

Hospitalization and Mortality Rates for Heart Failure in Public Hospitals in São Paulo

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Abstract

Background: Advances in the treatment of heart failure (HF) have resulted in reduced mortality and hospitalization rates. On the other hand, when hospitalized, patients are at high risk of death.

Objective: As there are few studies in this group of patients in Brazil, we analyzed the numbers of hospitalization and deaths due to HF in the Brazilian Public Health System (SUS) in the city of São Paulo.

Methods: Historical prospective study carried out between 1992 and 2010. The data were obtained from DATASUS. We used Chi-square and t tests for comparison between the periods 1992-1993 and 2008-2009 and logistic regression models when appropriate. The level of significance was set at 5%.

Results: There was a 32% decrease in the number of hospitalizations for HF between 1992-1993 and 2008-2009 ($p = 0.002$). The in-hospital mortality rate for HF was 15%, with a 15% increase in the period ($p = 0.004$). Between 1992 and 1993, the mean time of hospitalization for HF was 8.8 days. Between 2008 and 2009, it was 11.3 days ($p = 0.001$). August was the month with the highest incidence of hospitalizations for HF, 20% higher than in February, the month with the lowest incidence ($p = 0.041$).

Conclusion: This study showed changes in trends of hospitalization for HF and mortality over the last two decades. We emphasize important implications: 1: 32% decrease in the number of hospitalizations for HF in SUS hospitals in São Paulo; 2: 25% increase in hospitalization time, and 3: seasonal pattern of hospitalization for HF, with a peak in the third quarter. (Arq Bras Cardiol 2011;97(5):402-407)

Keywords: Heart failure/mortality; hospitalization; hospitals, municipal; hospitals, public.

Introduction

In recent decades, heart failure (HF) has emerged as a public health problem¹. Kannel², based on epidemiological data obtained from the Framingham Heart Study, estimates there are five million patients with HF in the United States, with an incidence of approximately 400,000 new cases per year. In Brazil, the same magnitude is presumed for this disease. Data from the Ministry of Health in 2006 suggest a prevalence of two million patients with HF, which is a major cause of hospitalization among the cardiovascular diseases in the Brazilian Public Health System (SUS)³.

On the other hand, several clinical trials have shown that the use of beta-blockers (Bb), angiotensin-converting enzyme inhibitors (ACEi), aldosterone inhibitors, associated with the use of implantable cardioverters and cardiac resynchronizers can increase survival and reduce hospitalization rates⁴⁻⁸.

Patients who require hospitalization, however, are at high risk for death and re-hospitalization^{9,10}. There are few studies directed specifically at this group of patients, and information about the clinical features and prognosis in this population is still limited. Thus, this study aims at analyzing the number of hospitalizations and deaths due to HF between 1992 and 2010 in SUS hospitals in the city of São Paulo.

Methods

Historical prospective study carried out from 1992 to 2010. Epidemiological data were obtained from the database of the Informatics Department of SUS (DATASUS), based on the "Authorization for Hospitalization" (AIH) form, a document filled out by the physician in charge at the time of hospitalization. We included data on patients older than 20 years whose primary diagnosis for hospital admission was HF. Population estimates were obtained from the demographic censuses of the Brazilian Institute of Geography and Statistics (IBGE).

The in-hospital mortality rate for HF was considered the ratio between the number of deaths due to HF and the number of patients admitted with a primary diagnosis of HF in the corresponding period. Calculation of the population mortality rate for HF was obtained by dividing the number of in-hospital

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deaths due to HF by the city population in the corresponding period. The Chi-square or *t* tests were used for comparison between the periods 1992-1993 and 2008-2009 and logistic regression models were used when appropriate. The level of significance was set at 5%.

Results

Between 1992 and 2010, in SUS hospitals in São Paulo, a total of 194,098 patients were hospitalized for HF (10,783 patients/year, \pm 2,740) of whom 95,219 were females (49.0%), with a predominance of patients aged 60 and 79 years (Table 1). In the historical series, considering the periods 1992-1993 and 2008-2009, there was a 32% decrease in the number of hospitalizations for HF ($p = 0.002$) (Figure 1).

