction between these outcomes, or the reduced number of studies with hospitalized elderly patients as in Brazil. Analytical studies aiming to investigate the relationship between cognition, functional capacity, and hospitalization in elderly people are incipient (Cristo & Pernambuco, 2009; Talmelli et al., 2010; von Renteln-Kruse et al., 2015).

It is not clear regarding the direct causality between hospitalization and cognitive deficit, which justifies the need for further studies on the topic. Investigations on the cognitive deficit and functional disability in the elderly population can assist in the development of clinical strategies for better management of hospitalized patients, and to minimize damage, iatrogenesis, and prolonged hospitalization. These aspects directly interfere in the clinical practice of the occupational therapist with the elderly person since an important attribution of the professional refers to the prevention of cognitive decline, the stimulation, and enhancement of remaining cognitive skills, and their relationship with the performance of BADLs (Exner et al., 2017). Thus, this study aimed to identify the association between cognitive deficit and functional disability in basic activities of daily living in hospitalized elderly patients.

2 Method

2.1 Study and Sample Design

This is a sectional study with a sampling of elderly hospitalized patients in the wards of two public tertiary and quaternary hospitals in Curitiba (PR). We chose this hospital

because it assists a considerable number of elderly people in the city and metropolitan region as it exclusively assists the Unified Health System and the number of active beds (516 in total). Both institutions offer inpatient, urgent and emergency services, surgeries, outpatient care by specialty and home. The study was approved by the Research Ethics Committee of the Hospital de Clínicas of the Federal University of Paraná, under registration number 37380414.4.0000.0096, the hospitals signed the consent to conduct the research and all participants signed the Informed Consent Form, agreeing to participate in the investigation or proxy informant.

For the selection of participants in the study, we considered only the elderly patients aged 60 years old or older, admitted to the Medical Clinic Units (wards), and hospitalized for more than 72 hours. We excluded the cases of refusal, patients in palliative care, decreased level of consciousness due to diagnosed delirium, cognitive changes due to pre-existing dementia, and diagnosis of brain injuries, psychiatric conditions, and clinical instability that prevented the interview and those who were discharged at the time of contact. This information was obtained through data described in the electronic/printed medical record of each elderly person. Thus, through a non-probabilistic convenience sample, we selected 101 patients from January 2014 to August 2016.

2.2 Dependent variable

We assessed the cognitive deficit using the Mini-Mental State Examination (MMSE) (Pereira et al., 2014). This is a cognitive screening tool frequently used in the literature (Folstein et al., 1975; Spirgiene et al., 2010; Ehlenbach et al., 2010; Chen et al., 2010; Lourenço et al., 2014; Dias et al., 2015) and the version was validated in studies with low-education populations to minimize possible confounding effects (Cullen et al., 2007). When we use it alone or incorporated into wider instruments, it allows the assessment of cognitive function and tracking of dementia. It has been used in clinical settings for the detection of cognitive deficit, for the follow-up of dementia, and in the monitoring of response to treatment. In research, it has been used in population studies and the evaluation of response to experimental drugs (Bertolucci et al., 1994). In Brazil, it was translated, validated, and adapted by Bertolucci and collaborators (Bertolucci et al., 1994).

Considering the reality of most hospitalized elderly people who have low education, a fact already evidenced in previous investigations (Caramelli & Nitrini, 2000; Bustamante et al., 2003), and according to a representative population sample to identify cognitive deficit (Pedone et al., 2005), we chose to adopt the following cutoff points: 18 for illiterate, 21 for those with up to three years of school, 24 for those with four to seven years of school and 26 for those with more than seven years of school, within the 30 items (with a maximum score of 30 points) of the instrument. This cutoff point was based on an epidemiological study to identify suspected dementia through the version of the MMSE, with the adjustment of cutoffs according to school years based on a sample of hospitalized elderly people (Bertolucci et al., 1994; Caramelli & Nitrini, 2000). The questions are grouped into seven categories according to specific cognitive functions, time orientation (5 points), immediate memory (3 points), attention and calculation (5 points), evocation (5 points), word recall (3 points), language (8 points) and visual constructive capacity (1 point).

