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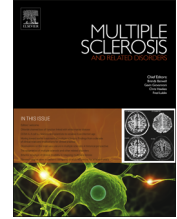
Burden of multiple sclerosis on direct, indirect costs and quality of life: National US estimates

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Abstract

Background: MS imposes a significant burden on patients, caregivers, employers, and the healthcare system.

Objective: To comprehensively evaluate the US MS burden using nationally representative data from the Medical Expenditure Panel Survey.

Methods: We identified non-institutionalized patients aged ≥ 18 with MS (ICD-9 code 340) from 1998 to 2009 and compared them to individuals without an MS diagnosis (non-MS) during the interview year. The cohorts were compared using multivariate regression on direct costs, indirect costs (measured in terms of employment status, annual wages, and workdays missed), and health-related quality of life (HRQoL; measured using Short Form 12, SF-6 Dimensions, and quality-adjusted life years [QALYs]).

Results: MS prevalence was 572,312 (95% CI: 397,004, 747,619). Annual direct costs were \$24,327 higher for the MS population ($n=526$) vs. the non-MS population ($n=270,345$) (95% CI: \$22,320, \$26,333). MS patients had an adjusted 3.3-fold (95% CI: 2.4, 4.5) increase in the odds of not being employed vs. non-MS individuals and a 4.4-fold higher adjusted

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number of days in bed (95% CI 2.97, 6.45). On average, MS patients lost 10.04 QALYs vs. non-MS cohort.

Conclusions: MS was associated with higher healthcare costs across all components, reduced productivity due to unemployment and days spent in bed, and lower HRQoL.

1. Introduction

MS, a chronic and debilitating inflammatory autoimmune disorder of the central nervous system, afflicts approximately 400,000 people in the United States (Zwibel and Smrtka, 2011; Goldberg et al., 2009) and 2.1 million people worldwide (Zwibel and Smrtka, 2011). MS is among the most common contributors to neurologic disability in young and middle-aged adults (Phillips, 2004) with detrimental effects on patients' productivity and health-related quality of life (HRQoL). Peak age of onset is approximately 30 years (Olofsson et al., 2011). Because patients with MS typically have a long life span and increased healthcare utilization (Prescott et al., 2007), MS imposes a significant burden on patients and their families/caregivers, employers, and the healthcare system.

Average total (direct and indirect) costs in a study of 1909 patients identified from the North American Committee on Multiple Sclerosis Patient Registry (NARCOMS) were estimated at $47,215 per patient per year, 63% for direct medical and nonmedical costs ($29,634) and 37% for total indirect costs including early retirement and informal care ($17,581) (Kobelt et al., 2006b). Ivanova et al. (2012) reported annual average total (direct and indirect) costs, excluding costs of disease modifying treatments (DMTs), ranging from $14,095 for DMT-adherent patients to $16,638 for those with poor adherence to DMTs. In a retrospective claims-based analysis of privately insured US employees with MS, total indirect costs (2006 US dollars) were more than 4 times higher for MS patients than for matched controls ($P < 0.0001$) (Ivanova et al., 2009).

A less widely reported component of the costs of MS is the additional burden on HRQoL (Orlewska, 2006), commonly referred to as "intangible costs". Many studies assessing MS burden do not include HRQoL in their estimates due in part to challenges in monetizing HRQoL measures (Orlewska, 2006). One HRQoL-informed measure that has been monetized is quality-adjusted life years (QALYs), a common metric used in cost-effectiveness research (Neumann and Greenberg, 2009). QALYs include two components: an HRQoL-informed utility weight (quality-adjusted component) and survival (life years component). Utility values are anchored at 0 for death and 1 for perfect health. For each time interval of survival, the utility weight is multiplied by the survival time and summed overall survival times thus producing QALYs. The QALY therefore allows for the translation of disparate risks and benefits into one common outcome measure that can be compared within and across diseases.

As the incidence of MS is projected to grow 5% by 2013 (National Multiple Sclerosis Society, 2011), and as new DMTs are expected to be introduced to the market that could influence treatment choice and cost, further examination of the economic and intangible burden of MS would add to the platform for evidence-based decisions.

The primary objective of the present study was to conduct a comprehensive evaluation of the current burden of MS in the United States using nationally representative data from the Medical Expenditure Panel Survey (MEPS), a public-access, large-scale database that links direct cost information with information on productivity and HRQoL. MEPS also makes adjustments for socioeconomic and demographic characteristics. This is the first time this unique dataset has been utilized to evaluate the comprehensive burden of MS including direct costs, indirect costs, and HRQoL.

2. Materials and methods

2.1. Data source

MEPS tracks individual and household demographic, socioeconomic, and health-related characteristics (Agency for Healthcare Research and Quality, 2013), providing a nationally representative sample of the US civilian non-institutionalized population (the study population of inference). The Household Component of the Medical Expenditure Panel Survey (MEPS-HC) is a nationally representative survey of the US civilian noninstitutionalized population. The sampling frame is drawn from respondents to the National Health Interview Survey, which is conducted by the National Center for Health Statistics (Cohen et al., 2009). The MEPS-HC collects data from a nationally representative sample of households through an overlapping panel design. A new panel of sample households is selected each year, and data for each panel are collected for two calendar years. The two years of data for each panel are collected in five rounds of interviews that take place over a 2.5 year period. This provides continuous and current estimates of health care expenditures at both the person and household level for two panels for each calendar year. To provide estimates that are representative of a national US population, the MEPS-HC panels have oversampled subgroups of individuals such as Hispanics, African-Americans, Asians, low-income households, and those likely to incur high medical expenditures. The most recent MEPS-HC panels have data on approximately 15,000 families and 35,000 individuals (Agency for Healthcare Research and Quality, 2013)

At the time of the analysis, the most recent available file was for 2009. We combined the 1998–2009 MEPS full-year consolidated, medical, and pharmacy utilization data files to generate an analytical cohort with robust sample size. The Colorado Multiple Institutional Review Board considers this research to be exempt from requiring board approval since MEPS is a publicly available data source.