Estudo Transversal EN

Maria P. B. Dias; Regina S. Barros; Giulia V. L. Medeiros; Raphaela X. Sampaio; Patrícia A. Garcia
Low schooling, polypharmacy and functional decline are associated factores with hospitalization in older adults: a cross-sectional study

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Baixa escolaridade, polifarmácia e declínio funcional são fatores associados à hospitalização de idosos: estudo transversal

Baja escolaridad, polifarmacia y declive funcional son factores asociados con la hospitalización de adultos mayores: estudio transversal

RESUMO

Objetivo: comparar fatores sociodemográficos, condições clínicas e desempenho físico entre idosos com e sem histórico de hospitalização atendidos na atenção secundária do sistema público de saúde. Método: estudo transversal com 205 idosos. Foram avaliados o histórico de hospitalização no último semestre e coletadas características sociodemográficas (idade, sexo e escolaridade), clínicas (comorbidades, medicamentos, estado cognitivo, quedas e estado nutricional) e de desempenho físico (mobilidade, força e massa muscular). Os dados foram analisados com testes t-student, U Mann Whitney, Qui-quadrado e regressão logística. Resultados: identificou-se menor escolaridade (p=0,013), maior quantidade de medicamentos (p=0,031) e pior mobilidade (p=0,039) entre idosos hospitalizados. Idosos com histórico de hospitalização tiveram três vezes maior chance de apresentar baixo desempenho de mobilidade (OR=3,906 [IC95% 1,296-11,770]; p=0,015). Conclusão: idosos com histórico de hospitalização apresentaram menor escolaridade, uso de maior quantidade de medicamentos e pior mobilidade quando comparados aos idosos que não necessitaram de hospitalização nos últimos seis meses.
DESCRITORES: Idoso; Hospitalização; Desempenho Físico Funcional; Escolaridade; Polimedicação.

ABSTRACT

Objective: to compare sociodemographic factors, clinical conditions and physical performance among elderly people with and without a history of hospitalization treated at secondary care in the public health system. Method: cross-sectional study with 205 elderly people. The history of hospitalization in the last semester was evaluated and sociodemographic characteristics (age, sex and education), clinical characteristics (comorbidities, medications, cognitive status, falls and nutritional status) and physical performance (mobility, strength and muscle mass) were collected. Data were analyzed with Student's t-test, U Mann Whitney, Chi-square and logistic regression. Results: lower educational level (p=0.013), higher quantity of medication (p=0.031) and worse mobility (p=0.039) were identified among hospitalized elderly. Elderly people with a history of hospitalization were three times more likely to have poor mobility performance (OR=3.906 [95%CI 1.296-11.770]; p=0.015). Conclusion: elderly people with a history of hospitalization had lower education, use of more medications and worse mobility when compared to elderly people who did not require hospitalization in the last six months.
DESCRIPTORS: Elderly; Hospitalization; Functional Physical Performance; Schooling; Polymedication.

RESUMEN

Objetivo: comparar factores sociodemográficos, condiciones clínicas y rendimiento físico entre ancianos con y sin historia de hospitalización atendidos en atención secundaria en el sistema público de salud. Método: Estudio transversal con 205 ancianos. Se evaluó el antecedente de hospitalización en los últimos seis meses y se recogieron características sociodemográficas (edad, sexo y escolaridad), clínicas (comorbilidades, medicación, estado cognitivo, caídas y estado nutricional) y de rendimiento físico (movilidad, fuerza y masa muscular). Los datos se analizaron mediante las pruebas t-student, U Mann Whitney, Chi-cuadrado y regresión logística. Resultados: entre los ancianos hospitalizados se encontraron niveles más bajos de educación (p=0,013), más medicación (p=0,031) y peor movilidad (p=0,039). Los ancianos con antecedentes de hospitalización tenían tres veces más probabilidades de presentar un rendimiento de movilidad deficiente (OR=3,906 [IC 95%: 1,296-11,770]; p=0,015). Conclusión: Los ancianos con antecedentes de hospitalización tenían niveles educativos más bajos, utilizaban más medicación y tenían peor movilidad en comparación con los ancianos que no habían requerido hospitalización en los últimos seis meses.
DESCRIPTORES: Ancianos; Hospitalización; Rendimiento Físico Funcional; Escolarización; Polimedicación.

