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Abstract

The aim was to analyze the behavior of causes and length of stay of hospitalizations of elderly people due to conditions sensitive to primary care in the State of Santa Catarina in the period between 2008 and 2015. Authorizations for hospital admissions AIH/SUS filtered by the cause and length of stay of the patients were used hospitalizations of elderly people due to conditions sensitive to primary care, from 2008 to 2015, in Santa Catarina. Standardized data by age using the direct method and statistical analysis using Joinpoint Regression[®] software. In asthma, chronic obstructive pulmonary disease and heart failure, a decrease in variation was observed during the study period. Ear, nose and throat infections, bacterial pneumonia and angina increase. The variation of hospital stays of up to seven days decreased and a significant increase, between 15 and 30 days. Cerebrovascular diseases were the main responsible for hospitalizations with length of stay over 15 days. The increase in the length of hospital stay has a negative impact on the life of the elderly, their family and the health system. Health professionals and authorities should be attentive to the expansion of care actions at the level of primary care for the elderly.

Descriptors: Elderly; Hospitalization; Residence Time; Primary Health Care; Environment and Public Health.

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Resumén

El objetivo fue analizar el comportamiento de las causas y la duración de la internación de ancianos por condiciones sensibles a la atención primaria en el Estado de Santa Catarina en el período comprendido entre 2008 y 2015. Autorizaciones de ingresos hospitalarios AIH/SUS filtradas por causa y tiempo de estancia de hospitalizaciones de ancianos por condiciones sensibles a la atención primaria, de 2008 a 2015, en Santa Catarina. Datos estandarizados por edad mediante el método directo y análisis estadístico mediante el software Joinpoint Regression®. En asma, enfermedad pulmonar obstructiva crónica e insuficiencia cardíaca se observó una disminución de la variación durante el período de estudio. Aumentan las infecciones de oído, nariz y garganta, la neumonía bacteriana y la angina. Disminuyó la variación de las estancias hospitalarias de hasta siete días y aumentó significativamente, entre 15 y 30 días. Las enfermedades cerebrovasculares fueron las principales responsables de las hospitalizaciones con estancia superior a 15 días. El aumento de la estancia hospitalaria tiene un impacto negativo en la vida de los ancianos, su familia y el sistema de salud. Los profesionales y autoridades de salud deben estar atentos a la ampliación de las acciones de cuidado en el nivel de atención primaria a los ancianos.

Descriptor: Anciano; Hospitalización; Tiempo de Permanencia; Atención Primaria de Salud; Medio Ambiente y Salud Pública.

Resumo

Objetivou-se analisar o comportamento das causas e tempo de permanência das internações de idosos por condições sensíveis à atenção primária no Estado de Santa Catarina no período entre 2008 e 2015. Utilizou-se as autorizações de internações hospitalares AIH/SUS filtrados pela causa e tempo de permanência das internações de idosos por condições sensíveis à atenção primária, no período de 2008 a 2015, em Santa Catarina. Realizou a padronização dos dados por idade através do método direto e a análise estatística por meio de *Software Joinpoint Regression*®. Na asma, doença pulmonar obstrutiva crônica e insuficiência cardíaca, observou-se queda de variação no período do estudo. Já as infecções de ouvido nariz e garganta, pneumonias bacterianas e angina, aumento. Diminuiu a variação de permanência hospitalar de até sete dias e aumento significativo, entre 15 e 30 dias. As doenças cerebrovasculares foram as principais responsáveis pelas internações com tempo de permanência acima de 15 dias. O aumento do tempo de permanência hospitalar impacta negativamente a vida do idoso, sua família e para o sistema de saúde. Profissionais e autoridades de saúde devem estar atentos a ampliação de ações de cuidado à nível de atenção primária às pessoas idosas.

Descritores: Idoso; Hospitalização; Tempo de Permanência; Atenção Primária a Saúde; Meio Ambiente e Saúde Pública.

