



Original article

The national burden of cerebrovascular diseases in Spain: A population-based study using disability-adjusted life years



Ferrán Catalá-López^{a,b,*}, Nerea Fernández de Larrea-Baz^c, Consuelo Morant-Ginestar^d, Elena Álvarez-Martín^e, Jaime Díaz-Guzmán^f, Ricard Gènova-Maleras^g

^a Division of Pharmacoepidemiology and Pharmacovigilance, Spanish Medicines and Healthcare Products Agency (AEMPS), Madrid, Spain

^b Fundación Instituto de Investigación en Servicios de Salud, Valencia, Spain

^c Health Research, Training and Infrastructures General Directorate, Regional Health Council, Red de Investigación en Servicios de Salud en Enfermedades Crónicas (REDISSEC), Madrid, Spain

^d Unidad Docente de Medicina Familiar y Comunitaria Este, Ramón y Cajal University Hospital, Madrid, Spain

^e Department of Preventive Medicine and Public Health, Rey Juan Carlos University, Madrid, Spain

^f Stroke Unit, Neurology Department, 12 de Octubre University Hospital, Faculty of Medicine, Complutense University, Madrid, Spain

^g Primary Care General Directorate, Regional Health Council, Madrid, Spain

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ABSTRACT

Background and objective: The aim of the present study was to determine the national burden of cerebrovascular diseases in the adult population of Spain.

Patients and methods: Cross-sectional, descriptive population-based study. We calculated the disability-adjusted life years (DALY) metric using country-specific data from national statistics and epidemiological studies to obtain representative outcomes for the Spanish population. DALYs were divided into years of life lost due to premature mortality (YLLs) and years of life lived with disability (YLDs). DALYs were estimated for the year 2008 by applying demographic structure by sex and age-groups, cause-specific mortality, morbidity data and new disability weights proposed in the recent Global Burden of Disease study. In the base case, neither YLLs nor YLDs were discounted or age-weighted. Uncertainty around DALYs was tested using sensitivity analyses.

Results: In Spain, cerebrovascular diseases generated 418,052 DALYs, comprising 337,000 (80.6%) YLLs and 81,052 (19.4%) YLDs. This accounts for 1,113 DALYs per 100,000 population (men: 1,197 and women: 1,033) and 3,912 per 100,000 in those over the age of 65 years (men: 4,427 and women: 2,033). Depending on the standard life table and choice of social values used for calculation, total DALYs varied by 15.3% and 59.9% below the main estimate.

Conclusions: Estimates provided here represent a comprehensive analysis of the burden of cerebrovascular diseases at a national level. Prevention and control programmes aimed at reducing the disease burden merit further priority in Spain.

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Carga de las enfermedades cerebrovasculares en España: estudio de base poblacional utilizando los años de vida ajustados por discapacidad

RESUMEN

Fundamento y objetivo: El objetivo del presente estudio fue determinar la carga de las enfermedades cerebrovasculares en la población adulta española.

Pacientes y métodos: Estudio transversal descriptivo de base poblacional. Se calcularon los años de vida ajustados por discapacidad (AVAD) utilizando datos específicos nacionales procedentes de estadísticas y estudios epidemiológicos para obtener resultados representativos a nivel nacional. Los AVAD fueron

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* Corresponding author.

E-mail address: ferran_catala@hotmail.com (F. Catalá-López).

divididos en años de vida perdidos (AVP) y años vividos con discapacidad (AVD). Los AVAD fueron estimados para el año 2008 mediante la aplicación de la estructura demográfica por sexo y grupos de edad, la mortalidad por causas específicas, los datos de morbilidad y los nuevos pesos de discapacidad que se proponen en el reciente estudio de la carga global de enfermedades. En el caso base, los AVP y los AVD no fueron descontados ni ponderados por edad. La incertidumbre en torno a los AVAD se examinó mediante análisis de sensibilidad.

Resultados: En España, las enfermedades cerebrovasculares generaron 418.052 AVAD, incluyendo 337.000 (80,6%) AVP y 81.052 (19,4%) AVD. Esto representa 1.113 AVAD por 100.000 habitantes (1.197 hombres y 1.033 mujeres) y 3.912 por 100.000 en los mayores de 65 años (4.427 hombres y 2.033 mujeres). En función de la tabla de vida estándar y la elección de las valoraciones sociales utilizadas en los cálculos, los AVAD totales variaron entre un 15,3 y un 59,9% por debajo de los resultados principales.