2.3 Explanatory variable - functional disability

The performance of activities of daily living, classically stratified into basic (BADL), instrumental (IADL), and advanced (AADL), is measured by components involving higher cognitive functions, family, environmental and social participation (Dias et al., 2015). In this study, we considered as a functional disability the difficulty to perform activities of the Katz functional scale (Katz et al., 1963). They are food, sphincter control, transfer, personal hygiene, ability to dress and take a shower. This scale is one of the most widely used to assess performance in basic activities of daily living. It consists of six items that measure the individual's performance in self-care activities, which obey a hierarchy of complexity. The score results from the sum of positive responses ranging from six (independence for the ADLs), four (partial dependence) to two points (important dependence - disability) (Lino et al., 2008). Due to the high subjectivity involved in carrying out these activities and the lack of a single instrument for their assessment, the selected BADLs included in the study were based on the literature (Talmelli et al., 2010; Lourenço et al., 2014; Andrade et al., 2017).

2.4 Selection of adjustment variables

We collected the data based on the application of the standardized instruments described and on a brief questionnaire containing information such as gender, age, education, length of stay, presence of the caregiver, number of medications, comorbidities, and nutritional diagnosis.

We selected these instruments based on the evidence regarding their applicability to the elderly patient and because they are brief collection instruments suitable for the hospital environment. We always applied the tests in the morning and afternoon during the entire data collection process. Potential confounding variables were based on previous research on the cognitive deficit and functional disability in the elderly participants (Pedone et al., 2005; Talmelli et al., 2010; Ehlenbach et al., 2010; Hoogerduijn et al., 2012), including sociodemographic factors (age, gender, education level in years of study and presence of a caregiver/companion) and clinical factors (comorbidities, polypharmacy, nutritional status, length of stay and hospital).

The comorbidities were selected chronic diseases, assessed as “none or one” and “two and more”, including the following conditions: infectious (HIV/AIDS), renal (renal failure, kidney stones, lithiasis), cardiovascular (arterial hypertension, infarction, heart failure, venous thrombosis), pulmonary (COPD or asthma), musculoskeletal (osteoporosis, rheumatoid arthritis, gout), metabolic (anemia, obesity, diabetes, hypothyroidism), visual (cataract), cancer and psychic (anxiety). The doctors on service established all diagnoses and we extracted the information from the patient's medical record, according to a previous theoretical model (Sierra et al., 2015).

Complementing the information on clinical conditions, we collected the nutritional risk status and medications for continuous use by consulting the medical records of the multidisciplinary team and supporting elements (prescriptions or packages of medications). The clinical nutritionists carried out the nutritional diagnosis at the institutions, based on the Global Subjective Assessment (GSA) instrument

(Detsky et al., 1987), which contemplates recent weight loss, perceived changes in food intake, quality of food intake and gastrointestinal symptoms, according to the perception of the patient or caregiver. It also assesses the metabolic stress caused by the disease using laboratory criteria, muscle depletion, and the presence of edema characteristic of protein malnutrition. This set of data is subjectively classified into nutritional adequacy; mild, moderate, or severe malnutrition. For analysis, we classified the patients into only two groups, without the nutritional risk or nutritional risk status. Finally, we considered polypharmacy to use five or more drugs simultaneously (Loyola Filho et al., 2008). The length of stay was counted in days from the moment the elderly person was admitted to the hospital (via the emergency room, hospitalization, or elective surgery) until the moment of hospital discharge.