Introduction

With the fast and intense aging of the Brazilian population, a new paradigm in health is outlined to promote the functional capacity of individuals and the ability to lead their own lives independently and autonomously.¹

Population aging brings with it a series of challenges to the health system and care models. The repercussions for the health system become even more aggravating in view of the fact that, with hospitalization, the elderly person undergoes a sequence of events that triggers factors associated with frailty that often culminate in a decrease in their functional capacity and their quality of life, contributing to the increase of their vulnerability².

Elderly people have high rates of hospitalization and a longer average stay in the health institution, when compared to the younger population³⁻⁵.

It is known that hospital stay, continuous exposure to invasive procedures and other peculiar factors of hospitalization of the elderly directly influence the potential decrease in their autonomy and quality of life. Prolonged hospital stay is an indirect indicator of the quality of care provided to patients in tertiary services, it produces negative

effects on the life of the elderly, in addition to resulting in high costs for the health system^{3,6}.

The study of hospitalizations for preventable causes produces important indicators of the quality of health care, particularly in the elderly, given the magnitude of hospitalization in their lives. It is believed that timely and adequate care at the primary level could avoid unnecessary hospitalizations⁷. Thus, the present study aims to analyze the behavior of the causes and length of stay of hospitalizations of elderly people due to conditions sensitive to primary care (ACSC) in the State of Santa Catarina (SC) in the period between 2008 and 2015.

Methodology

Ecological study regarding the causes and length of stay of hospitalizations of elderly people due to conditions sensitive to primary care in the state of Santa Catarina, from 2008 to 2015. Elderly were those aged 60 years or over, as established by the Statute of the Elderly⁸.

For the definition of Sensitive Conditions to Primary Care (ACSCs), the official list published by the Ministry of Health through Ordinance no. according to the tenth



Revision of the International Classification of Diseases – ICD10. The hospitalizations of group 19 of ACSCs, that is, diseases related to prenatal care and childbirth (O23- urinary tract infection in pregnancy; A50- congenital syphilis; P35- congenital rubella syndrome), were not part of the study, as they represent an outcome incompatible with the established age group.

Information on admissions was obtained from hospital admission authorizations (AIHs), through the

Hospital Information System (SIH) made available by the Department of Informatics of the Unified Health System (DATASUS), tabulated with the help of the Tabwin® software and exported to the software Microsoft Excel® for data consolidation. Population information was collected through the Brazilian Institute of Geography and Statistics (IBGE). The length of stay is available in the AIH categorized as follows: up to seven days, 8-14 days, 15-21 days, 22-28 days and 29 days or more.

Proporção o tempo de permanência e internações por CSAP

$$= \frac{n^{\circ} \text{ de ICAPS por tempo de permanência}}{n^{\circ} \text{ ICAPS em pop. com 60 anos ou mais}} \times 100$$

Proporção de causas de internações por CSAP

$$= \frac{n^{\circ} \text{ de ICAPS por grupo de causa}}{n^{\circ} \text{ ICAPS em pop. com 60 anos ou mais}} \times 100$$

Then, the proportions of hospitalizations for ACSCs of the elderly were standardized by age using the direct method, using the standard world population as the standard. The age-adjusted rate calculated was $\sum (\text{age-specific rate}) \times (\text{world standard population in age group}) / \sum \text{world standard population}$ ⁹.

In order to smooth the historical series, according to the oscillation of the points, the moving average centered on three terms was calculated. In this process, the coefficient analyzed for the year corresponds to the arithmetic mean of the coefficients of the previous year, the same year and the following year. However, the historical series consists of the years 2009 to 2014, despite using information from 2008 to 2015 for the calculation.

The analysis was performed using the Joinpoint® software, version 4.3.1, used to calculate the variation in the proportions of hospitalization of the elderly by age-adjusted ACSCs, from 2008 to 2015. The use of the joinpoint method allows a detailed description of trends, identifying the changes that have occurred over the years. The program performs segmented linear regression (joinpoint regression) to estimate the annual percentage change and identify points where there is a change in the trend.

