Original article

Disability-adjusted Life Years Lost to Ischemic Heart Disease in Spain

Nerea Fernández de Larrea-Baz,[a,][*] Consuelo Morant-Ginestar,[b] Ferrán Catalá-López,[c] Ricard Gènova-Maleras,[d] and Elena Álvarez-Martín[e]

[a] *Centro Nacional de Epidemiología, Instituto de Salud Carlos III, Red de Investigación en Servicios de Salud en Enfermedades Crónicas (REDISSEC), Madrid, Spain*
[b] *Unidad Docente de Medicina Familiar y Comunitaria Este, Hospital Ramón y Cajal, Madrid, Spain*
[c] *Fundación Instituto de Investigación en Servicios de Salud, Valencia, Spain*
[d] *Servicio de Informes de Salud y Estudios, Subdirección de Promoción de la Salud y Prevención, Consejería de Sanidad, Madrid, Spain*
[e] *Departamento de Medicina Preventiva y Salud Pública, Universidad Rey Juan Carlos, Madrid, Spain*

A B S T R A C T

Introduction and objectives: The health indicator *disability-adjusted life years* combines the fatal and nonfatal consequences of a disease in a single measure. The aim of this study was to evaluate the burden of ischemic heart disease in 2008 in Spain by calculating disability-adjusted life years.
Methods: The years of life lost due to premature death were calculated using the ischemic heart disease deaths by age and sex recorded in the Spanish National Institute of Statistics and the life-table in the 2010 Global Burden of Disease study. The years lived with disability, calculated for acute coronary syndrome, stable angina, and ischemic heart failure, used hospital discharge data and information from population studies. Disability weights were taken from the 2010 Global Burden of Disease study. We calculated crude and age standardized rates (European Standard Population). Univariate sensitivity analyses were performed.
Results: In 2008, 539 570 disability-adjusted life years were lost due to ischemic heart disease in Spain (crude rate, 11.8/1000 population; standardized, 8.6/1000). Of the total years lost, 96% were due to premature death and 4% due to disability. Among the years lost due to disability, heart failure accounted for 83%, stable angina 15%, and acute coronary syndrome 2%. In the sensitivity analysis, weighting by age was the factor that changed the results to the greatest degree.
Conclusions: Ischemic heart disease continues to have a huge impact on the health of our population, mainly because of premature death. The results of this study provide an overall vision of the epidemiologic situation in Spain and could serve as the basis for evaluating interventions targeting the acute and chronic manifestations of cardiac ischemia.

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Años de vida ajustados por discapacidad perdidos por cardiopatía isquémica en España

R E S U M E N

Introducción y objetivos: Los años de vida ajustados por discapacidad aúnan en una medida consecuencias mortales y no mortales de las enfermedades. El objetivo fue cuantificar la carga de enfermedad de la cardiopatía isquémica en España en 2008 mediante el cálculo de años de vida ajustados por discapacidad.
Métodos: Años perdidos por muerte prematura calculados a partir de defunciones por cardiopatía isquémica por edad y sexo del Instituto Nacional de Estadística y tabla de vida del estudio de carga global de enfermedad 2010. Años vividos con discapacidad calculados para el síndrome coronario agudo, la angina estable y la insuficiencia cardiaca isquémica, con datos del registro de altas hospitalarias y de estudios poblacionales, y pesos de discapacidad del estudio de carga global de enfermedad 2010. Se calcularon tasas brutas y estandarizadas por edad (población estándar europea). Se realizaron análisis de sensibilidad univariantes.
Resultados: En 2008 se perdieron en España 539.570 años de vida ajustados por discapacidad por cardiopatía isquémica (tasa bruta: 11,8/1.000; estandarizada: 8,6/1.000). El 96% correspondía a años perdidos por muerte prematura y el 4% por discapacidad. De estos últimos, el 83% por insuficiencia cardiaca, el 15% por angina estable y el 2% por síndrome coronario agudo. En el análisis de sensibilidad, el factor que más modificó los resultados fue la ponderación por edad.

* Corresponding author: Monforte de Lemos 5, Pabellón 12, 28029 Madrid, Spain.
 E-mail address: nfernandez@isciii.es (N. Fernández de Larrea-Baz).