2.5 Statistical analysis

The sample characteristics, considering the outcome and confusion variables included in this study, were presented in proportions and means (with the respective standard deviations) and then compared between groups with and without cognitive impairment, using the test Pearson's Chi-square and Fisher's Exact, for proportion. Logistic regression was used, estimating the odds ratio values and respective confidence intervals (95%), without adjustment (crude model), and with adjustment, including sociodemographic and clinical variables. In the univariate analysis, a statistical criterion for the inclusion of multiple confounding factors was used, considering a level of statistical significance of 20%. In the multivariate analysis, a 5% level of association was considered statistically significant and the variables sex and age were maintained in the final model as a clinical criterion. The Hosmer-Lemeshow and R² test substantiated the quality of the fit and usefulness of the explanatory variables. All analyzes were performed using the Stata 13.0 software, considering the significance level of 0.05.

3 Results

The prevalence of cognitive deficit was 51.5% (95% CI, 41.6-61.4) in the study period. The prevalence in men was 51.0% (95% CI, 36.5-65.5) and in women was 51.9% (95% CI, 37.9-66.0). Table 1 describes the characteristics of the study sample and the association with cognitive impairment. The average age was 71 (\pm 8.34) years old, most were female (54.5%), hospitalized without a caregiver (63.3%), with an average school time of 4.33 (\pm 4.15) complete years. The predominant reasons for hospitalization were cardiovascular (45.5%), endocrine (16.6%), and respiratory (8.1%) diseases with a high burden of morbidity, mainly systemic arterial hypertension and diabetes. We observed that 79.2% of the patients had multiple comorbidities as they obtained two or more diagnoses of chronic diseases, which reflected in the number of medications in use. The average number of drugs prescribed by the elderly patient was 7.8 (\pm 3.15) and the average hospital stay was 8.04 (\pm 8.01) days.

Table 1. Sociodemographic characterization and health condition of hospitalized elderly patients, according to the cognitive deficit.

Variables	Total		Cognitive Deficit		p-value
	N (101)	%			
			No (n=49)	Yes (n=52)	
<i>Sociodemographics</i>					
Gender					0.928
Male	49	54.5	24 (49.0%)	25 (48.1%)	
Female	52	45.4	25 (51.0%)	27 (51.9%)	
Age group (years old)					0.143 ^a
60-74	69	75.7	38 (77.6%)	31 (59.6%)	
75-84	24	18.1	9 (18.4%)	15 (28.9%)	
85 and more	8	6.0	2 (4.1%)	6 (11.5%)	
Education level					0.582
Illiterates	22	21.8	9 (18.4%)	13 (25.0%)	
1 – 3 years	29	28.7	15 (30.6%)	14 (26.9%)	
4- 7 years	26	25.7	15 (30.6%)	11 (21.2%)	
> 7 years	24	23.8	10 (20.4%)	14 (16.9)	
Caregiver/companion (yes)	66	65.4%	30 (61.2%)	36 (69.2%)	0.398
<i>Health Condition</i>					
Comorbidities ^b					0.061
None or one	21	20.8%	14 (28.6%)	7 (13.5%)	
Two or more	80	79.2%	35 (71.4%)	45 (86.5%)	
Polypharmacy (yes)	84	83.2%	44 (89.8%)	40 (76.9%)	0.071 ^a
Nutritional risk status	66	65.4%	30 (61.2%)	36 (69.2%)	0.398
Length of hospital stay					0.393 ^a
3 – 10 days	79	78.2%	37 (75.5%)	42 (80.8%)	
11 – 20 days	16	15.8%	10 (20.4%)	6 (11.5%)	
> 20 days	6	5.9%	2 (4.1%)	4 (7.7%)	
Hospital					0.136
General	50	49.5%	28 (57.1%)	22 (42.3%)	
Especialized	51	50.5%	21 (42.9%)	30 (57.7%)	

^a Fisher's exact, ^b Comorbidities included: infection (HIV/AIDS) and kidney disease (kidney failure, kidney stones, lithiasis), cardiovascular (high blood pressure, infarction, heart failure, venous thrombosis), pulmonary (COPD or asthma), musculoskeletal (osteoporosis, rheumatoid arthritis, gout), metabolic (anemia, obesity, diabetes, hypothyroidism), visual (cataract), psychic (anxiety) and cancer.