From the estimated slope for each line segment (regression coefficient), the annual variation in percentage and its statistical significance were calculated, estimated by

the least squares method by a generalized linear model, assuming that the rates follow a Poisson distribution, and that the change in percentages is not constant over the period. For each line segment, with estimated slope, the limits of the 95% confidence interval (95%CI).

Results

In the period between 2008 and 2015, the state of Santa Catarina accounted for 303,757 hospitalizations of the elderly due to ACSCs, responsible for 41% of the total of general hospitalizations of the elderly in 2008 and 32% in 2015.

The causes of ICSAP revealed different behaviors, when their variation was analyzed. Asthma, chronic obstructive pulmonary disease (COPD) and heart failure showed a decrease in variation. In contrast, ear, nose and throat infections, bacterial pneumonias and angina increased, both results being statistically significant. The other groups of causes also fluctuated, as shown in Table 1.

It is noteworthy that the data presented in the table below refer to the variation in the percentage of data analyzed in the period studied and not the prevalence of diseases, considering that in the state of SC, in descending order, the most prevalent causes of hospitalizations of elderly people due to ACSCs are: heart failure, COPD, cerebrovascular diseases and angina.

Table 1. Annual variation in the causes of hospitalizations in the elderly due to ACSCs. Florianópolis, SC, Brazil, 2008-2015

Variables	% Annual variation	
	2008-2015	IC95%
Immunization-preventable diseases and preventable conditions	-1,9	(-32,4 ; 42,3)
Infectious gastroenteritis and complications	0,2	(-22,6 ; 29,8)
Iron deficiency anemia	2,5	(-21,3 ; 33,5)
Nutritional deficiencies	-11,6	(-54,1 ; 70,2)
Ear, nose and throat infections	9,4[^]	(4,9 ; 14,2)
Bacterial pneumonia	11,7[^]	(8,2 ; 15,2)
Asthma	-19,1[^]	(-22,1 ; -16,1)
COPD	-4,0[^]	(-4,7 ; -3,3)
Hypertension	5,7	(-21,1 ; 41,5)
Angina pectoris	3,9[^]	(2,0 ; 5,8)
Cardiac insufficiency	-3,6[^]	(-5,0 ; -2,2)



Cerebrovascular diseases	9,2	(-17,5 ; 44,6)
Diabetes mellitus	-7,3	(-30,3 ; 23,4)
Epilepsy	19,8	(-25,5 ; 92,5)
Kidney and urinary tract infection	9,8	(-13,3 ; 39,1)
Infection of the skin and subcutaneous tissue	6,5	(-24,8 ; 52,2)
Female pelvic inflammatory disease	-14,4	(-65,7 ; 113,2)
Bleeding gastrointestinal ulcer	7,0	(-24,8 ; 52,2)

Note: ^percentage of statistically significant annual variation.

The length of stay of ACSCs behaved differently, when analyzing the period between 2008 and 2015. In 2008, the period of hospital stay of up to seven days was responsible for 80% of hospitalizations, decreasing to 77% in

2015, proven by the result of the temporal analysis, which shows a reduction of 0.7% every year -0.7^{\wedge} (CI $-0.8 ; 0.5$). On the other hand, hospitalizations lasting 15 to 30 days had a significant increase of 3.3% each year, as shown in Table 2.

Table 2. Percentage of annual variation in length of stay of elderly people hospitalized for ACSCs. Florianópolis, SC, Brazil, 2008-2015

Variables	% Annual variation	
	2008-2015	IC95%
Up to seven days	-0,7[^]	(-0,8 ; 0,5)
8-14 days	2,8	(-19,1 ; 30,6)
15-21 days	4,1[^]	(3,1 ; 5,0)
22-28 days	3,3[^]	(2,1 ; 4,6)
29 days or more	-0,2	(-34,6 ; 52,2)

Note: ^percentage of statistically significant annual variation.