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INTRODUCTION

The prevalence of hospitalization in the elderly population has been increasing in recent years, due to the increase in life expectancy and the change in the chronicity profile of diseases. Among the main causes of hospitalization are diseases of the circulatory, digestive and respiratory systems, neoplasms and diseases of the genitourinary tract. [1,2] There are several factors correlated with the hospitalization of the elderly, subdivided in this study into sociodemographic, clinical and physical performance factors. Previous studies suggest that hospitalization rates increase among older females [3,4], according to the progression of the age group, as well as for individuals with a lower level of education. [5,6] As for clinical factors, researchers [7] found that the increase in hospitalizations among the elderly is directly proportional to the amount of continuous use medication and the number of comorbidities. In addition, prior to hospitalization, the elderly have significant weight loss [8] and functional decline, often associated with the occurrence of falls, which increase the risk of hospitalizations. [4,5].

Hospitalization results in several consequences for the health of the elderly, such as: loss of independence, decline in muscle strength, functional decline, increase in the number of institutionalizations and impairment of vitality. [2,9] Cognitive decline is present in most elderly people after hospitalization, increasing levels of dependence and frailty after the period in the hospital. [10,11] Through physical performance factors, the loss of muscle strength is greater in elderly patients undergoing surgical procedures when hospitalized. [9] In addition, mobility was reduced in the elderly at the time of hospital admission, demonstrating a decline prior to hospitalization. [11–13]

The hospitalization of the elderly stems from intrinsic issues, such as the course of the disease and consequently the functional decline; and extrinsic, the hospital environment and the behaviors employed by health professionals. [14] In addition, elderly people who evaluate their health condition negatively, have limitations to perform functional activities, require a greater number of medical consultations and emergency care at home, therefore, are more likely to be hospitalized [15]

Studying the factors associated with hospitalization and comparing them between elderly people who have or have not been hospitalized is a matter of interest to public health, as it contributes to the development of effective health policies for the promotion, prevention and treatment for different levels of health care. In addition, it has the power to help track elderly people at risk, prioritize more effective interventions and develop strategies to prevent hospitalizations that can be avoided in this age group. [15]

Despite the extensive investigation of factors associated with hospitalization in the elderly, researchers have reported limitations related to data collection, sometimes from the Hospital Information System (SIH-SUS) and sometimes from the elderly's self-report. The information collected by the SIH-SUS is more harmful and biased for the studies, since it excludes a large portion of hospitalizations of the elderly not funded by the Unified Health System. [2]

In this context, the objective of this study was to compare sociodemographic factors, clinical conditions and physical performance among elderly people with and without a history of hospitalization, received by a specialized care service in the public health system.

METHOD

The present study is characterized as an observational, cross-sectional and analytical research, approved by the Research Ethics Committee of the State Department of Health of the Federal District and the Faculty of Ceilândia of the University of Brasília (CAAE 7009.7417.7.0000. 8093; Opinion 3,650,491) and all participants signed the Free and Informed Consent Form (TCLE).

The research was carried out with elderly people evaluated at the reception service of the Health Polyclinic in the western region of the Federal District in the years 2019 to 2021. This secondary-level geriatrics outpatient clinic, that is, responsible for providing specialized outpatient services, monitors elderly people who require specialized care from the geriatrics team, referred by primary health care units or another specialty.

The elderly are assigned to the geriatric outpatient clinic: (a) aged 80 years or older regardless of health condition and (b) elderly aged 60 years or older, who meet at least one of the following criteria: i. dependence on basic activities of daily living; ii. cognitive impairment (cognitive decline, depres-

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sion, delirium/confusion, and dementia); iii. parkinsonism; iv. fecal or urinary incontinence; v. partial or total immobility; saw. postural instability (repetition falls, low-impact fracture - femur); vii. polypathology (5 or more diagnoses); viii. polypharmacy (5 or more drugs); ix. frequent hospitalizations or clinical decompensations.

