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ORIGINAL ARTICLE

FACTORS ASSOCIATED WITH LONG-TERM HOSPITALIZATIONS IN A HIGH COMPLEXITY HOSPITAL INSTITUTION

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ABSTRACT

Objective: to analyze the factors associated with long-term hospitalizations of patients treated by the Unified Health System in a highly complex institution. **Method:** it is a quantitative cross-sectional study based on secondary data on hospital admissions from 2013 to 2015. The prevalence ratio was calculated using crude and adjusted Poisson regression. **Results:** about the 12,689 hospitalizations during the years of study, 645 were long hospital stay (>30 days), with a prevalence of 5.1%. There was a predominance of males (62%),> 60 years-old (52.6%). The most frequent causes of hospitalization were diseases of the circulatory system (33.5%) and external causes (22.3%). Death occurred to 45.6%. In the bivariate analysis, the following variables were statistically associated with long-term hospitalizations: gender, age (60 years-old and over), low or uneducated individuals, being from the 17th Regional Health Department, having been admitted to the neurosurgery specialty and having needing ICU admission. However, the male gender remained in the final model, staying in the regional health department of the municipality under analysis and requiring admission to the Intensive Care Unit (p <0.001). **Conclusion:** Health promotion strategies aimed at men's health should be developed by the municipality, especially considering that they are the ones who most lose their lives due to the lack of health care and due to injuries resulting from external causes.

Keywords: Long-term care. Length of hospital stay. Hospitalization. Bed Occupancy.

INTRODUCTION

Long-term patients are, in general, of high care complexity, with worsening chronic problems, frequent visits to the Intensive Care Unit (ICU) and have a high hospital mortality rate[1-3]. Other factors affect the length of hospital stay, such as sociodemographic and waiting time in the emergency room[4-5].

The average length of stay is an indicator that shows the efficiency and effectiveness of hospital management. This indicator shows the impact of each day of hospitalization on the cost of the patient, indicating that the longer the hospital stay, the higher the cost will consequently be[5-6].

According to data released by the Brazilian Institute of Geography and Statistics (IBGE), deaths in Brazil started to be caused by chronic, degenerative diseases and, also, by external causes, with high severity and that impact on the permanence of this individual for several days in beds hospital[7].

Brazil is a country of continental geographical dimensions, with important regional differences and complex problems arising from social inequalities. Public policies, such as the Unified Health System (SUS), are

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mechanisms capable of promoting greater equity and social justice and, therefore, need to be monitored and evaluated so that the resources allocated to them are optimized and fulfill their mission of minimizing inequalities present in the country and improve the living conditions of the population[8-9].

It is observed that even with the undeniable advances of the Unified Health System (SUS), managers still face challenges in structuring services to ensure the promotion of the population's health and comprehensive care, especially in view of the aging of the population, the increased incidence of chronic diseases, the lack of hospital beds, the management of long-term patients and safe des-hospitalization have been shown to be frequent challenges for hospital institutions[10,2].

Hospitalization is a resource of the health system used in an attempt to recover the health of individuals, but attention has been increasing for the length of stay of patients in hospitalizations, considering the consequences for them, their families and, still, the impact on the increase in hospital costs[1].

The Ministry of Health establishes a standardization of nomenclature for hospitals that are part of the SUS, defining long-term hospitalization for patients who occupy a hospital bed for a period equal to or greater than 30 days[11].

It is essential to know the profile of long-term hospitalizations to seek strategies that reduce hospitalization time, but without decreasing the quality of care. In this sense, it is necessary to identify factors that lead patients to stay longer in a hospital institution, increasing the occupancy rate recommended by SUS and, even, which may cause harm to the patient.

In this context, this study aimed to analyze the factors associated with long-term hospital admissions of patients treated by the Unified Health System in a highly complex institution.

METHOD

This is a quantitative, cross-sectional study, carried out in a hospital in a large city, located in the southern region of Brazil. The municipality has an estimated population of 569,733 inhabitants[12-13].

