Prevalence of Stroke in the Parsi Community of Bombay

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A door-to-door survey of 14,010 Parsis living in colonies in Bombay, India, screened people for possible neurologic diseases. High school graduates, social workers, and a medical student administered a questionnaire that had been shown in a pilot study to have a sensitivity of 100% for identifying persons with stroke. Neurologists used defined diagnostic criteria to evaluate those who were positive on the screening survey. One hundred eighteen persons (57 men, 61 women) suffered from stroke (842.3 cases/100,000 population). The age-specific prevalence ratios increased with age for both sexes and for each age group. Age-adjusted prevalence ratios were slightly higher for men than for women. The most common type of stroke was ischemic (114 cases). (Stroke 1988;19:60–62)

Stroke is a major cause of death and disability, particularly in the elderly, and accurate information on the prevalence of stroke in developing countries is needed. In cooperation with the National Institutes of Health, the World Health Organization developed a protocol to measure the prevalence of major neurologic diseases including stroke. This protocol has been used to carry out investigations in the United States, Nigeria, and the People's Republic of China, while smaller pilot studies were completed in India, Colombia, Ecuador, Mexico, Venezuela, and Peru.

The Indian pilot study was carried out in a community of 851 Parsis living in a colony in Bombay. The questionnaire was initially tested in the same community and was found to have a sensitivity of 100% for detecting epilepsy, febrile seizures (only in children), completed stroke, peripheral neuropathy, movement disorders, cerebral palsy, mental retardation, and severe dementia. We describe the results of a large-scale door-to-door survey of the prevalence of stroke among all Parsis living in Bombay colonies. It is the first of its type from India.

Subjects and Methods

The Parsis (followers of the Zoroastrian religion) left Iran and migrated to India between the seventh and tenth centuries AD. The present community is stable, does not accept religious conversions, and allows very little intermarriage with other religions. According to the 1971 census, about 71% of the 91,000 Parsis in India live in Bombay. About one third of the Parsis in Bombay reside in large groups of houses known as colonies (Figure 1). These colonies were built earlier by wealthy Parsis for the less affluent members of the group. Most of these people have lived there for years, even after their social circumstances improved.

Informed consent was obtained from community leaders, heads of households, all individuals aged 14 years or older, and from the parents of children younger than 14. Parsis were eligible for the study if they were residents of a colony in Bombay city on March 1, 1985. In a door-to-door survey, high school graduates, social workers, and a medical student administered both a census and a screening questionnaire. The study neurologists examined individuals positive on the screening questionnaire. The examinations were carried out in a common area in the colony itself or in the person's home. The protocol and methodology are reported elsewhere.

In this study, stroke was defined as the sudden onset of a focal neurologic deficit lasting >24 hours or resulting in the death of the individual. If the cerebrospinal fluid was bloody, a global neurologic deficit might be present, and a diagnosis of subarachnoid hemorrhage was then made. Intracerebral hemorrhage was diagnosed either by computed tomography (CT) or clinically if there was a smoothly evolving deficit with no fluctuating signs. No attempt was made to distinguish between cerebral infarction due to atherosclerosis and distal insufficiency, cerebral embolism, or lacunar infarction; the diagnoses were usually made solely on clinical grounds. Those with possible stroke were excluded, and only first strokes were considered. The frequency of stroke in this study is expressed in terms of a point prevalence ratio (prevalence day, March 1, 1985). Only those who developed stroke after establishing residence in the colony are included.
in this study. All ratios were age-adjusted to the 1960 U.S. population.  

**Results**

On prevalence day, the population of the colonies was 14,010 people living in 4,537 households; 261 households (5.8%) could not be interviewed because they either refused or were not available despite repeated attempts to contact them. The age and sex distribution of the screened population is shown in Figure 2. This pattern is unlike that of the general population in India and several other developing countries. Forty-four percent were over age 50, compared with 12% of the general Indian population and 10% of individuals in the Nigerian study.

One thousand six hundred thirty-six persons were positive for stroke on screening; following the neurologic evaluation, 168 were identified as having stroke. Of the remaining individuals, 1,268 had other neurologic conditions and 180 were neurologically normal; 20 refused neurologic examination. Of the 168 persons with stroke, 118 developed a definite stroke after moving to the colonies and on or before prevalence day (prevalent cases). The point prevalence ratio for completed stroke was 842.3/100,000 population at risk. Of the 118 prevalent cases of completed stroke, 25 persons experienced their first stroke in the year preceding prevalence day. The median age of onset of stroke was 62.5 years.

The age-specific prevalence ratios for completed stroke increased dramatically with age (Figure 3). For instance, the prevalence ratio for those 75 years and older was 182 times higher than for those under age 35. The age-adjusted prevalence ratio of completed stroke was higher for men (457/100,000 population at risk) than for women (397.7/100,000 population at risk). The age-adjusted prevalence ratio for the total population was 424.3/100,000 population at risk.

Among prevalent cases of completed stroke, cerebral infarction accounted for 96.6% of the total, intracerebral hemorrhage 2.5%, and subarachnoid hemorrhage 0.8%.

As regards ambulatory status, 97 (82%) of the 118 stroke cases were able to walk unimpaired. Recurrent strokes occurred in 14 (12%) of the 118 stroke cases at intervals ranging from 1 month to 20 years after the first stroke.

**Discussion**

The worldwide prevalence ratio for cerebrovascular disease is between 500 and 700/100,000 population; the age-adjusted prevalence ratio (424/100,000) for stroke among the Parsis is slightly lower than the international average. However, it is much higher than the corresponding figure for stroke in Vellore, in southern India (94/100,000); the Vellore...
study offers the only other prevalence data for an Indian population. The higher prevalence ratio for completed stroke in the present study compared with Vellore may be attributed to the fact that only hemiplegic strokes with residual disability were considered in the Vellore study. The exponential increase in prevalence of completed stroke with age and slight male preponderance in this study are compatible with the international data.

In this study, cerebral infarction accounted for most of the completed strokes, as reported elsewhere in the world. Since CT was not widely used to evaluate persons with completed stroke in this population, small intracerebral hemorrhages would be misdiagnosed as cerebral infarction. Thus, the actual proportion of cerebral hemorrhage was larger than that reported. While intracranial hemorrhage is associated with a higher case-fatality ratio and relatively short survival, there would be proportionally fewer prevalent cases of intracranial hemorrhage.

The vast majority of stroke cases in this study were ambulatory without aid compared with 56% in a similar survey carried out in Copiah County, Mississippi. A case-control study has been undertaken to identify risk factors for stroke in the Parsi community. We hope that knowledge of these risk factors will lead to designing and implementing prevention and control programs.

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References


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