Viewpoint

What is Happening with Heart Failure in Brazil? An Insight from DATASUS Data Analysis

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Introduction

Heart failure (HF) is a chronic and progressive clinical syndrome caused by a structural or functional cardiac abnormality, whose symptoms include dyspnea and fatigue and are accompanied by physical signs such as peripheral edema, pulmonary rales, and jugular venous distension.[1] The natural history of HF often involves rapid worsening of symptoms and signs, leading to severe manifestations at rest, characterizing acute decompensated HF (AHF), usually requiring hospitalization for its control.[2]

AHF is responsible for a large part of the costs of HF for the health system and represents a serious clinical problem with an in-hospital mortality rate of around 4%.[3]

However, the recently published results of the BREATHE study (First Brazilian Registry of Acute HF), including data from 3,013 patients hospitalized for AHF in 71 health services in different regions of Brazil between 2011 and 2018, reported a hospital mortality rate of 10.9%, a value considerably higher than those reported in other contemporary registries. The reasons for this high mortality are unclear.[4]

To contribute to the understanding of this scenario, we analyzed the evolution of the number of hospitalizations and in-hospital mortality of the main cardiovascular diseases (CVD) in the Unified Health System (SUS) using the DATASUS platform. In addition, we collected data on mortality due to HF in the general Brazilian population.

Methods

On the platform DATASUS TabNET, we accessed the hospital information system of the Ministry of Health (SIH/MS) to extract information on the number of hospitalizations and in-hospital deaths considering the international classification of diseases (ICD10) codes corresponding to HF (ICD10: I50), myocardial infarction (ICD10: I21 and I22) and stroke (ICD10: I64). The research covered the years 2008 to 2019.

HF mortality in the general Brazilian population was obtained from the Ministry of Health's mortality information system.

Results

HF mortality in Brazil

Figure 1 shows the temporal evolution of the mortality rate due to HF in Brazil, adjusted for 100,000 inhabitants, between 2008 and 2019. A significant trend of progressive reduction of this rate is observed (linear regression showing $R2=0.71$, $p<0.05$), reaching 12.9 deaths/100,000 inhabitants in 2019.

Number of hospitalizations and hospital mortality due to HF compared to other CVDs

Table 1 shows data on hospitalizations for HF, acute myocardial infarction (AMI) and stroke, between 2008 and 2019, showing the absolute numbers and the percentage value in relation to the total number of hospitalizations for CVD, in addition to the total number of deaths and hospital mortality rate in the same period, for each condition.

We observed that the total number of hospitalizations for CVD remained relatively stable during the period. The number of hospitalizations for HF showed a significant decrease of 26% during the same period. In contrast, we observed a significant increase in hospitalizations for AMI, of 108%, and for stroke, of 76%, during the same period.

In parallel, we observed a 37% increase in hospital mortality due to HF, reaching a rate of 11.4% in 2019. In contrast, mortality among patients hospitalized for AMI fell by 28% and for stroke the reduction was 15%. The evolution of these in-hospital mortality rates is illustrated in Figure 2.

Discussion

The main results of this rapid survey show that mortality from HF in the general Brazilian population has been falling over the last decade. This is most likely due to several factors, including advances in pharmacological therapy, with the addition of new drugs capable of changing the natural history of the disease, greater access by the population to HF medications, and improvements in health care, with the education of health professionals and publication of guidelines by medical societies.

Keywords

Heart Failure; Hospitalization; Epidemiology.