Conclusiones: Las estimaciones proporcionadas aquí representan un análisis exhaustivo de la carga de las enfermedades cerebrovasculares a nivel nacional. Los programas de prevención y control para reducir la carga de enfermedad cerebrovascular merecen una mayor prioridad en España.

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Introduction

Cerebrovascular diseases are a group of illnesses of the blood vessels supplying the brain, primarily affecting the elderly population and often resulting in a marked decline in the quality of life of both patients and caregivers.^{1,2} Cerebrovascular diseases, mainly stroke, can be prevented to a large extent since there are major risk factors including cardiomyopathy, high blood pressure, smoking, alcohol abuse, physical inactivity and an unhealthy diet.^{3–5} In view of the demographic and epidemiological trends occurring in recent decades, the absolute numbers of people with cerebrovascular diseases and the ensuing use of healthcare resources will probably continue to grow due to the ageing populations and chronicity.^{1,6} In 2008, cerebrovascular diseases were the second leading cause of death worldwide,⁷ the attributable disease burden being high in both developed and developing countries.^{3,8,9} However, mortality and morbidity rates of cerebrovascular diseases differ greatly between countries and regions.^{3,8,10} In the particular case of Spain, until recent years there have been few studies assessing their incidence and all of them have been local, with considerable methodologic variations.^{10,11}

Researchers and policy-makers face the challenge of responding to current disease management and control priorities, while being responsible for predicting future priorities. Ideally, such decisions should be based on summary measures of population health. Summary measures of population health are intended to guide debates on future health priorities, and they provide a way of monitoring and evaluating the disease burden and the potential benefits of healthcare services. Particularly, setting priorities for the prevention and control of cerebrovascular diseases requires an empirical understanding of the relative disease burden at national level, where the disease patterns are generally less well understood but where specific public health actions are often set. This study aims to provide a comprehensive and detailed description of the national burden caused by cerebrovascular diseases in the adult population of Spain in the year 2008.

Methods

This is a cross-sectional, descriptive population-based study.

Sources of demographic and epidemiological data

Data came from country-specific information sources. The 2008 mortality data by age, sex, and cerebrovascular cause (diagnosis

codes of the *International Classification of Diseases, Tenth Revision* [ICD-10]: I60 – subarachnoid haemorrhage, I61 – intracerebral haemorrhage, I62 – other nontraumatic intracranial haemorrhage, I63 – cerebral infarction, I64 – stroke not specified as haemorrhage or infarction, I67 – other cerebrovascular diseases, and I69 – sequelae of cerebrovascular disease) were obtained from the National Statistics Institute (*Instituto Nacional de Estadística*), Spanish Ministry of Economy and Competitiveness.¹² This source is based on anonymised death records containing all death certificates registered at a national level. Incidence and in-hospital mortality data came primarily from the recent IBERICTUS study,^{13,14} which was a prospective population-based registry on a study sample of 1.4 million adult people from 5 geographical areas representing north, south, central and Mediterranean regions of Spain. In that study, methodologies were standardized, and diagnoses were verified by clinical neurologists using neuroimaging techniques. Estimates of the adult population (18 years old and over) were based on the 2008 demographic data by sex and age-groups in the National Statistics Institute.¹⁵ Other parameters for the estimation of the burden of cerebrovascular diseases, including disease duration, and age of onset, were estimated with DISMOD-II software,¹⁶ using incidence, remission rate, in-hospital mortality, cause-specific mortality, total mortality and total population. The remission rate was assumed to be zero. The disability weights were derived from the results recently presented in the Global Burden of Disease (GBD) study^{17,18} and the severity distributions were derived from two comprehensive epidemiological studies conducted in Spain^{19,20} (Table 1).

Table 1

Proportion of patients with cerebrovascular disease in Spain at each level of disability and the corresponding disability weight.

Definition of score	% of patients with cerebrovascular disease in Spain ^a	Disability weight associated with score ^b
No sequelae	30	0.000
Mild disability	25	0.021
Moderate disability	14	0.076
Moderate disability plus cognition problems	9	0.312
Severe disability	2	0.539
Severe disability plus cognition problems	20	0.567

Weighted average disability weight across all severity levels: 0.168.

^a Alzamora et al.¹⁹; Barba et al.²⁰

^b Salomon et al.¹⁸

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