The study sample was constituted by convenience. Elderly people aged 60 years or older, who were evaluated by the specialized geriatrics team at the Policlínica de Ceilândia between 2019 and 2021, were included in this study. The following participants were excluded from the study: i. no assessment of cognitive status by the Mini-Mental State Examination; ii. no assessment of grip strength, muscle mass and physical performance; iii. without signature of the TCLE.

The sample size required for analyzing the variables in this study was estimated based on previous findings [4], who compared the functional mobility by TUG of elderly people with and without risk of hospitalization. Using the statistical comparison test of two independent groups and considering an effect size of Cohen's d of 0.42 [4], a power of 80% and an alpha error of 0.05, a total sample size of 182 elderly people was estimated for the two-tailed test. An n of 10% was added to the estimated sample size in order to compensate for possible losses, totaling a sample size of 200 participants for the present study.

The variables investigated in the present study were sociodemographic, clinical and physical performance characteristics and the history of hospitalization in the last six months. Such variables were collected from the evaluation form, formulated by researchers and health professionals from the region.

As for sociodemographic variables, the following were investigated: i. age (in complete years); ii. gender (female or male); and iii. schooling (in years of study).

Regarding the clinical variables, the following were analyzed: i. presence of comorbidities (cardiopathies, stroke, dementia, diabetes and depression); ii. amount of continuous use medication; iii. cognitive state; iv. history of falls; and v. nutritional status. The Mini-Mental State Examination (MMSE) was used to assess the cognitive state. This

test assesses the cognitive domains that include orientation in time, orientation in space, word registration, attention, calculation, memory, language, verbal fluency, response to commands and manual skill. When added together, the scores for each item can reach a maximum score of 30 points. [16] The history of falls was investigated through the self-report of the participant or companion, through the question: "Have you suffered any falls in the last 6 months?". Nutritional status was assessed using the Body Mass Index, with participants grouped into underweight (BMI < 22 kg/m²), eutrophic elderly (BMI 22–27 kg/m²) and overweight elderly (BMI > 27 Kg/m²). [17]

To investigate the physical performance variables, the following were evaluated: muscle strength, muscle mass and mobility. Isometric handgrip muscle strength (HGS) was measured in KgF using a Saehan® manual hydraulic dynamometer (Saehan Corporation, 973, Yangdeok-Dong, Masan, Korea), a valid and reliable instrument. For HGS measurement, the test was performed on the dominant upper limb, taking the position of adducted shoulders in a neutral position, in order to avoid rotations, the elbow flexed at 90°, forearm in a neutral position with thumb pointing up and feet flat on the floor. The individuals were encouraged through the verbal stimulus and the average of the 3 attempts was considered for analysis. For this study, values below 16 KgF for women and 27 KgF for men were considered muscle weakness. [18]

Muscle mass, in turn, was assessed from the measurement of calf circumference (CC). This measure was evaluated with a tape measure, with the elderly person sitting with feet flat on the floor, knee and ankle in a 90° position, measuring the largest diameter of the calf of the dominant leg. The cutoff point of the present study was 31 centimeters (cm), considering the muscle mass of elderly people with CC below this value to be low. [18]

Finally, mobility was assessed using the Timed Up and Go (TUG) test. The test consists of getting up from a chair without armrests and walking a distance of 3 meters (m), within the individual's usual speed, turning 180 degrees, returning to the chair along the same path and sitting down. The time was measured from the removal of the

buttocks from the chair until the return to the sitting position. 19 Were classified as low physical performance, the elderly who had a time greater than or equal to 12.47 seconds. [19]

The hospitalization history was characterized by hospitalization or hospitalization in an emergency care unit for at least 24 hours in the six months prior to the assessment carried out in the reception. The variable collection was generated through the question: "Have you been hospitalized for a minimum period of 24 hours in the last 6 months?". Based on this information, study participants were grouped into: i. group of elderly people with a history of hospitalization (record of at least 1 hospitalization in the last 6 months); and ii. group of elderly people without a history of hospitalization (no hospitalization recorded in the last 6 months).