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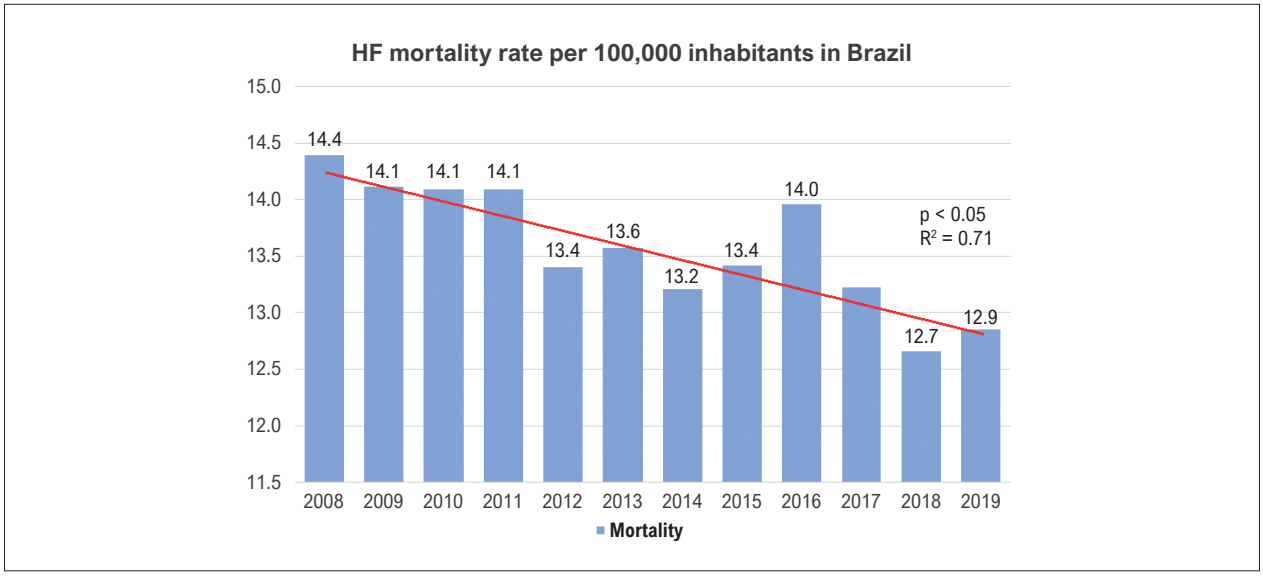

Figure 1 – *Illustrating the mortality rate per 100,000 inhabitants in Brazil between 2008 and 2019. Source: MS/SVS/CGIAE - Mortality Information System – SIM.*[5]

Table 1 – Number of hospitalizations due to the main cardiovascular diseases: HF, AMI, stroke, with percentage in relation to the total number of hospitalizations due to CVD in the SUS, number of deaths and in-hospital mortality in Brazil between 2008 and 2019

Year	Heart Failure			Acute myocardial infarction			Stroke			CVD Hospitalizations
	Interventions*	Deaths/mortality In-hospital		Hospitalizations	Deaths/mortality In-hospital		Hospitalizations	Deaths/mortality In-hospital		
2008	270,988 (24.49%)	22513	8.31%	63,388 (5.73%)	8631	13.62%	92,863 (8.39%)	20732	16.77	1,106,568
2009	269,891 (23.77%)	23043	8.54%	68,497 (6.03%)	8881	12.97%	9109,612 (9.66%)	22368	16.06	1,135,281
2010	265,038 (22.95%)	23677	8.93%	75,244 (6.51%)	9715	12.91%	116,633 (10.10%)	23717	16.25	1,155,046
2011	260,995 (22.53%)	24451	9.37%	81,102 (7.00%)	10371	12.79%	124,143 (10.72%)	24256	16.11	1,158,271
2012	242,919 (21.40%)	23071	9.50%	85,222(7.51%)	10571	12.40%	127,512 (11.23%)	24130	15.73	1,134,964
2013	236,550 (20.87%)	22858	9.66%	86,795 (7.66%)	10785	12.43%	133,930 (11.82%)	24281	15.23	1,133,438
2014	223,825 (19.59%)	22031	9.84%	95,343 (8.35%)	11187	11.73%	142,403 (12.47%)	24323	14.86	1,142,322
2015	217,050 (19.34%)	22756	10.48%	100,617 (8.96%)	11837	11.76%	145,276 (12.94%)	25593	15.38	1,122,402
2016	214,434 (19.09%)	23519	10.97%	107,577 (9.58%)	12174	11.32%	149,333 (13.29%)	26278	15.44	1,123,323
2017	209,162 (18.39%)	22669	10.84%	113,655 (9.99%)	12090	1.64%	153,595 (13.51%)	15532	14.69	1,137,207
2018	201,040 (17.40%)	22487	11.19%	120,010 (10.39%)	12494	10.41%	157,203 (13.60%)	25802	14.44	1,155,560
2019	199,858 (16.93%)	22723	11.37%	132,173 (11.20%)	12887	9.75%	163,384 (13.84%)	26410	14.30	1,180,508

**Percentages in relation to the total number of interventions for cardiovascular diseases (CVD). Source: SIH/MS – Source: Ministry of Health – SUS Hospital Information System (SIH/SUS).*[6]

However, contrary to this positive result, in-hospital mortality due to HF in the SUS has shown a worrying increase, reaching rates similar to those reported by the BREATHE registry, whose data collection occurred within the period covered by our data survey, even though BREATHE was not restricted to public institutions.[3]

Based on the results shown here, this increase in in-hospital mortality occurred in parallel with a significant reduction in the number of hospitalizations for HF. This observation strongly suggests that there has been a selection of more severe cases for hospitalization for HF, which may explain the observed increase in in-hospital mortality. It is worth noting that the number of hospitalizations for HF has increased in other countries around the world, such as the United States of America, where there were 1,297,000 hospitalizations for HF in 2019, an increase of 16% compared to 2008.[7]

