Cerebrovascular Disease in Rural Kashmir, India

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We studied the Kuthar Valley in the Anantnag District of south Kashmir (northwestern India) during the year 1986 to ascertain the prevalence and pattern of completed stroke. We detected 91 cases, giving a crude prevalence rate of 143/100,000. However, age-specific prevalence was 41/100,000 in the group aged 15–39 years and 630/100,000 in the group aged ≥40 years; 69.23% of the cases were in men. Hypertension was present in 58.24% of the cases, while strokes due to valvular heart disease and puerperium-related strokes were most common in the young. Our study is first of its kind in this part of India. (Stroke 1989;20:1691–1693)

There are few reports about the incidence and prevalence of cerebrovascular diseases from developing countries such as India,1,2 and most such reports are based on the retrospective analysis of patients admitted to hospitals.3 We studied the prevalence of completed strokes in the population living in a mountainous valley in south Kashmir, a region in northwestern India, from July to November of 1986. We did not consider sodium intake or the smoking habits. Bruits in the neck were not auscultated.

Subjects and Methods

The Kuthar Valley in the Anantnag District of south Kashmir in the northwestern part of India (Figure 1) is situated between 33°39' and 33°48' north latitude and 75°09' and 75°23' east longitude at an altitude of approximately 1,530 meters. The area measures approximately 120 km², with temperatures ranging from −15° to 35° C. The majority of its southern, eastern, and northern regions are covered by thick forests and mountains.4 Most of the remaining area comprises paddy rice and maize fields, with a few people and some walnut orchards.

In November of 1986, the Kuthar Valley (Integrated Child Development Services [ICDS] Project Block Shangas) population of 63,645 comprised 33,726 males and 29,919 females, or 887 females per thousand males. Approximately 42% of the total population is ≤14 years of age. The population is relatively stable, with little immigration or emigration.

An average village comprises approximately 30–40 thatched mud huts, each enclosing approximately 75–100 ft², with 8–15 residents per household. The houses rarely have latrines, and open-air defecation is common. Drinking water is provided by several small open springs, ponds, and streams. Eighty percent of the population is illiterate, and medical care facilities are sparse. Quacks and fake “peers” and “Sadhus” attend to most of the population’s health problems. More than 80% of the population are cultivators and shepherds. Rice forms the staple diet, and an average meal is rich in carbohydrates and salt, with the heavy use of spices. The use of any kind of alcohol is unknown.

The existing Social Welfare Department Scheme in the Kuthar Valley provided the services of their Child Development Project personnel.5 These employees consisted of female health workers called Angan Wadi workers (AWWs) who were usually educated up to the 10th standard or matriculation. Each Angan Wadi Center caters to a population of 600–1,000 people, with approximately 18–25 such centers constituting one zone. The ICDS Block Shangas (the Kuthar Valley) comprises five zones having 100 Angan Wadi Centers. The AWWs formed the basic group that screened the population, whereas the neurologic work-up was done by a neurologic team at each Angan Wadi Center.

During the first phase of the study, AWWs were trained in the detection of neurologic complaints by completing a screening questionnaire written in the local vernacular that had been prepared in accordance with World Health Organization protocol for measuring the prevalence of neurologic disorders in developing countries.6 The AWWs subsequently carried out a house-to-house screening and census in which no one refused to participate. Usually the older members of a family would give the details, and because generations live together, the occurrence of disease (especially neurologic disease) was...
known to all in the household. The neurologic team subsequently interviewed and examined all suspected cases, including 500 home visits to verify findings on invalids. The neurologic team covered 40 Angan Wadi Centers by Jeep or local transport and reached the rest of the centers on foot through rough mountainous terrain.

The epidemiologic field study was carried out mainly from July to November, with November 1, 1986, used as the point prevalence day.

The diagnosis of completed strokes was based on the diagnostic criteria published by Garraway et al, in which stroke is considered to include brain infarction due to arterial thrombosis, stenosis, or embolism, to primary and secondary intracerebral hemorrhages, or to subarachnoid hemorrhage. We did not differentiate between cerebral infarction, cerebral hemorrhage, and subarachnoid hemorrhage.

**Results**

The distribution and prevalence rates of completed stroke is shown in Table 1. Ninety-one cases of completed stroke were detected, yielding a crude prevalence rate of 143/100,000. The proportion of strokes that occurred in men (69.23%) was higher than in women (30.77%). A prevalence rate of 244/100,000 was found in the population >15 years of age. The age-specific prevalence increased with age in males but not in females, possibly due to their small numbers. The prevalence rate of stroke in the specific group aged 15–39 years was 41/100,000.

Hypertension was a factor in 58.24% of the cases of completed stroke. Three cases (3.3%) were related to the puerperium and four (4.4%) to valvular heart disease, all of which occurred in persons <40 years of age. Six cases (6.6%) were repeated strokes.

Among the 91 cases of completed stroke, 9.9% had full recovery while the remaining 90.1% had residual deficits.

**Discussion**

Our field study involving a house-to-house survey by AWWs is a sensitive method of case ascertainment since the chances of missing completed strokes are minimal. We did not include transient ischemic attacks in our study because of the nonspecificity of their clinical diagnosis. Analysis of our results showed an overall prevalence rate of 143/100,000 for completed strokes and a rate of 244/100,000 in the population aged >15 years old. Compared with worldwide prevalence rates (ranging from 500 to 700/100,000) ours are low. However, our rates are higher than those of a southern India study in which a prevalence rate of 56.9/100,000 (68.5 in males and 44.3 in females) has been reported. The prevalence rates of stroke when age-adjusted to the 1960 US population is lower in all age groups.

Many hospital-based studies in India show that strokes among young persons <40 years of age...
constitute 18.8–32.0% of all stroke cases. In our study of 91 completed strokes, 10 patients (10.9%) were 15–39 years old, and the age-specific prevalence in this age group was only 41/100,000. This rate is comparable to that in the West and would seem to support rheumatic heart disease and its sequela as important causes of stroke in India. The prevalence rate we found among the young is also similar to that in general practice in England (30/100,000).

Because our survey was door-to-door and since we also saw people with nonneurologic illness, our chance of missing cases of mild stroke was reduced. After thorough examination, we excluded approximately three times the number of neurologic diagnoses as being other disorders simulating neurologic disease.

The most common risk factor among the elderly in our study was hypertension, whereas in young stroke patients valvular heart disease and postpartum cerebral venous thrombosis were predisposing factors. We did not consider smoking habits in our study, but we note that in a small-sample population survey in which the overall rate of hypertension was 18.97%, 71% of the people smoked.

In conclusion, we found that the prevalence of strokes in the group aged 15–39 years is similar to that in the West but lower than that of various other Indian studies.

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