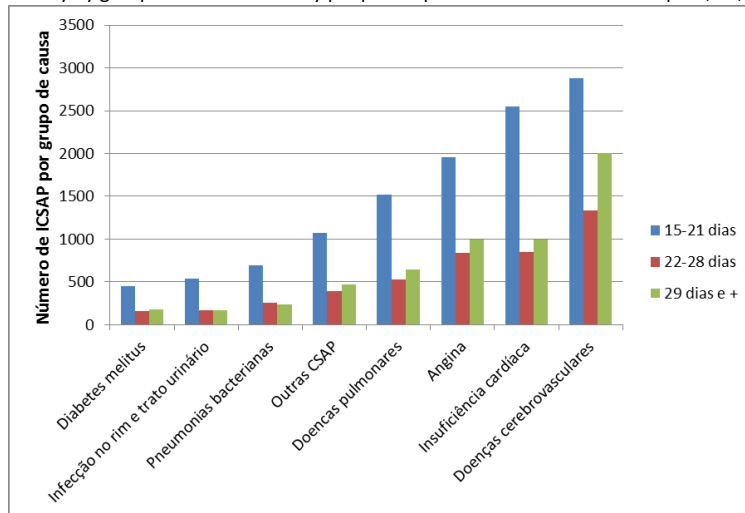
Cerebrovascular diseases were the main responsible for hospitalizations with length of stay over 15 days, followed by heart failure, angina and COPD.

Other ACSCs are included in the group: immunization-preventable diseases and preventable conditions; infectious gastroenteritis and complications; anemia; nutritional deficiencies; ear infections; nose and

throat; asthma, hypertension; epilepsies; skin and subcutaneous tissue infection; inflammatory disease female pelvic organs and gastrointestinal ulcer.

Diabetes Mellitus, kidney and urinary tract infection and bacterial pneumonia were also relevant reasons for hospitalizations longer than 15 days.

Figure 1. Length of stay by group of causes of elderly people hospitalized for ACSCs. Florianópolis, SC, Brazil, 2008-2015



Discussion

As already indicated by the projections of the Brazilian Institute of Geography and Statistics (IBGE), the number of elderly people in Santa Catarina has been increasing rapidly. During the study period, in 2008 we had 580,908 elderly people and in 2015 we had reached 830,540. The population of elderly people aged 80 years and over increased more sharply when compared to those aged 60 to 79 years, totaling an increase of 1,348 people aged between

60 and 79 years and 2,010 people aged 80 years or over in the state¹⁰.

Elderly people aged 80 years and over also became more expressive, when analyzing their proportion of hospitalizations for ACSCs. In 2008, they were responsible for 24%, reaching, in 2015, 27% of hospitalizations.

Regarding the behavior of the causes of ACSCs, asthma, COPD and heart failure showed a decreasing variation, a result that corroborates with other existing



studies. On the other hand, ear, nose and throat infection, bacterial pneumonia and angina increased^{11,12}.

In a study carried out in a city of São Paulo, obtained similar results to this research in relation to infections of the nose, ear and throat. In Santa Catarina nose, ear and throat infections were responsible for the second largest variation and represented less than 1% of ACSCs, as in the result found in the aforementioned study. A study in Minas Gerais also showed an increase in nose, ear and throat infections^{12,13}.

Study refers to the importance of exploring these infections, as they are associated with excess pollutants that delineate air quality, such as ozone, responsible for irritation in the airways and decreased lung capacity¹³.

Pneumonia is a serious respiratory infection that usually affects many elderly people. Other studies that used Brazilian municipalities and states also obtained an increase in the variation of bacterial pneumonia as a result. Although studies indicate an increase in hospitalizations considered to be preventable due to pneumonia, studies indicate that the low technological density resources available at the primary level are sufficient to diagnose and treat this pathology early and, thus, avoid unnecessary hospitalizations^{12,14-17}.

Regarding angina, there was an increasing annual variation, in addition to representing one of the most prevalent causes of ACSC in the elderly. According to a study, stabilization of angina hospitalization rates in the state of Paraná was found in the period from 2000 to 2011, with age limited to 74 years. It highlights the relevance of the result, since angina is related to the occurrence of acute myocardial infarction and sudden death¹¹.