The elderly were evaluated in a single moment. For the collection of sociodemographic and clinical data, an interview was conducted with the elderly person and/or companion. In the sequence, the cognitive state was evaluated using the MMSE, the muscle mass by measuring the calf circumference, the muscle strength by the HGS and, later, the mobility by means of the TUG. All the procedures described were performed by two evaluators, previously trained, trained and supervised by a senior specialist from the Polyclinic. A standard procedure was instituted, elaborated by the members of the research group of the present study, used both for the interview and for carrying out the tests and collecting measurements.

Statistical analyzes were processed using the Statistical Package for Social Sciences (SPSS) program, version 22.0. Continuous data were descriptively analyzed using measures of central tendency (mean and median) and variability (standard deviation and 25% and 75% percentiles). Categorical data were presented in absolute and percentage frequency. Data distribution was investigated using the Kolmogorov-Smirnov test, in which a normal distribution was identified only for age data. To compare numerical variables between elderly people with and without a history of hospitalization, an independent t-student test or U Mann Whitney test was used, according to data distribution.

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To compare the categorical variables between the two study groups, the chi-square test was used. To verify how much the hospitalization history was associated with worse mobility, univariate logistic regression analysis was performed. The calculation of odds ratios (OR) was performed with a 95% confidence interval. A significance level of 5% was considered.

RESULTS

During the study period, 488 elderly people admitted to the polyclinic were evaluated for eligibility, of which 205 were included in the present study. Of the participants included in the study, 13.2% (n=27) reported hospitalization in the last six months (Figure 1).

Most of the elderly included in the study were female (72.7%), with a mean age of 77.3 (±7.39) and a median of 3 (P25%-P75%: 0-4) years of schooling. It was observed that elderly people with a history of hospitalization had less education, used more medications and had worse mobility when compared to elderly people without a history of hospitalization in the last six months (Table 1).

The binary logistic regression analysis identified that the history of hospitalization in the last six months was associated with worse mobility in the TUG when the elderly were received in specialized care. Elderly people with a history of hospitalization were three times as likely as elderly people who did not require hospitalization in the last six months to present poor performance on the TUG (OR = 3.906 [95%CI 1.296-11.770]; p=0.015).

DISCUSSION

The present study aimed to compare sociodemographic factors, clinical conditions and physical performance among elderly people with and without a history of hospitalization. The main findings showed that elderly people with a history of hospitalization had a lower level of education, a greater amount of medication for continuous use and worse mobility when compared to elderly people without a history of hospitalization.

According to the present study, other authors sought to investigate the association between education and hospitalization of the elderly. [1,4–6] Consistently, low education has been associated with hospitalization of the elderly by the Unified Health System (SUS) in several studies. [1,4] Previous studies