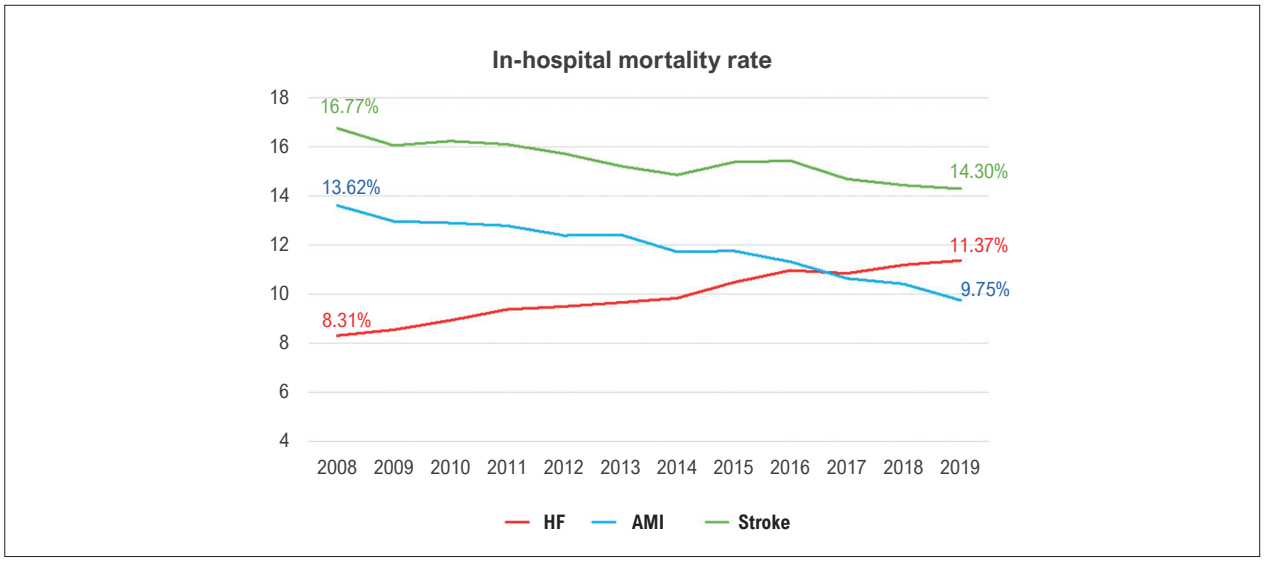

Figure 2 – *Line graph illustrating the evolution of the in-hospital mortality rate for the main cardiovascular diseases (HF, AMI, and stroke) between 2008 and 2019.Source: Ministry of Health – SUS Hospital Information System (SIH/SUS).[6] HF: heart failure; AMI: acute myocardial infarction.*

However, we still need to consider why other CVDs, such as AMI and stroke, exhibited completely opposite behavior. Considering that the total number of hospitalizations for CVD showed practically no increase in the period surveyed, it is plausible to assume that there was a "competition" for hospital beds in the SUS and that patients with AMI and stroke, due to their more dramatic clinical presentation and the widely disseminated concept that "heart attack can kill", were considered to be at higher risk and required emergency hospitalization. At the same time, there was not the same perception of high risk in patients with HF. Nothing is more eloquent to attest to how this perception of low risk in HF is false than the numbers presented here, with mortality from HF already exceeding mortality from AMI in 2019.

Conclusions

This data survey from DATASUS shows us that mortality from HF in the general Brazilian population has been reduced in recent years.

However, in-hospital mortality due to HF has increased significantly in the SUS, in contrast to the reduction in mortality due to AMI and stroke, possibly due to a selection of more severe cases for hospitalization. This aspect unmasks the occurrence of a false perception of low risk in relation to the diagnosis of acute HF in health services in Brazil, which highlights the absolute need for educational campaigns for doctors and managers to recognize the high risk associated with the diagnosis of acute HF, allowing for better treatment and consequent improvement in outcomes.

Author Contributions

Conception and design of the research: Monteiro RA, Passos ADC, Simões MV; Acquisition of data: Simões TCP, Monteiro RA; Analysis and interpretation of the data: Simões TCP, Monteiro RA, Passos ADC; Writing of the manuscript: Simões TCP, Simões MV; Critical revision of the manuscript for content: Passos ADC, Simões MV.

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 thesis or dissertation work.

Ethics approval and consent to participate

This article does not contain any studies with human participants or animals performed by any of the authors.

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