The in-hospital mortality rate for HF during the period was 15% (\pm 1.02%), an increase of 15% over the observation period ($p = 0.004$) (Figure 2). The population mortality rate for HF had a 71% decrease in the period: from 1.91 deaths for HF/10.000 inhabitants between 1992 and 1993 to 1.36/10,000 inhabitants in 2008 to 2009 ($p = 0.03$) (Figure 3).

The mean hospital stay for HF was 10 days (\pm 1.0), with a progressive increase during the observation period (Figure 4). In the 2008-2009 period, the mean hospital stay was 11.3 days, 25% higher than in the 1992-1993 period (8.8 days) ($p = 0.001$).

Table 1 – Description of the population hospitalized for HF in public hospitals in São Paulo between 1992 and 2010

	n	%
Female sex	95.219	49.0
Hospitalizations due to HF		
20 to 29 years	4,142	2.0
30 to 39 years	8,963	5.0
40 to 49 years	17,726	9.0
50 to 59 years	30,796	16.0
60 to 69 years	41,324	21.0
70 to 79 years	41,671	21.0
80 years and older	30,223	16.0
Deaths due to HF		
20 to 29 years	449	2.0
30 to 39 years	912	4.0
40 to 49 years	1,739	8.0
50 to 59 years	3,350	16.0
60 to 69 years	5,617	27.0
70 to 79 years	7,311	35.0
80 years and older	7,069	34.0

HF - Heart failure.