The investigation of functional limitation showed that 37.6% of the evaluated patients had a dependence on one or more basic activities of daily living with an average of 4.1 points (95% CI, 3.7-4.7). Table 2 shows the results of the analysis of performance in basic activities of daily living and cognitive deficit. We observed that both the number

of activities compromised ($p = 0.002$) and the final classification of the Katz index ($p = 0.001$) were statistically different between groups of elderly people with and without a cognitive deficit.

Table 2. Cognitive deficit according to the number of compromised daily activities and the Katz Index ranking in the hospitalized elderly people.

Variables	Total		Cognitive Deficit		p-value
	N=101	%	Não (n=49)	Sim (n=52)	
Basic Activities of Daily Living^a					0.002^b
Not compromised	4	4.0	0 (0.0%)	4 (7.7%)	
1 to 3 activities	26	25.7	7 (14.3%)	19 (36.5%)	
4 a 6 activities	71	70.3	42 (85.7%)	29 (55.8%)	
Katz Index					0.001
Independent	63	62.4	39 (79.6%)	24 (46.2%)	
Dependent	38	37.6	10 (20.4%)	28 (53.9%)	

^aThe activities of daily living considered were food, continence, locomotion, hygiene, dressing, and using the bathroom, ^bFisher's exact.

Figure 1 shows the distribution of the elderly patients with and without cognitive deficit according to the level of dependence on BADLs. We observed that the proportion of elderly people without cognitive deficit is higher in the group of independent ones and that elderly people with dependence (partial or total) have a higher prevalence of cognitive deficit.

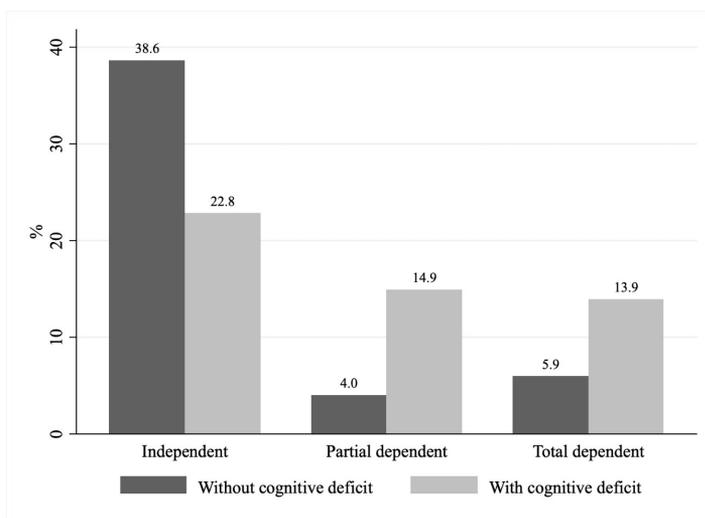


Figure 1. The proportion of cognitive deficit according to the classification of performance for Basic Activities of Daily Living (BADL) of the elderly admitted to hospitals.

The bivariate analysis showed that age, comorbidities, polypharmacy, hospitalization, and functionality in basic activities of daily living were associated with

the outcome ($p < 0.20$). Table 3 shows the logistic regression models for the variables associated with cognitive, gross, and adjusted deficits. We found that the association between cognitive deficit and functional disability is independent of the factors that could confuse the relationship. Having one to three compromised activities increased the chance of deficit by 7.47 (95% CI, 1.97-28.42). The chance of deficit was 4.25 (95% CI, 1.18-15.38) times higher among the elderly patients with four to six difficulties in basic activities of daily living. Dependence on BADLs implied an increase of 5.08 (95% CI, 1.84-14.01) in the chance of cognitive deficit.

Table 3. Logistic regression models of the association between cognitive deficit and functional disability in basic activities of daily living in hospitalized elderly patients.