The institution chosen by the hospital is highly complex with 136 beds in the inpatient unit and 36 beds in the Intensive Care Unit (ICU), which serves clinical and surgical patients. The institution is of a philanthropic nature, non-profit, serving patients linked to health plans and SUS [14]. For this research, only the hospitalizations performed by SUS were considered.

The study material consisted of hospital admissions carried out by SUS, with hospitalization date recorded between January 1st, 2013 and December 31st, 2015. The data collection was carried out in the first half of 2016 from information from the electronic system adopted at the institution, in which data related to all services provided by a patient are recorded.

The admissions criteria for patients aged 18 years-old and over and financed by SUS were adopted as inclusion criteria. The exclusion criteria were long-term hospitalizations of patients admitted by means of health insurance or paid for by the patient and/or family members, and it was also decided to exclude hospital readmissions, so that variables related to the individual were not overestimated.

The dependent variable of the study were long-term hospitalizations and the independent variables were divided into two groups: those related to the patient and those related to the clinical characteristics of the hospitalization.

In the first group, the following variables were evaluated: sex (female and male), age in three categories (18 to 30, 31 to 59 and 60 or more); self-reported education, with four categories (no education, elementary school, high school and higher education); municipality of origin grouped by Regional Health Departments of Paraná. A Regional Health Department can be understood as the continuous geographic space constituted by groups of bordering Municipalities, with the purpose of integrating the organization and planning of health actions and services[15].

The second group included the clinical specialties necessary for specifying each hospitalization, the International Classification of Diseases (ICD-11)[16], information on whether the patient needed to be admitted to the intensive care unit (ICU), yes or no, and the type of

clinical outcome (discharge/death).

For the processing of information, it was counted on the help of a professional with experience in the system called Business Intelligence (BI), used by the institution, for the selection of hospitalizations performed by SUS, in the studied periods. Subsequently, these files were unzipped and debugged using the Microsoft Excel program[17], through which the variables of interest for analysis were selected and possible inconsistencies were corrected.

The data were analyzed using the Statistical Package for the Social Science (SPSS), version 20.0. Descriptive analyses were performed, with presentation of absolute and relative frequencies. In the association analyses, crude and adjusted Poisson Regression (PR) was used to verify the relation between long-term hospitalizations and the other independent variables of the study. Variables with a p-value <0.20 were incorporated into the multivariate model. The independent variables with a 95% confidence interval (CI) remained in the final model, which maintained a significant association after adjustment (p <0.05).

The Term of Confidentiality and Secrecy was used to use the data. The project for this study was approved by the Research Ethics Committees involving Human Beings of the Proponent Institution under opinion nº 084264/2016 and also by the Research Ethics Committee Involving Human Beings of the place where the research was carried out under Opinion nº 51/16.

RESULTS

Table 1. Characterization of patients hospitalized by the Unified Health System in a highly complex hospital according to length of hospital stay (2013-2015). Paraná, Brazil, 2016.

Variables (N=645)		**Hospital stay ≥ 30 days**	
		n	**%**
Year	2013	218	33.8
	2014	211	32.7
	2015	216	33.5
Gender	Female	245	38.0
	Male	400	62.0
Age (in years)	Up to 30	64	9.9
	From 31 to 59	242	37.5
	Over 60	339	52.6
Education*	No schooling	66	11.5
	Elementary School	376	65.5
	High School	111	19.3
	Higher Education	21	3.7
Regional Health Departments	17th Regional Department	535	82.9
	Other Regional Departments	110	17.1
Hospitalization Specialty	Cardiology	54	8.4
	Angiology	20	3.1
	General surgery	38	5.9
	Neurosurgery	165	25.6
	Orthopedics	82	12.7
	Others	286	44.3
International Classification of Diseases (by Chapter)	IX-Circulatory System	216	33.5
	XI-Digestive System	30	4.7
	XIV-Genitourinary System	56	8.7
	XIX-External Causes	144	22.3
	Others	199	30.9
ICU Hospitalization	Yes	511	79.2
	No	134	20.8
Clinical outcome	Discharge	351	54.4
	Death	294	45.6

