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## National Trends in Heart Failure Hospitalization Rates in Patients With Diabetes Mellitus: 1997-2010



### Tendencias nacionales en hospitalización por insuficiencia cardíaca de pacientes con diabetes mellitus: periodo 1997-2010

#### To the Editor,

Heart failure (HF) is a major public health problem in developed countries, with an increasing prevalence mainly due to population aging and significant advances in the treatment of associated comorbidities, and it is one of the leading causes of hospital admission.<sup>1</sup>

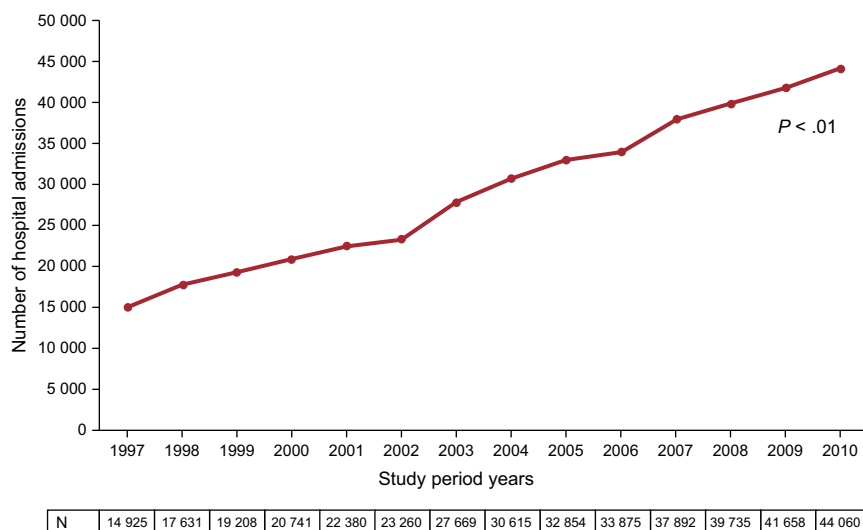
Furthermore, the prevalence of diabetes mellitus (DM) in Spain has increased significantly in recent decades and now affects 14% of the adult population.<sup>2,3</sup>

The incidence of HF increases in patients with DM, with the risk being 2.4 times higher in men and up to 5 times higher in women than in individuals without DM, even after exclusion of coronary

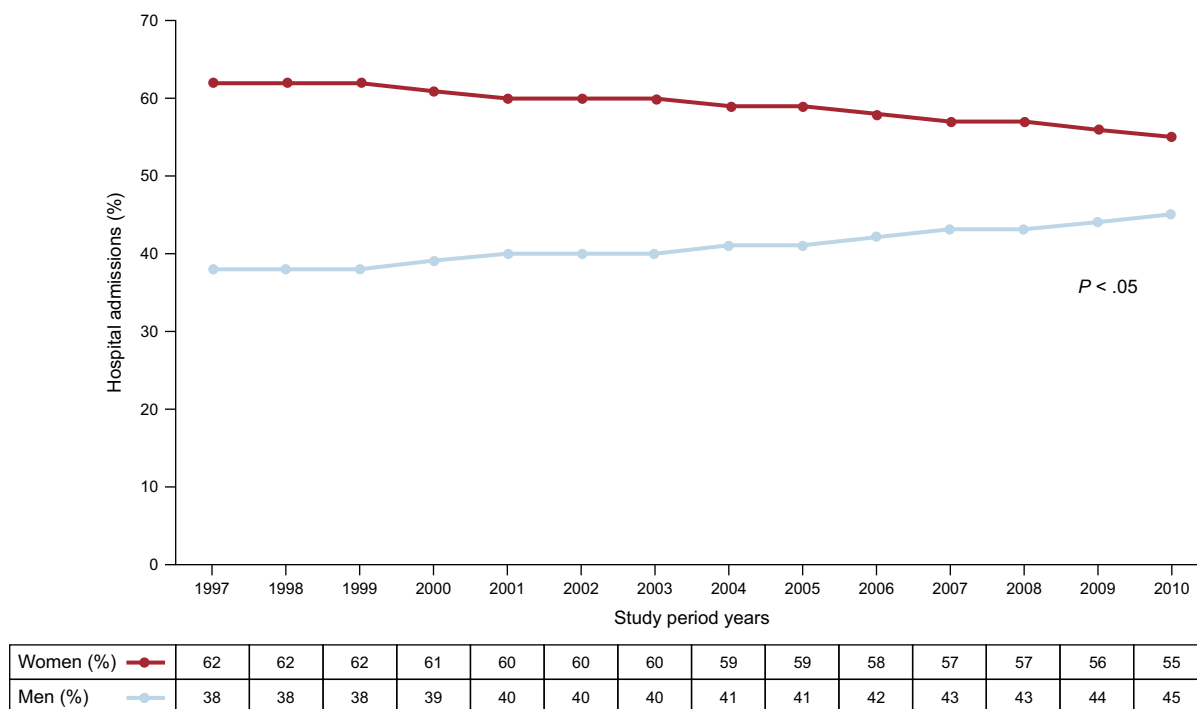
heart disease.<sup>4</sup> Persons with DM also have a higher mortality rate and a higher probability of hospitalization due to worsening of HF compared with nondiabetic individuals.<sup>1</sup>