Variables	Gross Model		Adjusted Model	
	OR (CI95%)	p-value	OR (CI95%)	p-value
Basic Activities of Daily Living				
Not compromised	1.00		1.00	
1 to 3 activities	6.36 (1.88-21.48)	0.003	7.47 (1.97-28.42)	0.003
4 to 6 activities	3.96 (1.34-11.72)	0.013	4.25 (1.18-15.38)	0.027
Katz Index				
Independent	1.0		1.0	
Dependent	4.55 (1.88-11.00)	0.001	5.08 (1.84-14.01)	0.002

Adjusted Model for gender, age, comorbidities, polypharmacy, and hospitalization.

For data exploration, we determined the predictive effect of variables that showed correlations with statistical significance to explain both the results of the MMSE and the Katz index. Education level, age, and the Katz index explain 37.4% of the MMSE variability. The age and place of collection explain 44.5% of the Katz index variability. The functional disability was a predictive factor of the cognitive performance of hospitalized elderly patients.

4. Discussion

The results of this study show a high prevalence of cognitive deficit and dependence in the daily activities of hospitalized elderly participants. These findings suggest that, in addition to a multifactorial event, the cognitive deficit is the result of functional conditions. According to previous studies, they can collaborate in the interpretation of its etiological complexity and in directing the systematization of care through the development of strategies for evaluation and targeted early intervention to minimize cognitive and functional losses that may originate with hospitalization (Pereira et al., 2014; Siqueira et al., 2004; Talmelli et al., 2010).

The hypothesis of an association between cognitive deficit and functional disability is because hospitalized elderly people are exposed to complications such as immobility in bed, risk of falls, sleep deprivation, and pain (Talmelli et al., 2010). These conditions can trigger cognitive changes, such as delirium (Alvarez et al., 2012), for example. The prevalence of cognitive deficit in this research was 51.5%, which corroborates other

evidence that adopted the same assessment measures (Chen et al., 2010; Buurman et al., 2011). However, the deficit can be transitory and when the elderly person leaves the hospital can recover his cognitive condition, as shown in a study in Taiwan, which showed that 31% of the elderly participants with a cognitive deficit in hospital recovered after discharge (Chen et al., 2010).

The results showed that dependence on BADL brings an increase of 5.8% in the chance of cognitive deficit; however, this association between cognitive and functional deficit is still discussed. Spirgiene et al. (2010) corroborate this study by pointing out the cognitive deficit as a secondary condition to the already person's existing functional decline, suggesting that functional disability leads to a cognitive deficit. However, in a short-term longitudinal study, the cognitive deficit was considered a predictor of functional decline, along with the advanced age factor (Chen et al., 2010). Thus, regardless of the causal direction between these outcomes, we observed a consistent association between them, which increases the suffering of individuals, families, and treatment expenses.

The different results regarding the prevalence of cognitive deficit and functional disability during hospitalization can be justified by the different punctuation adopted in each study, and the use of different cognitive and functional screening instruments. The Mini-Mental State Examination, widely used, was also adopted as an evaluative measure in other studies (Talmelli et al., 2010; Hoogerduijn et al., 2012; von Renteln-Kruse et al., 2015), which considered hospitalized elderly people with a high level of studies and with a score below 24 points with cognitive decline. However, Chen et al. (2010), Buurman et al. (2011), and Lourenço et al. (2014) used different scores from this test in their studies, based on other psychometric parameters, compromising the comparison between the investigations.

We can observe this same phenomenon for measuring functional capacity, which is classified as “independent” or “dependent” in the literature. There is a study that defines “without compromise” the hospitalized elderly person who does not present any impairment in any of the activities of daily living (Hoogerduijn et al., 2012). However, others describe the basic activities of daily life in which the elderly patients are dependent, without considering the final score (Mudge et al., 2010; Hoogerduijn et al., 2012). Other authors who used the Barthel index, for example, consider the general score from 0 to 100 to define functional capacity (Lendinez et al., 2010; Spirgiene et al., 2010). In our study, we sought to understand these different classifications and the stratification of the Katz index score allowed us to understand the association of cognitive deficit in the functional capacity of hospitalized elderly people.