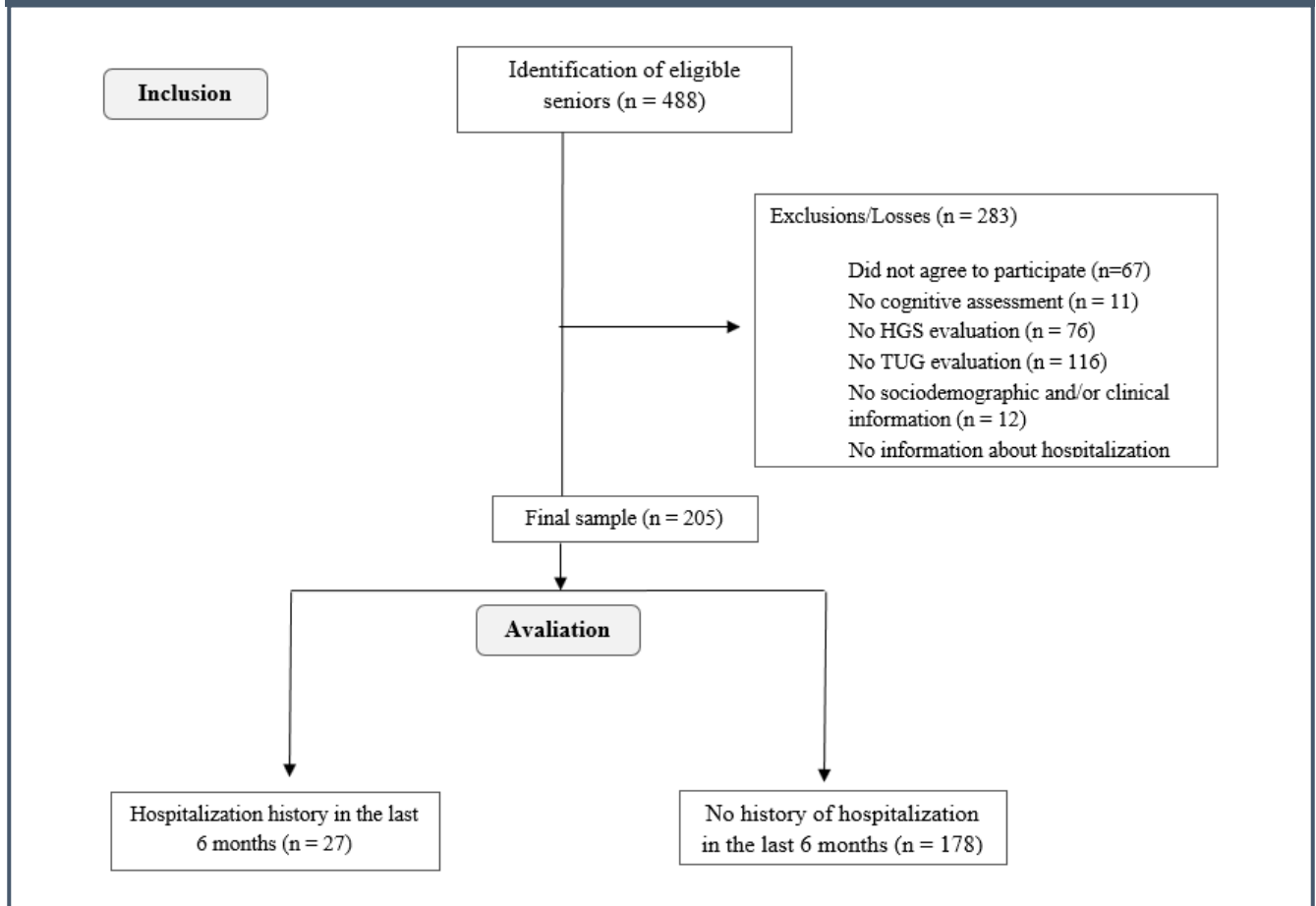Figura 1. Fluxograma de seleção de amostra, Brasília-DF, Brasil, 2019-2021

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Table 1. Comparison of sociodemographic, clinical and physical performance variables between study groups, Brasília-DF, Brazil, 2019-2021