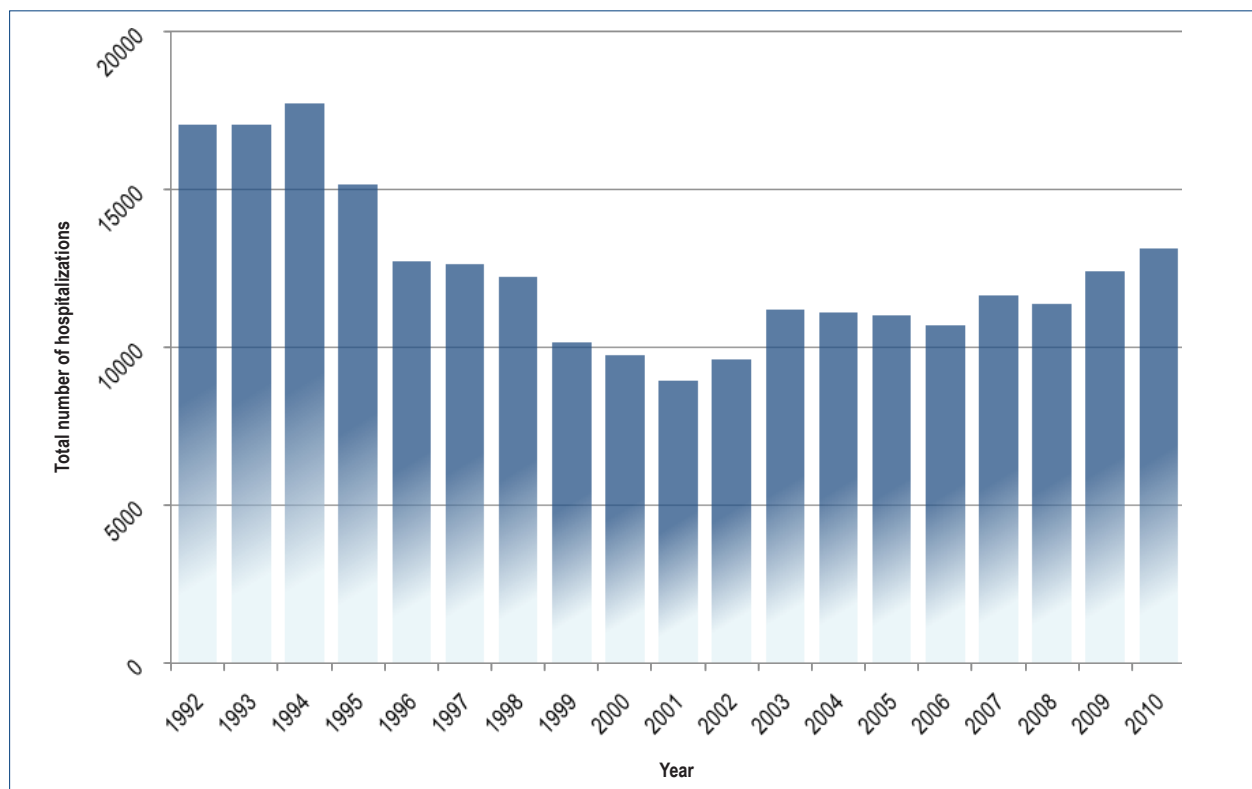


Figure 1 – Total number of hospitalizations for heart failure in the city of São Paulo between 1992 and 2010; * $P = 0.002$.

As shown in Figure 5, there was a seasonal variation in the number of hospitalizations for HF in São Paulo, with the highest rates seen in July, August and September. The month with the highest incidence of hospital admissions was August, with 18,466 admissions, 20% higher than in February, the month with the lowest incidence ($p = 0.041$).

Discussion

This analysis showed significant decrease in hospital admissions and population mortality rates for HF in São Paulo. As our study covered the period of consolidation of modern therapy for HF, in which the decrease in mortality and need for hospitalization has

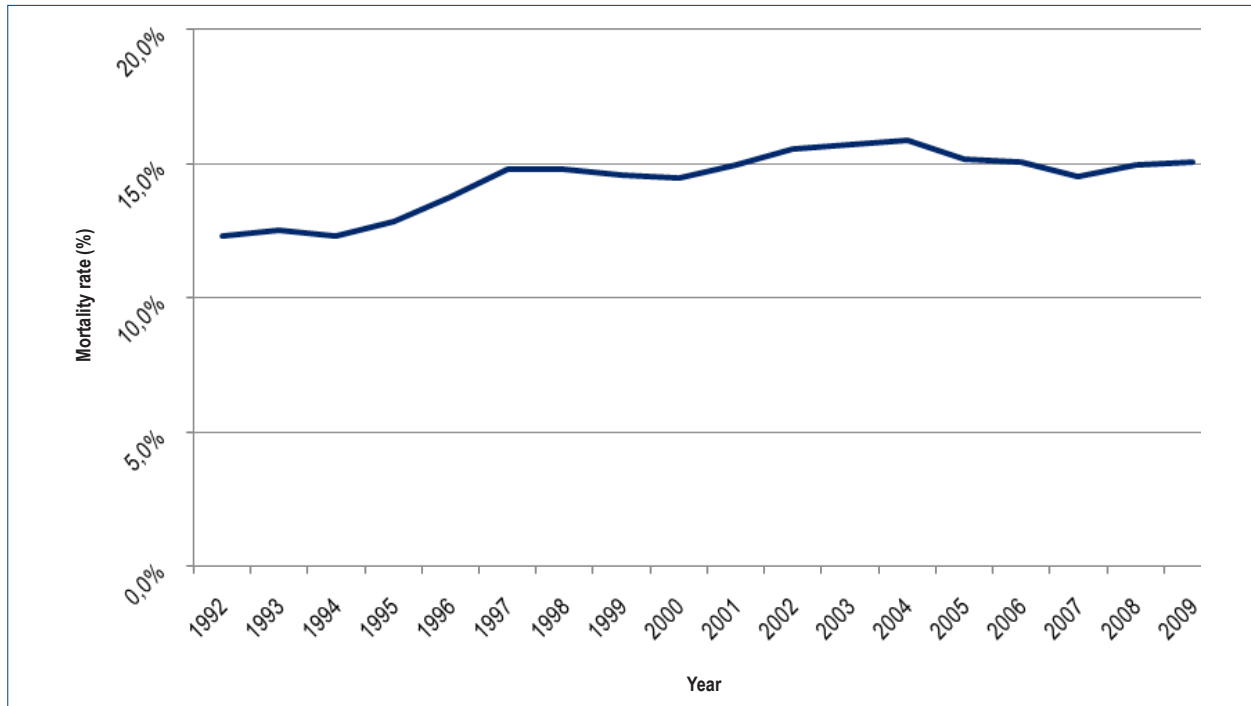


Figure 2 – Hospital mortality rate for HF in the city of São Paulo between 1992 and 2010; * $P = 0.004$.