It is known that the elderly demand more from health services and have a longer bed occupancy time when compared to other age groups. The elderly population faces risks when undergoing hospital admissions, as staying in the health service, prolonged bed rest, continuous exposure to invasive procedures and other factors that negatively influence functional capacity result in changes in quality of life³.

Thus, contemporary health policies must invest in the promotion of healthy aging, with attention to the functional capacity of the elderly, disease prevention, health recovery of those who fall ill and rehabilitation of those with restricted functional capacity¹.

Length of stay is commonly used as an indicator of hospital efficiency and is related to the quality of care provided. A study carried out in a city in Rio de Janeiro mentions concern about the consequences of prolonged hospitalizations in the elderly, since it found as a result that only 45% of the 767 medical records analyzed had a hospital stay of less than 10 days^{18,19}.

In line with the limitations that occurred in the life of the elderly exposed to hospitalization, the study carried out with information from 1,624 elderly people in Minas Gerais, with the objective of analyzing the association between functional capacity and use of health services among the elderly, found a positive association between hospitalization and functional disability²⁰.

Reporting to Santa Catarina, the results of this research indicate a drop in ACSC, corroborating the studies

analyzed. However, the length of stay of hospitalizations for ACSCs increased during the study period, decreasing the number of hospitalizations up to seven days and increasing hospitalizations longer than 15 days. Another Brazilian state was found in the literature that showed a decrease in ACSC rates and an increase in length of stay^{12,21-23}.

This result may hypothetically be associated with an increase in the proportion of hospitalizations in the age group of 80 years or older and an increase in hospitalizations for cerebrovascular diseases, whose group of causes responsible for long hospitalizations increased from 13 to 15% during the study period.

Cerebrovascular diseases are a public health problem in Brazil. In the population over 60 years, they represent the main cause of death and disability in this population. In addition to generating a financial impact for families and the health system, causing prolonged hospitalizations, stroke is responsible for high mortality rates and has late effects, such as the degree of motor disability, post-stroke depression, reduced cognitive function and, consequently, reduced quality of life^{24,25}.

In Brazil, stroke is understood as a disease still very neglected, considering the few actions and the low budget in the prevention and treatment of this disease²⁶.

A study exploring the reason for a hospital stay longer than 30 days pointed to the cancellation of the surgical procedure, waiting for the stabilization of the clinical picture and the use of antibiotic therapy as the main justifications. It should be noted that the severity of the patient's clinical condition is another reason that influences the length of stay²⁷.

Other reasons are also found in the literature regarding factors that interfere with the increase in hospital stay, such as pain, alcohol consumption, smoking, systemic arterial hypertension, diabetes mellitus and hospital infections. The average length of hospital stay of the elderly who had nosocomial infection resulted in an increase of 15 days in relation to the average of the elderly who were not detected with nosocomial infection^{3,4,6,28,29}.

Socioeconomic variables also demonstrate an influence on the length of hospital stay. A study showed that hospitalized people with income above five minimum wages remained hospitalized about 1/3 of the time, when compared with incomes of up to one minimum wage⁶.

Final Considerations

There are several factors that influence hospitalization. What cannot be denied is the unfavorable impact of this outcome on the lives of the elderly. In Santa Catarina, the results show that preventable causes of hospitalization, such as pneumonia, angina and acute infections, which could be solved in primary care, continue to increase. Another worrying result is the consequences of the length of hospital stay, which has been increasing significantly in hospitalizations of 15 to 30 days and decreasing in hospitalizations of up to seven days. It is believed that this result is related to the increase in the proportion of the population over 80 years of age and of cerebrovascular diseases in ACSCs.



It is suggested that other studies explore actions that can be carried out in primary care in relation to the promotion and prevention of cerebrovascular diseases, as well as other pathologies that showed an increase and the factors that may be related to the increase in the permanence of the elderly in Santa Catarina. It is noteworthy

that the decrease in ACSC demonstrated in several studies needs to be analyzed with caution and together with other factors, since the number of hospitalizations may decrease, but the severity of the conditions of the elderly in hospitalization may be greater, which causes a longer time of hospitalization.

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