Variable	General Sample (n=205)	Group without hospitalization history (n=178)	Group with hospitalization history (n=27)	p-value
Sociodemographic characteristics				
Age[a]	77,30 (7,39)	76,99 (7,28)	79,33 (7,88)	0,126
Gender[c]				0,249
Female	72,7 (149)	74,2 (132)	63,0 (17)	
Male	27,3 (56)	25,8 (46)	37,0 (10)	
Years of study[b]	3 (0-4)	3,00 (0 – 4)	1,00 (0 – 3)	0,013*
Clinical features				
Comorbiditites[c]				
Cardiopathies	32,7 (67)	30,3 (54)	48,1 (13)	0,079
EVA	17,6 (36)	16,9 (30)	22,2 (6)	0,586
Dementia	27,3 (56)	29,2 (52)	14,8 (4)	0,164
Diabetes	48,8 (100)	47,2 (84)	59,3 (16)	0,303
Depression	42,0 (86)	41,0 (73)	48,1 (13)	0,533
Amount of medications [b]	5 (3 – 7)	5 (3 – 7)	6 (4,5 – 8,5)	0,031*
Cognitive status (MMSE)[b]	18 (15 – 22)	18,0 (14 – 22)	17,0 (16 – 20,5)	0,586
Cognitive impairment	83,9 (172)	82,0 (146)	96,3 (26)	0,088
Fall History[c]	37,6 (77)	38,2 (68)	33,3 (9)	0,676
IMC[b]	87,84 (5,86)	27,20 (23,51 – 31,74)	26,62 (24,14 – 32,07)	0,837
Nutritional status[c]				
Thinnes	23,9 (49)	24,7 (44)	18,5 (5)	0,233
Eutrophy	37,1 (76)	34,8 (62)	51,9 (14)	
Overweight	39,0 (80)	40,4 (72)	29,6 (8)	
Physical and functional characteristics				
Muscular strength (Kgf)[b]	18,66 (13,66 – 22,63)	18,63 (13,66 – 22,60)	18,67 (13,5 – 22,81)	0,750
Muscle mass (cm)[b]	32 (29 - 35)	32,0 (29 -35)	32,0 (28 – 35,5)	0,907
Mobility (TUG – s)[b]	14,03 (11,57 – 19,39)	13,85 (11,37 – 19,37)	16,13 (13,60 – 21,84)	0,039*
Good performance on TUG (TUG<12,47s)[c]	37,1 (76)	40,4 (72)	14,8 (4)	
Low performance on TUG (TUG≥12,47s) [c]	62,9 (129)	59,6 (106)	85,2 (23)	0,012*

[a]Mean (Standard deviation) compared with independent Student's t-test. [b] Median (P25-P75%) compared with the U Mann Whitney test. [c] Percentage (Absolute frequency) compared with Chi-square test. *p<0.05.

[5,6] also found an association between low education and a higher prevalence of hospitalizations among the elderly, with groups of elderly people with more than 5 years of study having a lower frequency of hospitalization when compared to those with 1 to 4 years of study or who had no education at all. [6] In addition, elderly people who could read and write showed a protective factor against hospitalization.[5] This relationship can be explained by the fact that low education represents a great loss of important information, dependence and vulnerability to false information that can harm health, considering that, in order to have access to self-care information, the elderly need help from their family members or third parties.[20]

In line with our findings, polypharmacy has also shown a strong relationship with hospitalization of the elderly in previous studies. [5,7,21,22] The clinical and adverse effects of polypharmacy in the elderly, who have a different metabolism, are still an area to be explored and should be analyzed in future studies. [23] To understand this association, we can take as a basis the demographic and epidemiological changes that occurred in the 21st century, [7] which modified the profile of hospitalizations and prevalence of comorbidities in the elderly population. Currently non-communicable chronic diseases (NCDs), such as hypertension, diabetes, acute myocardial

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infarction, congestive heart failure, cerebrovascular disease, hemiplegia, dementia, peripheral vascular disease, liver disease, chronic lung disease, connective tissue disease, peptic ulcer, chronic kidney disease and malignancy have become the most prevalent among the hospitalized elderly population, and these comorbidities require more medication for their control. [22] Thus, the hypothesis is drawn that elderly people who are hospitalized have a greater number of CNCDs and, consequently, need a greater amount of medication to control these pre-existing comorbidities. It is also worth mentioning that the elderly person using polypharmacy may have drastic clinical outcomes that require hospitalization, such as falls and cognitive impairment. [7,23] Thus, the hypothesis is drawn that elderly people who are hospitalized have a greater number of CNCDs and, consequently, need a greater amount of medication to control these pre-existing comorbidities. It is also worth mentioning that the elderly person using polypharmacy may have drastic clinical outcomes that require hospitalization, such as falls and cognitive impairment. [22]