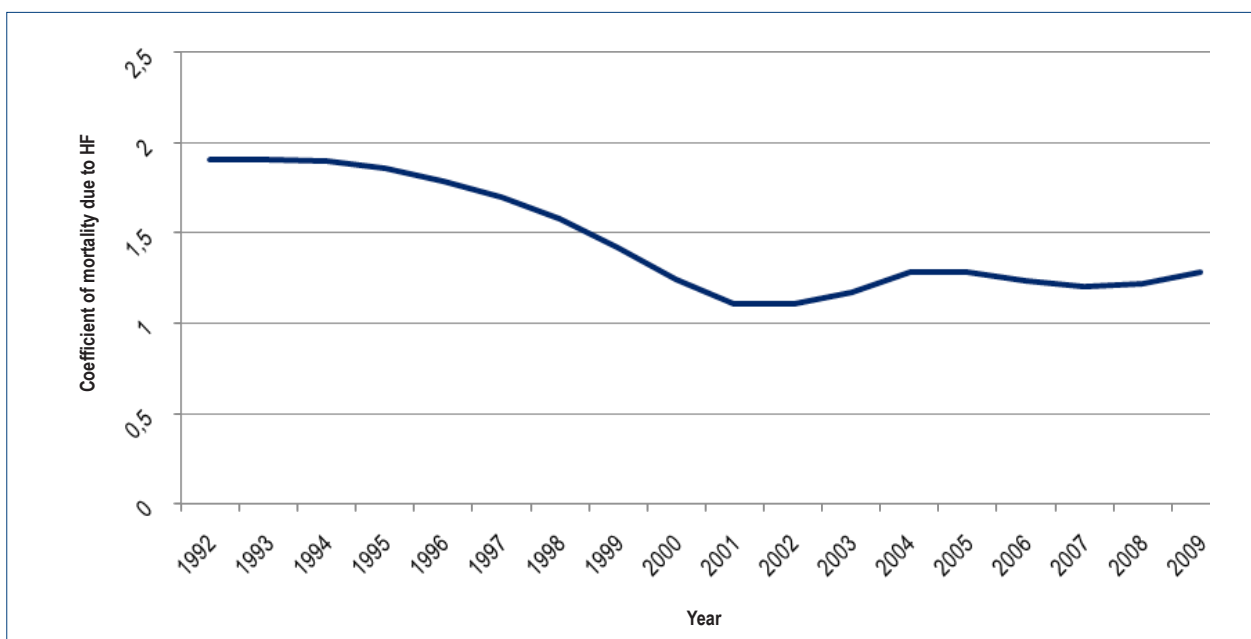


Figure 3 – Coefficient of population mortality for heart failure in the city of São Paulo between 1992 and 2010 (per 10,000 inhabitants); * $P = 0.03$.

been repeatedly demonstrated⁴⁻⁸, it is reasonable to suppose that these results have been obtained due to the more appropriate use of guidelines for HF treatment¹¹ offered by physicians in the public healthcare system of the municipality.

