Stroke in Switzerland: Social Determinants of Treatment Access and Cost of Illness

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Background: Few useful empirical data on stroke are available for Switzerland. The aim of this study was to collect data on the use of medical resources and associated costs among stroke patients. Special attention was paid to possible correlations between epidemiologic indicators, sociodemographic variables, resource use, and costs. *Methods:* We carried out a representative population survey of 19,123 households in the German- and French-speaking parts of Switzerland with computer-assisted telephone interviews in 2005. Detailed sociodemographic data and information on the use of resources were collected from 509 individuals aged 15-75 years who had cared for a stroke patient in the past 1-2 years. *Results:* In the last 1-2 years, a total of 7.8% of households were affected by stroke in the German-speaking part of Switzerland, whereas only 4.3% of households were affected in the French-speaking part of Switzerland (odds ratio [OR] = 1.89, $P < .001$). Based on the length of stay, the total cost of inpatient treatment and rehabilitation during the average 1-year observation period was estimated at €40,090. Stroke therefore caused approximately 2.9% of all inpatient costs in Switzerland. Patients with supplementary insurance were treated more frequently as inpatients than patients with statutory insurance (OR: 2.14, $P = .014$), and patients with a low household income were referred less frequently to an inpatient rehabilitation facility than those with medium or high household income (OR = .58, $P < .05$). *Conclusions:* This survey confirms the medical and economic importance of stroke and supplements the existing European data. Further research is needed in regard to incidence differences in stroke across Switzerland. Patients without supplementary insurance or with low household income were less likely to receive inpatient treatment. **Key Words:** Stroke—cost factors—socioeconomic factors—economics—stroke facilities—stroke prevalence—stroke rehabilitation—Switzerland—epidemiology—cost-of-illness.

Introduction

According to the World Health Organization (WHO), cerebrovascular accidents (CVAs) are the second leading cause of death worldwide[1] and are responsible for 12.19% of all deaths in Europe. Although the incidence of stroke and stroke mortality in high-income nations declined in the past 4 decades, it doubled during this period in countries with medium or low incomes.[2] However, an increase in the incidence and prevalence of stroke is still likely even in richer countries because of the continuing aging of the population and the marked increase in the incidence of CVAs with age.[3,4]

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Received January 8, 2013; revision received July 22, 2013; accepted July 30, 2013.
Grant support: None.
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1052-3057/$ - see front matter

http://dx.doi.org/10.1016/j.jstrokecerebrovasdis.2013.07.042

Mortality within the first 30 days of a CVA is 13%-23% for ischemic stroke and 25%-48% for hemorrhagic stroke. Approximately 60% of all patients die within 5 years.[2,5,6] In 62 of the 192 WHO member states, mortality due to stroke is higher than that for coronary heart disease.[7] In addition to the high mortality, strokes result in significant morbidity and disability in everyday life. CVAs are therefore rated as the most common cause of acquired long-term disability.[8] Of the patients who survive an ischemic stroke, about 50% remain dependent on long-term help for everyday life after the event; of these, about half are referred to institutional care.[1,6]

Strokes are not only a huge challenge for patients and their families but also a major financial burden for the health-care system. High direct costs are incurred by the expensive acute care and rehabilitation, but there are also high indirect costs because of lost productivity on the part of both the patient and the relatives.

Few detailed cost studies are available from other countries. Because the relevant studies differ significantly in terms of their design (different population groups, sample sizes, and methodology) and also because of inconsistent methods of diagnosis and coding of CVAs, it is not surprising that there may be wide variation in the cost estimates of recent health economic studies. An international systematic overview in 2004 estimated the direct costs of treatment and rehabilitation of stroke patients in several countries (Europe, United States, and Australia) at about 3% of the total cost of government health expenditure.[9] The American Heart Association estimated that a total cost of $34.3 billion was incurred by CVAs in 2008, which corresponds to about 1.9% of total health expenditure in that year.[18] According to the WHO, the United Kingdom expends about 6% of its health-care budget on the direct costs resulting from stroke cases.[1]

A comparative European study estimated the direct health-care costs of a CVA in Switzerland at approximately CHF 125,000 (€76,000) in 2004.[9] In this European comparison, there was little difference in the cost of acute care in Switzerland but there were major differences in the cost of rehabilitation (follow-up costs). The authors attributed this significant difference to the availability of well-established facilities designed specifically for the rehabilitation of stroke patients in Switzerland. Despite these well-equipped facilities, no relevant empirical data on stroke are available for Switzerland with regard to epidemiologic indicators or the use of health-care resources. We therefore conducted a representative population-based survey on the use of medical resources after stroke, using a "bottom-up approach." Special attention was paid to possible correlations between resource use and epidemiologic indicators on the one hand and sociodemographic characteristics of affected individuals on the other. We investigated in particular whether gender, socioeconomic status, and health insurance were correlated with the nature, duration, or cost of treatment and rehabilitation. We also estimated the direct costs of treatment and rehabilitation for stroke patients who were initially treated as inpatients.

Methods

Population Survey

The database was compiled during a representative population survey in a 19-week period between July 2004 and January 2005. The telephone survey was conducted with individuals aged 15-74 years who lived in a household with a telephone connection. The addresses of the households were selected at random from the electronic telephone directory for Switzerland. Three quarters of the interviews were conducted in German (German-speaking Switzerland) and a quarter of the interviews were conducted in French (French-speaking Switzerland). The German and the French parts of Switzerland cover over 95% of the Swiss population and are representative for all economic regions (the Italian part of Switzerland was not included in this study). The target person in the household was selected according to quota specifications that corresponded to the age and gender ratios of the Swiss population according to the annually updated data of the Swiss Federal Statistical Office (FSO). Selection of respondents was based on a 2-stage random-quota procedure. Individuals were excluded from the survey if they were institutionalized or had no landline telephone connection. At the time of the survey, landline telephone coverage amounted to 87%.

To cover the working population, surveys were carried out on weekday evenings between 5 and 9 p.m. From 1000 to 1016 telephone calls were made per week with 5-fold oversampling. In a maximum of 300 cases, no member of the household corresponded to the age and gender quotas; participation was refused in a maximum of 500 cases. The net response rate was at least 56%.

A total of 19,123 households were surveyed with regard to CVAs. Sociodemographic variables (gender, age, education, employment status, household income, economic region, and type of settlement) were collected for all households. For the 841 households in whom a CVA had occurred during the last 1-2 years, interviewees were divided into the following categories: individuals who had had a stroke themselves (50); those who indicated an affected person in the household, but had not themselves cared for this person (277); and individuals who had themselves cared for an affected member of the household (509). A detailed computer-assisted telephone interview was conducted with the latter individuals (Fig 1).

Statistical Analysis

All statistical analyses were performed with the SPSS 11.0 program from IBM. For bivariate associations