

## Original article

## Health Care and Nonhealth Care Costs in the Treatment of Patients With Symptomatic Chronic Heart Failure in Spain



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## ABSTRACT

**Introduction and objectives:** Chronic heart failure is associated with high mortality and utilization of health care and social resources. The objective of this study was to quantify the use of health care and nonhealth care resources and identify variables that help to explain variability in their costs in Spain.

**Methods:** This prospective, multicenter, observational study with a 12-month follow-up period included 374 patients with symptomatic heart failure recruited from specialized cardiology clinics. Information was collected on the socioeconomic characteristics of patients and caregivers, health status, health care resources, and professional and nonprofessional caregiving. The monetary cost of the resources used in caring for the health of these patients was evaluated, differentiating among functional classes.

**Results:** The estimated total cost for the 1-year follow-up ranged from € 12 995 to € 18 220, depending on the scenario chosen (base year, 2010). The largest cost item was informal caregiving (59.1%-69.8% of the total cost), followed by health care costs (26.7%- 37.4%), and professional care (3.5%). Of the total health care costs, the largest item corresponded to hospital costs, followed by medication. Total costs differed significantly between patients in functional class II and those in classes III or IV.

**Conclusions:** Heart failure is a disease that requires the mobilization of a considerable amount of resources. The largest item corresponds to informal care. Both health care and nonhealth care costs are higher in the population with more advanced disease.

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### Costes sanitarios y no sanitarios de personas que padecen insuficiencia cardiaca crónica sintomática en España

## RESUMEN

**Introducción y objetivos:** La insuficiencia cardiaca crónica es una enfermedad con elevada mortalidad y consumidora de recursos sanitarios y sociales. El objetivo del estudio es cuantificar la utilización de los recursos sanitarios y no sanitarios e identificar variables que ayuden a explicar la variabilidad de su coste en España.

**Métodos:** Estudio multicéntrico, prospectivo y observacional con 12 meses de seguimiento. Se incluyó a 374 pacientes con insuficiencia cardiaca sintomática de consultas específicas de cardiología, y se recogió información sobre características socioeconómicas de pacientes y cuidadores, estado de salud, recursos sanitarios y cuidados profesionales y no profesionales. Los recursos empleados en el cuidado de la salud se valoraron monetariamente, diferenciando entre clases funcionales.

**Resultados:** El coste total estimado durante ese año osciló entre 12.995 y 18.220 euros, dependiendo del escenario elegido (año base, 2010). La mayor partida fue para los cuidados no profesionales (59,1-69,8% del coste total), seguido del gasto sanitario (26,7-37,4%) y los cuidados profesionales (3,5%). Dentro de los costes sanitarios, el coste hospitalario tuvo el mayor peso, seguido de la medicación. Hubo diferencias estadísticamente significativas en los costes totales entre los pacientes en clase funcional II y los de clases III-IV.

## Palabras clave:

Insuficiencia cardiaca crónica

Coste sanitario

Coste social

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**Conclusiones:** La insuficiencia cardiaca es una enfermedad que requiere la movilización de un importante volumen de recursos. La partida más importante del gasto es la del cuidado informal del paciente. Tanto el gasto sanitario como el no sanitario son mayores en la población con enfermedad más avanzada.

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## Abbreviations

CHF: chronic heart failure  
NYHA: New York Heart Association

## INTRODUCTION

Chronic heart failure (CHF) is a clinical syndrome produced by an anatomical or functional abnormality of the heart. It is the final outcome of changes in heart function<sup>1</sup> in cardiology patients, especially those with hypertension and/or ischemic heart disease.<sup>2</sup>

According to data from the Spanish National Institute of Statistics, CHF is the fourth leading cause of death in Spain (2010), although there has been a downward trend since 2008.<sup>3</sup> This high mortality rate is due to the poor prognosis associated with exacerbation of CHF.<sup>4</sup> Despite therapeutic advances, survival in these patients 5 years after diagnosis is around 50%,<sup>5–9</sup> lower than that in diseases such as human immunodeficiency virus infection and certain types of cancer. In addition, quality of life is poorer in individuals with CHF than in the general population.<sup>10</sup>

The prevalence of CHF has increased due to population aging and higher survival rates after myocardial infarction.<sup>2,7,8,11–15</sup> Given the population pyramid, CHF will increase demand for health care. Cost analyses are designed to estimate the economic impact of diseases and also evaluate the social burden associated with comorbidities.