The MAHLER study¹² showed that the simple fact that prescribing physicians adhered to the recommendations of

European guidelines was a prognostic predictor in patients with HF. Although several international studies have shown that the prescription of treatments recommended for HF is still suboptimal^{13,14}, in the EVEREST study¹⁵, at the moment of randomization, 93% of the South Americans patients used ACEi and 56%, β b. In a Brazilian study, Baliero et al¹⁶

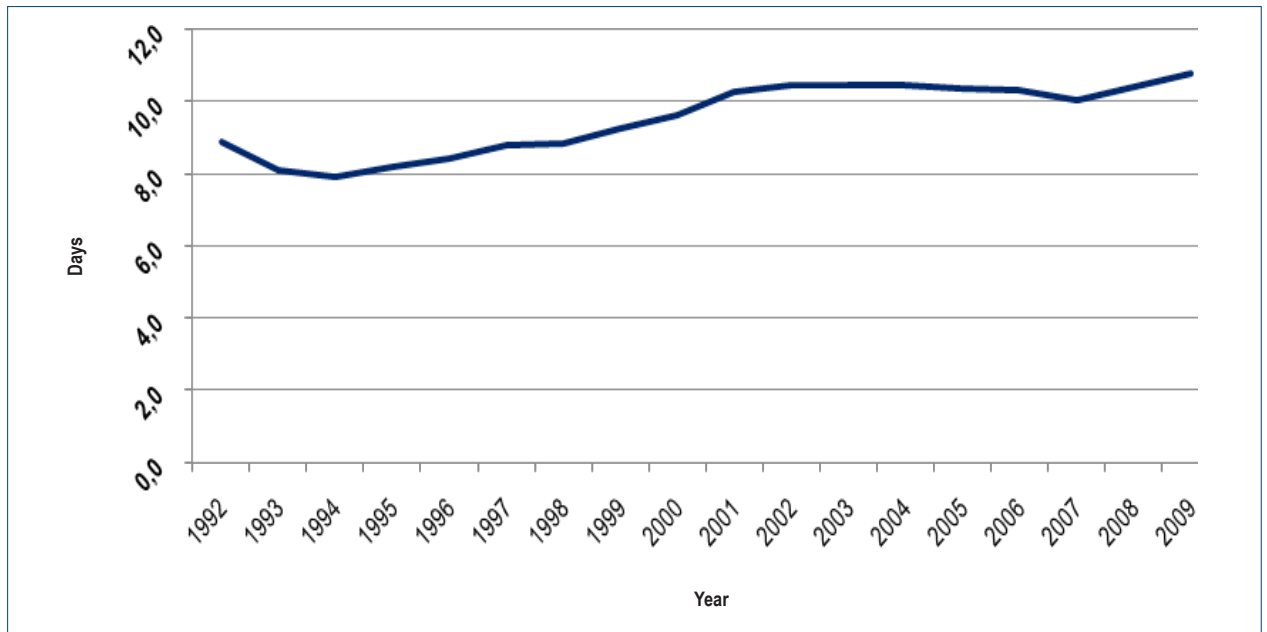


Figure 4 – Days of hospitalization for heart failure in the city of São Paulo between 1992 and 2010; *P= 0.001.