Among the 12,689 hospitalizations that occurred during the study period, 645 (5.1%) were from patients who required long-term hospitalizations. Among them, there was a

predominance of male patients (62.0%); aged over 60 years-old (52.6%); with elementary education (65.5%) and the vast majority (82.9%) belonging to the 17th Regional Health Department. In hospitalization specialties, neurosurgery stood out (25.6%). In relation to the ICD-10, hospitalizations for diseases of the circulatory system were the most frequent (33.5%), followed by hospitalizations due to external causes (22.3%) and 20.8% of patients with long hospital stays required ICU admission. The death rate in these hospitalizations was 45.6%, as shown in Table 1.

With regard to the association between sociodemographic and clinical variables with long-term hospitalizations in their crude analysis (Table 2), the following variables were significantly associated with long-term hospitalizations: gender, age (60 years-old and over), low or no schooling of individuals, being from the 17th Regional Health Department, having been hospitalized for neurosurgery and having required ICU admission.

It was found that the prevalence of long-term hospitalizations was higher among males, with 34% higher when compared to women's hospitalizations (p <0.001). There was a predominance, in this type of hospitalization, for individuals aged 60 or over (p = 0.020) and for those with low (p = 0.0130) or with no schooling (p = 0.010).

In relation to the Regional Health Department, the prevalence of long-term hospitalizations was 87% higher for individuals belonging to the 17th Regional Health Department when compared with other regional (p <0.001).

Neurosurgery was the medical specialty with the highest number of long-term hospitalizations when compared to the others (p <0.001). ICU admission for individuals with long-term hospitalization needs was 6.61 times higher than for hospitalizations of less than 30 days (p <0.001).

Table 2. Bivariate analysis between sociodemographic and clinical variables of patients undergoing long-term hospitalization in a highly complex hospital (2013-2015). Paraná, Brazil, 2016.

Variables N=645		Long-term hospitalizations			
		N(%)	PR	CI 95%	p-value
Year	2013	218 (33.8)	1.00		
	2014	211 (32.7)	0.99	0.82-1.19	0.937
	2015	216 (33.5)	0.99	0.83-1.19	0.939
Gender	Female	245 (38.0)	1.00		
	Male	400 (62.0)	1.34	1.14-1.56	<0.001
Age (in years)	Up to 30	64 (9.9)	1.00		
	From 31 to 59	242 (37.5)	1.06	0.81-1.39	0.647
	From 60 and older	339 (52.6)	1.36	1.05-1.77	0.020
Education*	Sem escolaridade	66 (11.5)	1.89	1.17-3.06	0.010
	Elementary School / High School	487 (84.8)	1.72	1.13-2.65	0.013
	Higher School	21 (3.7)	1.00		
Regional Health Departments	17th Regional Department	535 (82.9)	1.87	1.53-2.27	<0.001
	Other Regional Departments	110 (17.1)	1.00		
Hospitalization specialty	Neurosurgery	165 (25.6)	2.42	2.04-2.88	<0.001
	Orthopedics	82 (12.7)	0.96	0.76-1.21	0.727
	Others	398 (61.7)	1.00		
International Classification of Diseases (by chapter)	Circulatory System	216 (33.5)	0.88	0.74-1.05	0.156
	Ext. Causes	144 (22.3)	0.74	0.88-1.30	0.500
	Others	285 (44.2)	1.00		
ICU Hospitalization	Yes	511 (79.2)	6.61	5.48-7.97	<0.001
	No	134 (20.8)	1.00		

Percentage referring to the column of long-term hospitalizations.

In the multivariate analysis, the variables sex, regional health department and ICU admission remained in the final model. Long-term hospitalizations had a 42.0% higher frequency for males, (p <0.001) and were 51.0% higher among patients belonging to the 17th Regional

Health Department. Regarding ICU admission, individuals with long-term hospitalization needs had six times more hospitalization in this sector, when compared to short-stay patients (p <0.001) (Table 3).