The factors that could confuse the association between cognitive and functional deficits in hospitalized elderly patients and a hypothesis that guided this investigation, such as age, especially elderly people over 80 years old, female, malnourished nutritional status, low education level, severity of the clinical picture, diagnosis, social isolation and adverse effects of psychotropic drugs are considered good predictors in the literature, both of impairment of functional capacity (Cristo & Pernambuco, 2009; Ehlenbach et al., 2010; Chen et al., 2010; Mudge et al., 2010) and cognitive deficit (Mudge et al., 2011; Covinsky et al., 2011), in hospitalized elderly patients. However, in our study, we did not find significant differences between groups with and without cognitive deficit based on these characteristics, which differs from other national and

international findings (Folstein et al., 1975; Siqueira et al., 2004; Chen et al., 2010; Dias et al., 2015), who raised a direct influence of these aspects on cognitive performance in the context of hospitalization. Despite this, our analysis model still considered the evidence to avoid possible confounding factors in the association, supporting the hypothesis of the association of cognitive and functional deficit.

These results suggest the need to expand the multidisciplinary intervention by reducing the risk of declining functional capacity during hospitalization, through access to early rehabilitation services (Mudge et al., 2010; Covinsky et al., 2011). These services are generally more accessible in large hospitals inserted in the Unified Health System. Also, the results contributed to thinking about the evidence-based occupational therapeutic intervention, when considering the potentialities, limitations, and the impact of cognitive changes and functional capacity in the performance of BADLs and the organization of the routine of hospitalized elderly people (Exner et al., 2017).

The places where data collection takes place have multi-professional residency programs that rely on the intervention of a varied number of professional categories and medical specialties, working in the units' routine, assisting a large part of the patients participating in the research.

However, despite the performance of these teams, there was still a high prevalence of cognitive deficit and functional disability among hospitalized elderly patients, data that were not previously described in medical records and were only identified after the research, showing the relevance of the early evaluation in the first hours of hospitalization, contributing to the recovery and/or maintenance of independence and autonomy as early as possible.

We must appreciate the results of the study with some limitations. Although the purpose of the study was not to determine causality between outcomes, the cross-sectional design with a restricted sample, selected for convenience, limits the temporal inference between them. The exact moment of evidence of cognitive or functional deficit cannot be established since we only considered the elderly patients who were already hospitalized. This issue is discussed in more detail in other studies, reinforcing the hypothesis that outcomes can occur at different times of hospitalization (Spirgiene et al., 2010; Mudge et al., 2010).

5. Conclusions

This study showed the association between the limitations in activities of daily living and cognitive deficits among the elderly population, considering potential confounding factors. The process of functional disability and the cognitive deficit is complex, and the establishment of causality requires long-term designs. However, understanding the relationship between cognitive deficit and functional disability in hospitalized elderly patients is an inherent condition for encouraging a clinical practice of evidence-based occupational therapy and for the development of policies to encourage the prevention and recovery of these damages in the hospital context. Therefore, this research collaborates in the systematization of assistance to the people in question, allowing the multidisciplinary teams to develop strategies for early assessment and targeted intervention to minimize cognitive and functional losses that may appear with hospitalization.

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Authors' contributions

Brenda Pina dos Santos: Conception of the manuscript/preparation of the article, the creation of the methodology, data analysis, interpretation, and discussion of the results. Juleimar Soares Coelho de Amorim: Conception of the manuscript, in the analysis and interpretation of the results. Bruno Costa Poltronieri: Preparation of the methodology, analysis, and interpretation of results. Amer Cavalheiro Hamdan: Participation in all phases of the study, data analysis, orientation of the master's dissertation by Brenda Pina dos Santos, the conception of the manuscript, analysis and interpretation of results, and preparation of the article. All authors approved the final version of the text.

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