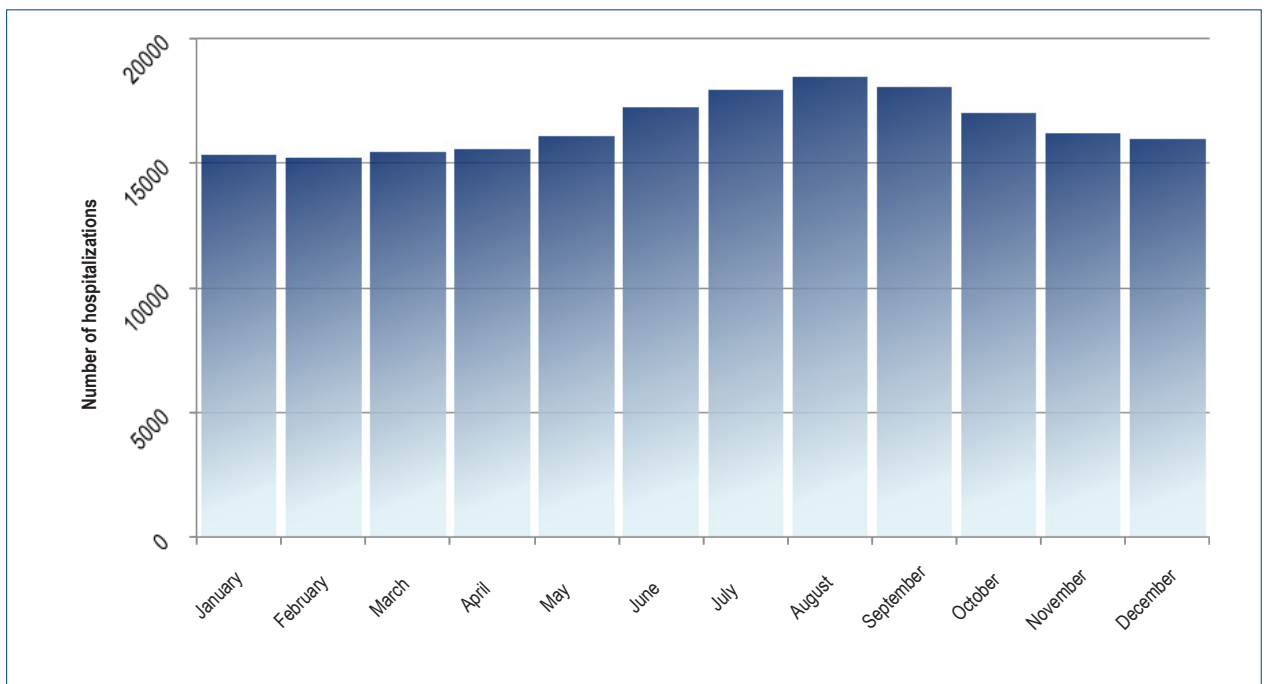


Figure 5 – Total number of hospitalizations for heart failure in the city of São Paulo between 1992 and 2010, distributed by month of hospital admission.

observed the use of ACEi and β b in more than 70% of the patients diagnosed with HF.

Throughout the analyzed period, we observed an increased hospital mortality rate and hospitalization time for HF. Inversely, Bueno et al¹⁷ observed that in North-American patients, there was a decreased length of hospital stay and hospital mortality for HF over 14 years. However, these authors found significantly increased in-home mortality and re-hospitalization rates. These findings suggest a growing complexity in patients hospitalized for HF, particularly those at higher risk, such as elderly patients, those with kidney failure and chronic lung disease¹⁸.

On the other hand, observations of the ADHERE¹⁹ registry provide clues on how to improve the quality of the offered medical care. In this study, the decrease in mortality rates and length of hospitalization was obtained concomitantly with the increase in compliance with the recommendations of healthcare quality in HF, such as evaluation of ventricular function during hospitalization and early prescription of ACEi²⁰.

We also observed a significant increase in hospitalizations for HF during the winter months, a pattern previously reported in studies of countries with temperate climates²¹⁻²³. Several mechanisms are involved in this pattern: increased neurohumoral activation at lower temperatures, decreased water loss by transpiration and perspiration and, especially, increased incidence of respiratory infections²⁴. These data reinforce the need for strict control of hydrosaline intake in winter and of vaccination against *Influenza* and *Pneumococcus*, particularly in cities that exhibit great climatic changes among the seasons, as shown in the III Brazilian Guidelines on Chronic Heart Failure⁴.

Our study has limitations: the reliability of the information provided by the DATASUS database is restricted by the level of accuracy and completeness of AIH forms filled out by physicians. In addition, the observations obtained in this study cannot be generalized to the entire city of São Paulo, as only SUS hospitals in the city were included in the analysis. Despite these limitations, our study showed the possibility to assess changes in trends of hospitalization and mortality rates for HF over the past two decades.

These observations allow us to monitor the effectiveness of the offered medical care aiming at tailoring policies regarding the treatment of patients with HF.

In this context, we highlight three important implications: 1st: reduction of 32% in the number of hospitalizations for HF in SUS hospitals in São Paulo, 2nd: 25% increase in hospitalization time and 3rd: seasonal pattern of hospitalization for HF, showing a peak in the third quarter.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Study Association

This study is not associated with any post-graduation program.

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