Mobility and hospitalization of the elderly can be analyzed in two spheres: the worsening of mobility as a result of hospitalization [3-5,11-13] and reduced mobility as a conditioning factor for hospitalization in the future. [11-13] In the present study, it was observed that elderly people with a history of hospitalization had worse mobility performance in the TUG, however, considering the cutoff point of 12.47 seconds indicative of a greater risk of falling. [19] Similar to our findings, other authors [4] revealed that the average time spent on the test was higher among hospitalized elderly. In a study that analyzed the impact of hospitalization on the mobility of the elderly during 30 days, it was observed that the mean TUG seconds in seconds increased significantly after the 15th and 30th day of hospitalization. [14] As for the reduced mobility of the elderly as a risk factor for hospitalization, a previously developed study found that more than 60% of the elderly, assessed using the TUG upon being admitted to hospital, they presented impaired or regular mobility, indicating impairment of functionality prior to hospitalization. [13] This functional decline in elderly patients before, during and after hospitalization has a multifactorial cause, and may be related to age, comorbidities presented by the elderly, to medications in use, immobility, falls, malnutrition and even due to hospital procedures, such as exams performed during the in-hospital period. [3]

Despite not demonstrating a statistically significant difference, some findings of the present study are shown to be relevant data in previous studies and, therefore, the importance of investigation in new studies, with a larger sample size and longitudinal design, is emphasized. Among these results, we can highlight the variables gender, cognitive state and history of falls. It is known that the group with a history of hospitalization in the last 6 months was composed of 63% of female individuals and 37% of males. Similar search 5 presented similar data, with 63.20% of the hospitalized sample composed of female individuals. Furthermore, despite the literature [10] pointing out the presence of cognitive decline in 35% of hospitalized elderly, the present study did not identify this association, most likely because it is a sample with a high frequency of cognitive impairment in both study groups. The history of falls was also shown to be a clinically relevant variable, 33.3% of individuals with a history of hospitalization had at least one fall in the last 6 months, as observed in previous studies [4], which demonstrated an increase in the number of hospitalizations due to falls in elderly individuals with a greater number of continuous use medications. [21]

As limitations of the present study, the cross-sectional design limits the identification of the causality of the hospitalization. In addition, the lack of investigation of the main and secondary diagnoses that led to hospitalization is shown to be a limiting factor, as occurs when analyzing functional decline, not being possible to identify whether it was already present prior to hospitalization. Regarding the variable comorbidities, respiratory diseases were not included, despite being one of the major causes of hospitalization. It can also be considered as a limitation, the performance of the collection through the self-report of the elderly and/or companion, subjecting the data to the memory bias of the participants specifically in the collection of information on the occurrence of falls. However, the present study has numerous strengths: the investigation was carried out specifically with elderly people treated in specialized care, which will help to elucidate the factors associated with hospitalization in this population. Additionally, most variables were collected using observed performance measures rather than using secondary sources or self-reports, which could provide outdated performance data.

The results described here demonstrate important clinical implications for health professionals and elderly people treated in secondary care settings. Health professionals, faced with elderly people with low education, using polypharmacy and with mobility deficits, should implement strategies in an attempt to reduce the risk of hospitalization that these elderly people present. Based on previous studies, researchers reinforce the relevance of mobilization/walking within hospitals and the importance of reducing hospitalization time in an attempt to prevent severe losses in functional capacity during the hospitalization period. [24] After the period of hospitalization, it is up to the attention of health professionals, at any level of complexity, to analyze the real need to use all the medicines included in the daily life of the elderly, translate the medicines into an accessible language for the elderly with low education (association with figures and colors), educate the elderly for proper storage and correct administration and involve family members in the care relationship with the elderly, in order to avoid intoxication and adverse effects. [7] Finally, elderly people identified with mobility declines should be directed to a specialized service and guaranteed access to physical and functional rehabilitation services.

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CONCLUSION

In conclusion, the present study identified that elderly people with a history of hospitalization had lower education, use of more medications and worse mobility when compared to elderly people who did not require hospitalization in the last six months.

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CONFLICT OF INTERESTS: the authors declare that there is no conflict of interest.

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