A recent review of cost analyses in CHF<sup>16</sup> reported that health care costs could represent 1.5% to 2.0% of the total Spanish health care budget, the largest percentage being concentrated in the hospital setting and involving a small percentage of patients with severe heart failure. This review also underlined important limitations in published reports, partly due to methodology and partly due to the paucity of data. Moreover, there are no recent studies on the cost of heart failure in Spain.<sup>17–19</sup>

The main objective of this study was to evaluate the utilization of health care and nonhealth care resources (family care—informal—and professional care—formal) associated with symptomatic CHF from a social point of view, identifying variables that help to explain variability in cost per patient.

## METHODS

This study of the costs occasioned by symptomatic CHF (INOESCARO) was a prospective, observational, multicenter trial, with a scheduled 12-month follow-up and was approved by the ethics committee of *Hospital 12 de Octubre* in Madrid, Spain.

The inclusion criteria consisted of patients older than 18 years of age who attended specialized cardiology clinics cardiology outpatient clinics with symptomatic CHF (stages C and D and New York Heart Association [NYHA] functional class II, III, or IV), and with a diagnosis of CHF at least 6 months previously. Consecutive patients were enrolled in each center until the assigned number

was reached. All of the patients and, when appropriate, the caregiver agreed to participate and provided their informed consent. Patients with severe cognitive impairment or life expectancy < 1 year were excluded, as were those who did not sign the informed consent form.

The patients were recruited in the specialized cardiology clinics of 7 Spanish hospitals (*Hospital Central de Asturias*, Oviedo; *Hospital Marqués de Valdecilla*, Santander; *Hospital del Mar*, Barcelona; *Hospital 12 de Octubre*, Madrid; *Hospital Nuestra Señora de Candelaria*, Santa Cruz de Tenerife; *Hospital Virgen de la Arrixaca*, Murcia; *Hospital Infanta Cristina*, Badajoz), all of which specialize in heart failure and 4 of which had heart transplantation programs. A procedure for competitive recruitment was established until the target enrollment of 465 patients was reached. Of the 374 patients in the valid sample, the highest number of recruits from a single center was 77 and the lowest was 8.

The investigators collected sociodemographic information on both patients and caregivers, as well as clinical data, functional status, and health-related quality of life in the patients (EuroQol-5D, Minnesota Living With Heart Failure [Questionnaire], caregiver burden (Zarit Burden Interview), hours of professional care (social services) and of nonprofessional (informal) care, and the use of health care services (primary care, specialized care, medication, emergencies managed in primary care and in hospitals, medical transport, and hospital admissions).

## Assessment of Health Care and Nonhealth Care Resources

The analysis comprised the health care resources utilized by the patients who completed the scheduled follow-up period (12 months) and by those who, despite failing to keep their final appointment at 12 months, had provided sufficient information for the cost estimate. To calculate the use of health care resources such as medication, specialist visits, primary care visits, and medical transport, the investigators used the information recorded on the data collection forms.

All the resources were assessed using 2010 as the base year. The prices provided in the Catalogue of the Spanish Board of Pharmaceutical Associations were used to calculate the cost of drug therapy. To calculate the cost of primary care and specialized care visits, emergency room visits (hospital-based and primary care), and medical transport, we based the unit cost of the visits on information in eSalud, the Spanish health care cost database, from 2010 or from previous years (with the cost updated to 2010 values in line with the Consumer Price Index). To calculate the cost of hospital stays, when the relationship between the cause for admission and a diagnosis-related group was clear, we decided to use the cost corresponding to the identified diagnosis-related group, by using the mean costs published by the Spanish Ministry of Health, Social Services and Equality for 2010. When there was no clear evidence of a diagnosis-related group, we decided that days of hospital stay be evaluated by using the Spanish eSalud health care cost database, which had been updated to 2010 values, based on the Consumer Price Index.

Once informed consent had been signed, the investigators collected information on health care resource utilization throughout the year of follow-up, obtained from the medical records.

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