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Featured Articles

The worldwide economic impact of dementia 2010

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Abstract **Objective:** To acquire an understanding of the societal costs of dementia and how they affect families, health and social care services, and governments to improve the lives of people with dementia and their caregivers.

Methods: The basic design of this study was a societal, prevalence-based, gross cost-of-illness study in which costs were aggregated to World Health Organization regions and World Bank income groupings.

Results: The total estimated worldwide costs of dementia were US$604 billion in 2010. About 70% of the costs occurred in western Europe and North America. In such high-income regions, costs of informal care and the direct costs of social care contribute similar proportions of total costs, whereas the direct medical costs were much lower. In low- and middle-income countries, informal care accounts for the majority of total costs; direct social care costs are negligible.

Conclusions: Worldwide costs of dementia are enormous and distributed inequitably. There is considerable potential for cost increases in coming years as the diagnosis and treatment gap is reduced. There is also likely to be a trend in low- and middle-income countries for social care costs to shift from the informal to the formal sector, with important implications for future aggregated costs and the financing of long-term care. Only by investing now in research and the development of cost-effective approaches to early diagnosis and care can future societal costs be anticipated and managed.

Keywords: Alzheimer's disease; Dementia; Costs; Cost of illness

1. Introduction

Today, more than 35 million people live with dementia, 54% of whom live in countries with low or middle incomes (LMIC)[1–3]. Numbers affected are set nearly to double every 20 years, with the most rapid increases in LMIC. Among older people, dementia is the leading chronic disease contributor to disability and need for care. Dementia is thus affecting every health system in the world significantly, and large amounts of resources and money are spent in caring for people with dementia. A proper understanding of the societal costs of dementia and how they affect families, health and social care services, and governments is fundamental to raising awareness, achieving proper prioritization, and focusing efforts to improve the lives of people with dementia and their caregivers. The aim of this article, summarizing the findings in the 2010 World Alzheimer Report [2] and parts of the World Health Organization (WHO) dementia report [4] is to highlight the economic impact of dementia worldwide so that governments and health and social care systems are better prepared for the future.

A. W. had full access to all the data in the study and had the final responsibility for the decision to submit for publication. A. W., B. W., and L. J. are consultants to drug companies that are purchasing or developing drugs for treatment of Alzheimer's disease or other dementias (eg, Pfizer, Janssen-Cilag, Astra-Zeneca, Novartis, Merz, Lundbeck, Forest, GSK, Wyeth, Sanofi, Elan, Neurochem, Lilly, and BMS), but their occupation did not influence the work associated with this article, nor was there any financing received from these companies.

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Cost-of-illness (CoI) studies for dementia have already been carried out for some regions and countries, mainly from high-income (HIC) parts of the world—for example, the whole of Europe [5], the United Kingdom [6], Sweden [7], Australia [8], the United States [9], and Canada [10]. The consensus is that dementia is already imposing huge societal economic burdens, both through direct (medical and social care) and indirect (unpaid caregiving by families and friends) costs. Evidence is just beginning to emerge of the extent of the economic burden in middle-income countries [9–12].

CoI studies are descriptive. They can be used to quantify the total societal economic burden of a health condition and can highlight the relative impact on different health and social care sectors. The distribution of costs among different countries and regions can also be estimated and compared. CoI studies can also be used to describe or (with less certainty) to predict the extent of changes in or distribution of costs over time. Although CoI studies conducted on different health conditions can be used to compare burden, some caution is needed in using these estimates to set priorities. The methods used, particularly the types of costs included or excluded, and the data used to estimate them may not be strictly comparable across different health conditions. Also, it has been argued that prioritization for investment in health care should be determined by the relative incremental cost-effectiveness of available interventions, rather than the burden of the disease [11]. Transparency is crucial with regard to the assumptions underlying any cost calculations and comparisons.

Previously, three articles that highlight the global economic burden have been published [12–14]. These reports were, at the time of their publication, based on the best available data for the prevalence of dementia and care inputs. The most recent of these updated previous estimates of global costs from US$315 billion in 2005 to US$422 billion in 2009, an increase of 34% (18% in fixed prices) in just 4 years. This update was based on the same database and the increase is mainly a result of an increase in numbers of people affected by dementia (from 29 million to 34 million). US$312 billion per year (74% of the worldwide total) is contributed by countries designated by the United Nations as more developed regions and US$110 billion (26% of the total) by less-developed regions. One major limitation of these reports is that they contained very few data on health and social care from LMIC and eastern Europe. Therefore, the cost models relied largely on extrapolation of economic conditions from higher to lower income countries, adjusted for gross domestic product (GDP) per person. Also, it was not possible to distinguish between direct medical costs (within the health care sector) and direct social care costs (within the community and care home sector). Because more articles are now published that at least overcome the limitations mentioned earlier in part, we are now merging the best available data regarding the worldwide cost of Alzheimer's disease and other dementias.

2. Methods

The estimated numbers of people affected by dementia worldwide and in different regions worldwide are based on the World Alzheimer Report 2009 [1], the WHO dementia report [4], and the joint article in this issue of *Alzheimer's & Dementia* [3]. We estimate that 35.6 million people lived with dementia in 2010.

2.1. Literature search for the CoI estimates

The search was done in PubMed/Medline, Ingenta, Cochrane Library, National Health Service Economic Evaluation Database/Health Technology Assessment Database, Health Economic Evaluations Database, Excerpta Medica base, Current contents, PsycINFO, Educational Resources Information Center, societal services abstracts and sociological abstracts. The search terms (Medical Subject Headings/Subheadings when appropriate) were dementia/Alzheimer's disease/Alzheimer disease combined with cost and/or economic and informal care. Two recent systematic reviews [15,16] and secondary articles from reference lists were also considered for inclusion.

2.2. Key design issues

An ideal, worldwide CoI study has a societal viewpoint that includes comprehensive accounting of informal care, and direct medical and social care costs. Precise data on the prevalence of dementia and resource use should be derived from representative population-based studies. These data, and the unit costs applied to the resources used, should refer to the same index year. The same methods should be used to collect these data across all countries.

The reality is different:

- Estimates of the size of the older population are of variable quality.
- Data on dementia prevalence are not available for all countries [1].
- Most studies of care arrangements, informal care, and resource use for people with dementia use convenience rather than representative population-based samples. People identified through convenience sampling tend to have more advanced and severe dementia, their caregivers typically report higher levels of strain, and the families are likely to have accessed and to have used more health and community support services. Many of the estimates come from small studies and, hence, may be imprecise. Many studies are not recent, and care arrangements and patterns of health care use may change over time. For many countries, there are few or no studies available
- Most of the source articles have a bottom-up design. This means that CoI data from local studies are extrapolated to a greater population (eg, a country).