Abbreviations

ACS: acute coronary syndrome
DALY: disability-adjusted life year
GBD: global burden of disease
YLD: year lived with disability
YLL: year of life lost due to premature death

INTRODUCTION

Ischemic heart disease has a major impact on the health of a population, stemming from its acute manifestation, acute coronary syndrome (ACS),[1] and chronic manifestations, such as angina and heart failure. These latter forms can develop as sequelae following 1 or various episodes of ACS or be the only clinical expression of the disease.

The disability-adjusted life year (DALY) is a synthetic health indicator used to measure the burden of disease in a population. It provides information on the fatal and nonfatal consequences of diseases and injuries, and their associated risk factors.[2] This indicator, which is expressed as the number of years of healthy life lost, has been used to describe the epidemiologic situation in various countries and regions,[3] and to estimate the impact of different interventions on the population.[4–6]

According to data from a previous exploratory study, 4.7 DALYs per 1000 individuals in Spain (6.5 in men and 2.8 in women) were lost in 2008 due to ischemic heart disease. This condition accounts for 4.2% of the total disease burden in our country, and is the third leading specific cause of DALY loss after depression and dementia.[7] Calculation of DALY in the exploratory study was performed by an indirect method,[2] using mortality data from Spain and morbidity data from the WHO (World Health Organization) for the Euro-A region.[8] Euro-A includes countries with widely varying ischemic heart disease-related epidemiology, such as Finland, which has a standardized mortality rate of more than 191 deaths per 100 000 men and 101 per 100 000 women, and France and Spain, with rates of less than 95 and 45 deaths per 100 000 men and women, respectively.[9] These differences underscore the importance of using local epidemiologic data to obtain estimations that are more in keeping with the reality of each country. The aim of the present study was to describe the burden of ischemic heart disease in Spain for 2008, through the use of DALY values calculated from national data.

METHODS

Disease burden measured in DALYs is the sum of 2 components: the years of life lost (YLLs) due to premature death and the years lived with disability (YLDs). To include the health loss caused by the different manifestations of ischemic heart disease, 3 health states were established, based on the disease model used in the 2010 Global Burden of Disease (GBD) study[10]: ACS (acute myocardial infarction and unstable angina), stable angina, and heart failure.

Calculation of Years of Life Lost Due to Premature Death

The overall year of life lost was the sum of the years of life lost per each death due to ischemic heart disease, calculated as the difference between the age of the person at death and the life expectancy at that age taken from the standard life-table reported in the GBD 2010 study.[11]

Data related to the population and cause-specific mortality were from the Spanish National Institute of Statistics. Deaths with the ICD-10 codes I20 to I25 were selected. Deaths attributed to poorly defined codes were reassigned following the methods used in the original GBD study,[2] with the exception of heart failure (code I50). This was retained as a specific cause, and a percentage of the deaths due to heart failure was reassigned to ischemic heart disease based on the epidemiology of Spain. For this purpose, we used data from the GALICAP study, in which 36.8% of heart failure cases in men and 26.6% in women had an ischemic etiology.[12]

Calculation of Years Lived With Disability

The number of YLDs due to ischemic heart disease was estimated by multiplying the number of incident cases of each health state (ACS, stable angina, and ischemic heart failure) by the average duration of the health state, and by an assigned weighting factor that reflected the severity of the disability associated with the health state. To obtain the information required, we preferentially searched population studies carried out in Spain around the year 2008 that provided data by sex and age groups.

Acute Coronary Syndrome

Various publications were identified containing data on the incidence of acute myocardial infarction obtained from population registries.[13–24] However, most of these studies focused on specific regions of Spain or covered incident cases from the 1990s, before troponin analysis was routinely used in the diagnosis of acute myocardial infarction. Because of these limitations, we decided to draw on the information in the Spanish Registry of Hospital Discharges (Minimum Basic Data Set),[25] which has been used in several studies on acute myocardial infarction.[26–29] Episodes were selected in which the main diagnosis was coded as 410, 411.1, 411.81 or 411.89 (ICD-9MC). The duration of the ACS episode was set at 28 days, following the model used in the GBD 2010 study.[30]

Stable Angina

The only nationwide prevalence study on stable angina identified[31] presented data from 1995 to 1996, which were not considered sufficiently representative of the epidemiologic situation in 2008. Therefore, data from the Minimum Basic Data Set