Table 3. Sociodemographic and clinical factors associated with long-term hospitalizations, in a highly complex hospital, according to a model adjusted by Poisson regression (2013-2015).Paraná, Brazil, 2016.

Variables		Long-term hospitalizations			
		N (%)*	PR	CI 95%	p-value
Gender	Female	245(38.0)	1.00		
	Male	400 (62.0)	1.42	1.22-1.66	<0.001
Regional Health Departments	17th Regional	535 (82.9)	1.51	1.25-1.84	0.001
	Others	110 (17.1)	1.00		
ICU hospitalization	No hospitalization	134 (20.8)	1.00		
	With hospitalization	511(79.2)	6.55	5.43-7.90	<0.001

*Percentage referring to the column of long-term hospitalizations

DISCUSSION

In Brazil, hospitalizations through the SUS from 2013 to 2015 corresponded to 33,895,163, with an average stay of 5.7 days[18]. The prevalence of hospitalizations of patients with long-term needs found in this study (5.1%) was higher than the Brazilian study [19], which showed a prevalence of 3.7%. It is possible that this difference was due to the fact that this study was carried out in a highly complex institution, with patients treated by SUS and in a specific area of Southern Brazil, while the study mentioned[19], covered the national territory, except for the North region of the country, with 63.1% of admissions by SUS and the others, coming from other health plans and private individuals, with no age limit.

The factors associated with long-term hospitalizations identified in this study were: gender; regional health department of origin of patients and ICU admission. In a study in Italy, on the other hand, it found patients with cognitive impairment and deficiency in activities of daily living, high comorbidity and inappropriate admission as a long-term factor [20]. And a Canadian cohort study showed an associated factor in patients who had a hospital decline in nutritional status by 5%[21].

The results of the study showed that the prevalence for long-term hospitalization was higher for males. This information is in accordance with the Ministry of Health [22], whose data indicate that men are at higher risk of hospitalization than women. They are more susceptible to diseases, possibly due to the more frequent risk behaviors, because they seek health services less, due to time limitations and, mainly, due to the false self-perception of their physical and mental infallibility; in addition to being more vulnerable to circulatory diseases and the occurrence of traumas and accidents, that is, external causes[23].

Regarding the prevalence of long-term hospitalizations in the 17th Regional Health Department, this data may be associated with the study site, located in a city in the said Regional Health Department, in addition, the studied institution is a reference for assistance to other nearby municipalities, also belonging to the same Regional Health Center. This data highlights the importance of studies being produced, to verify the prevalence of long-term hospitalizations in other municipalities/Regional Health Department.

The results of this study demonstrated that the ICU beds are occupied by older patients and with a high mortality rate. A way to reverse this scenario could be an adequate bed management, seeking the maximum possible use, safely, within the established technical and administrative criteria, in order to optimize the waiting time for hospitalization. Such measures could positively impact customer satisfaction and the Institution's revenue.

In addition, a Semi-Intensive Care unit could be created for patients who require intensive care, usually due to greater dependency, but who do not require permanent monitoring. This unit would have the presence of a companion so that

it would be prepared for the moment of hospital discharge and for the resumption of the patient's daily activities.

It is also important to create a Municipality Management Policy to create a Palliative Care unit, which consists of a multidisciplinary approach to improve the quality of life of patients and their families in the face of a disease that threatens the continuity of life. Long-term patients in the final stages of life would count on relieving suffering through identification, early assessment and treatment of pain and other physical, psychosocial and spiritual problems, and always with the support of family members.

Another possibility is the creation or implementation of the home care service, with support to meet the repressed demand that remains waiting in a hospital bed and even to find a reference for a less complex hospital when the patient has discharge conditions, but remains waiting for problems social.

As a limitation of this study, the collection was performed from secondary data and with a cross-sectional design, not allowing the establishment of a causal relationship between the variables studied.

It is known that the shorter the hospital stay, the lower the risk of hospital mortality. Knowledge of the regional incidence of each disease is also necessary to work in a planned and targeted manner, also reducing hospitalization.