The aim of this study was to describe the trend in hospital admissions due to HF in patients with DM in Spain. A national, retrospective, observational study was conducted in all DM patients admitted for HF between 1997 and 2010. The data were obtained from the Minimum Basic Data Set for hospitals in the Spanish national health system. We included all patients with a secondary discharge diagnosis of DM in whom the reason for admission or the main diagnosis was HF (diagnosis-related groups [DRGs] 398.91, 402.0, 402.11, 402.91, 404.0, 404.1, 404.9, 428.0, 428.1, 428.2, 428.3, 428.4 and 428.9). We evaluated the time trend of hospital admissions in general and by age and sex, the percentage of readmissions, mean length of hospital stay, the Charlson comorbidity index, mortality, and mean weight (complexity) per DRG. The trend in the number of admissions was adjusted for the Spanish reference population in each of the years of the study period.

Between 1997 and 2010, 5,447,725 diabetic patients were admitted to hospital in Spain (94.4% with type 2 DM). We



**Figure 1.** Time trend of hospital admissions due to heart failure in diabetic patients (1997–2010). The absolute number for each year of the study period is shown.



**Figure 2.** Time trend of hospital admissions due to heart failure in diabetic patients by sex (1997-2010). The percentage for each year of the study period is shown.

observed a constant increase in hospital admissions due to HF, in both absolute and relative numbers. In the period analyzed, admissions due to HF trebled, from around 15 000 to almost 45 000 admissions/y (Figure 1), representing an increase from 6.8% to 8.1% ( $P < .01$ ) compared with the total number of admissions in the diabetic population. While most episodes recorded were in women, we observed an increase in admissions among men, from 38% at the start of the study period to 45% at the end ( $P < .05$ ) (Figure 2).

The percentage of readmissions also increased significantly, from 14.3% to 18.8% ( $P < .01$ ), while length of hospital stay decreased from  $11 \pm 4.7$  to  $9.1 \pm 3.4$  days ( $P < .01$ ). The Charlson comorbidity index for the diabetic patients admitted for HF increased significantly, from 2.2 to 2.8 ( $P < .01$ ) in the study period. Both hospital mortality and mean weight per DRG remained stable (8% and 1.1 points, respectively).

HF is one of the leading causes of hospitalization in Spain, as well as in most Western countries, especially among the older population.<sup>5</sup> This analysis of hospital discharges in the Spanish national health system over 14 years confirms that hospital admissions due to HF represent a gradually increasing cause of admission among the diabetic population. Studies in Spain and in other countries in our environment have analyzed these trends in recent decades,<sup>5</sup> but none of them have focused analysis of hospitalization for HF on patients with DM. The factors related to a higher probability of hospitalization were increased longevity, the presence of comorbidities, and worse functional class.<sup>6</sup>

Despite the limitations and methodological imprecisions resulting from the use of administrative registries, the figures reflected in this analysis show that HF was one of the main reasons

for hospital admission, readmission, and comorbidity in diabetic patients. This trend has continuously increased in recent years, and is clearly associated with aging and female sex, although the difference by sex is beginning to decrease. Although high, hospital mortality has remained stable in recent years.

Our results confirm that HF represents a considerable health care challenge and a significant social-health care burden for the Spanish national health system. Multidisciplinary methods must therefore be implemented urgently to deal with this burden.

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