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Cost of disorders of the brain in Europe 2010.

Gustavsson A, Svensson M, Jacobi F, Allgulander C, Alonso J, Beghi E, Dodel R, Ekman M, Faravelli C, Fratiglioni L, Gannon B, Jones DH, Jenum P, Jordanova A, Jönsson L, Karampampa K, Knapp M, Kobelt G, Kurth T, Lieb R, Linde M, Ljungcrantz C, Maercker A, Melin B, Moscarelli M, Musayev A, Norwood F, Preisig M, Pugliatti M, Rehm J, Salvador-Carulla L, Schlehofer B, Simon R, Steinhausen HC, Stovner LJ, Vallat JM, den Bergh PV, van Os J, Vos P, Xu W, Wittchen HU, Jönsson B, Olesen J; on behalf of the CDBE2010 study group.

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Abstract

BACKGROUND: The spectrum of disorders of the brain is large, covering hundreds of disorders that are listed in either the mental or neurological disorder chapters of the established international diagnostic classification systems. These disorders have a high prevalence as well as short- and long-term impairments and disabilities. Therefore they are an emotional, financial and social burden to the patients, their families and their social network. In a 2005 landmark study, we estimated for the first time the annual cost of 12 major groups of disorders of the brain in Europe and gave a conservative estimate of €386billion for the year 2004. This estimate was limited in scope and conservative due to the lack of sufficiently comprehensive epidemiological and/or economic data on several important diagnostic groups. We are now in a position to substantially improve and revise the 2004 estimates. In the present report we cover 19 major groups of disorders, 7 more than previously, of an increased range of age groups and more cost items. We therefore present much improved cost estimates. Our revised estimates also now include the new EU member states, and hence a population of 514million people.

AIMS: To estimate the number of persons with defined disorders of the brain in Europe in 2010, the total cost per person related to each disease in terms of direct and indirect costs, and an estimate of the total cost per disorder and country.

METHODS: The best available estimates of the prevalence and cost per person for 19 groups of disorders of the brain (covering well over 100 specific disorders) were identified via a systematic review of the published literature. Together with the twelve disorders included in 2004, the following range of mental and neurologic groups of disorders is covered: addictive disorders, affective disorders, anxiety disorders, brain tumor, childhood and adolescent disorders (developmental disorders), dementia, eating disorders, epilepsy, mental retardation, migraine, multiple sclerosis, neuromuscular disorders, Parkinson's disease, personality disorders, psychotic disorders, sleep disorders, somatoform disorders, stroke, and traumatic brain injury. Epidemiologic panels were charged to complete the literature review for each disorder in order to estimate the 12-month prevalence, and health economic panels were charged to estimate best cost-estimates. A cost model was developed to combine the epidemiologic and economic data and estimate the total cost of each disorder in each of 30 European countries (EU27+Iceland, Norway and Switzerland). The cost model was populated with national statistics from Eurostat to adjust all costs to 2010 values, converting all local currencies to Euro, imputing costs for countries where no data were available, and aggregating country estimates to purchasing power parity adjusted estimates for the total cost of disorders of the brain in Europe 2010.

RESULTS: The total cost of disorders of the brain was estimated at €798billion in 2010. Direct costs constitute the majority of costs (37% direct healthcare costs and 23% direct non-medical costs) whereas the remaining 40% were indirect costs associated with patients' production losses. On average, the estimated cost per person with a disorder of the brain in Europe ranged between €285 for headache and €30,000 for neuromuscular disorders. The European per capita cost of disorders of the brain was €1550 on average but varied by country. The cost (in billion €PPP 2010) of the disorders of the brain included in this study was as follows: addiction: €65.7; anxiety disorders: €74.4; brain tumor: €5.2; child/adolescent disorders: €21.3; dementia: €105.2; eating disorders: €0.8; epilepsy: €13.8; headache: €43.5; mental retardation: €43.3; mood disorders: €113.4; multiple sclerosis: €14.6; neuromuscular disorders: €7.7; Parkinson's disease: €13.9; personality disorders: €27.3; psychotic disorders: €93.9; sleep disorders: €35.4; somatoform disorder: €21.2; stroke: €64.1; traumatic brain injury: €33.0. It should be noted that the revised estimate of those disorders included in the previous 2004 report constituted €477billion, by and large confirming our previous study results after considering the inflation and population increase since 2004. Further, our results were consistent with administrative data on the health care expenditure in Europe, and comparable to previous studies on the cost of specific disorders in Europe. Our estimates were lower than comparable estimates from the US.

DISCUSSION: This study was based on the best currently available data in Europe and our model enabled extrapolation to countries where no data could be found. Still, the scarcity of data is an important source of uncertainty in our estimates and may imply over- or underestimations in some disorders and countries. Even though this review included many disorders, diagnoses, age groups and cost items that were omitted in 2004, there are still remaining disorders that could not be included due to limitations in the available data. We therefore consider our estimate of the total cost of the disorders of the brain in Europe to be conservative. In terms of the health economic burden outlined in this report, disorders of the brain likely constitute the number one economic challenge for European health care, now and in the future. Data presented in this report should be considered by all stakeholder groups, including policy makers, industry and patient advocacy groups, to reconsider the current science, research and public health agenda and define a coordinated plan of action of various levels to address the associated challenges.

RECOMMENDATIONS: Political action is required in light of the present high cost of disorders of the brain. Funding of brain research must be increased; care for patients with brain disorders as well as teaching at medical schools and other health related educations must be quantitatively and qualitatively improved. The current move of the pharmaceutical industry away from brain related indications must be halted and reversed. Continued research into the cost of the many

disorders not included in the present study is warranted. It is essential that not only the EU but also the national governments forcefully support these initiatives.

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