CONCLUSION

The factors associated with long-term hospitalizations were being male, staying in another Regional Health Department and staying in the ICU. Although the prevalence of long-term hospitalizations is not high, the factors associated with these hospitalizations showed significant results in terms of severity, considering ICU admissions, and mortality. These facts show the need for further studies to investigate the particularities of these hospitalizations.

FATORES ASSOCIADOS ÀS INTERNAÇÕES DE LONGA PERMANÊNCIA EM INSTITUIÇÃO HOSPITALAR DE ALTA COMPLEXIDADE

RESUMO

Objetivo: analisar os fatores associados às internações hospitalares de longa permanência de pacientes atendidos pelo Sistema Único de Saúde em instituição de alta complexidade. **Método:** estudo transversal quantitativo a partir de dados secundários de internações hospitalares de 2013 a 2015. Calculou-se a razão de prevalência por Regressão de Poisson bruta e ajustada. **Resultados:** das 12.689 internações nos anos de estudo, 645 foram de longa permanência (>30 dias), com uma prevalência de 5,1%. Predominaram entre o sexo masculino (62%), > 60 anos de idade (52,6%). As causas mais frequentes da hospitalização foram doenças do aparelho circulatório (33,5%) e causas externas (22,3%). O óbito ocorreu para 45,6%. Na análise bivariada, estiveram estatisticamente associadas às internações de longa permanência as variáveis: sexo, idade (60 anos e mais) o baixo ou a não escolaridade dos indivíduos, ser da 17ª regional de saúde, ter sido internado na especialidade neurocirurgia e ter necessitado de internação em UTI. No entanto, permaneceram no modelo final sexo masculino, residir na regional de saúde do município em análise e ter necessitado de internação em Unidade de Terapia Intensiva. (p<0,001). **Conclusão:** Estratégias de promoção da saúde voltadas à saúde do homem devem ser desenvolvidas pelo município, especialmente considerando que os mesmos são os que mais perdem a vida pela ausência de cuidados com a saúde e em decorrência dos agravos resultantes de causas externas.

Palavras-chave: Assistência de longa duração. Tempo de internação. Hospitalização. Ocupação de leitos.

FACTORES ASOCIADOS CON HOSPITALIZACIONES DE LARGA ESTANCIA EN UNA INSTITUCIÓN HOSPITALARIA DE ALTA COMPLEJIDAD

RESUMEN

Objetivo: analizar los factores asociados a las internaciones hospitalarias de larga estancia de pacientes atendidos por el Sistema Único de Salud en institución de alta complejidad. **Método:** estudio transversal cuantitativo a partir de datos secundarios de internaciones hospitalarias de 2013 a 2015. Se calculó la razón de prevalencia por Regresión de Poisson bruta y ajustada. **Resultados:** de las 12.689 internaciones en los años de estudio, 645 fueron de larga permanencia (>30 días), con una prevalencia de 5,1%. Predominaron entre el sexo masculino (62%), > 60 años de edad (52,6%). Las causas más frecuentes de la hospitalización fueron enfermedades del sistema circulatorio (33,5%) y causas externas (22,3%). El óbito ocurrió para 45,6%. En el análisis bivariado, estuvieron estadísticamente asociadas a las internaciones de larga estancia las variables: sexo, edad (60 años y más) la baja o la no escolaridad de los individuos, ser de la 17ª regional de salud, haber sido internado en la especialidad neurocirugía y haber necesitado de

internación en UCI. Sin embargo, permanecieron en el modelo final sexo masculino, residir en la regional de salud del municipio en análisis y haber necesitado de internación en Unidad de Cuidados Intensivos. (p<0,001). **Conclusión:** Estrategias de promoción de la salud dirigidas a la salud del hombre deben ser desarrolladas por el municipio, especialmente considerando que los hombres son los que más pierden la vida por la ausencia de cuidados con la salud y en consecuencia de los agravios resultantes de causas externas.

Palabras clave: Cuidados a Largo Plazo. Tiempo de Internación. Hospitalización. Ocupación de Camas.

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