Stroke Epidemic in India: Hypertension-Stroke Control Programme is Urgently Needed

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India will soon face an enormous socio-economic burden on the costs of the rehabilitation of stroke survivors because the population is now surviving through peak years (age 55-65) of occurrence of stroke (CVD). The Global Burden of Disease (GBD) Study (1997) reported 9.4 million deaths in India, of which 619,000 were from 'Stroke,' and the Disability Adjusted Life Years (DALYS) that were lost, almost amounted to 28.5 million: nearly six times higher than that due to Malaria. In 2005, stroke deaths accounted for 87% of all deaths from developing countries and this burden will increase with ageing population. An estimated 5.7 million people died from stroke in 2005 and projected deaths will rise to 6.5 million by 2015.

Magnitude of Problem: In published literature there are reports on prospective and retrospective surveys for "hemiplegia" presumed to be CVD in India. The prevalence rates (or estimates) for "completed strokes" for North India (Kashmir) being 143/100,000 persons; for West India (Mumbai) at 245/100,000; for South India (Vellore) it has been 64/100,000 and for East India (Assam) it was 270/100,000. The average range being 90-220/100,000 persons. Above reports do not take into account TIA's and sudden deaths, nor confirmation of diagnosis by CT imaging tests. Because of methodological limitations and non-uniform definitions as well as regional variations it is difficult to compare above studies. For example, recent prospective well designed neuroepidemiological survey in Bangalore (rural and urban) reported a point prevalence rate at 136-165/100,000 and similar prospective study from rural West Bengal reported point prevalence rate at 168/100,000 with age specific rate for 41-60 yrs in the range of 540-850/100,000. Thus, the prevalence of hemiplegia presumed to be stroke has been rising with advancing age. To get the real estimate of prevalence rate for recent strokes (CVD) in the country (India), we will have to initiate multicentric prospective surveys using uniform definitions and methodologies with validation of diagnosis. The latter will give clear idea on inter-regional differences, if any, and for planning intervention strategies. Here, as a part of Global Stroke Initiative (GSI), WHO recommends STEPwise Stroke Surveillance Instrument (Version 2.0) for representative sample surveys of regional populations.

WHO Global Stroke Initiative: The purpose of WHO Global Stroke Initiative is to (i) assess the magnitude of stroke, (ii) describe population at risk, (iii) identify associated risk factors, (iv) monitor trends over time, (v) implement intervention strategies and (vi) evaluate the outcome of intervention. It will also give estimates of mortality and disability expressed as DALYs (Disability Adjusted Life Years). However, monitoring trend over a long period of time may not be possible. For complete registration of stroke events in the community, one will have to register hospitalized and non-hospitalized events both fatal and non-fatal. The basic aim will be to develop an "ideal" stroke registry to provide health workers and policy makers with reliable baseline information to plan cost-effective health-care and prevention strategies. No doubt risk factor surveillance (high blood pressure, obesity, tobacco use, unhealthy diet and physical inactivity) in STEPS stroke system will yield useful data for management and prevention of stroke.

The ICASS Study: The WHO STEPS stroke version 1.1 has been successfully tested in the Indian Collaborative Acute Stroke Study which is a prospective multi-centric study on unselected CT-confirmed cases of acute stroke (less than 72 h) admitted to major university hospitals in India. (Chandigarh, New Delhi, Mumbai, Pune, Bangalore, Chennai, Hyderabad). During the study period, 2002-2004, reliable information was available in 2162 acute stroke cases (CT confirmed). It was evident that the incidence of stroke was rising with advancing age -- the maximum being in the age bands of 41-70 years. Ischaemic strokes were 77%, haemorrhagic strokes were 22% and unspecified accounted for 2% of all cases. The risk factors identified were hypertension alone in 40%, hypertension with diabetes in 25%, and hypertension with other risk factors (raised cholesterol, ischaemic heart disease) accounted for another 20%. Diabetes and ischaemic heart disease alone were present in 5% cases. Thus it is evident that hypertension alone or in combination is a major risk factor associated with stroke and hypertension-stroke control programmes for secondary prevention should be of prime importance. In subgroup analysis of age groups, it was evident that younger subjects (<50 years) from LSEG (Lower Socio Economic Group) attended free hospitals whereas older subjects (>50 years) in USEG (Upper Socio Economic Group) went to private medical facilities. This may also reflect admission sample bias. Due to this bias correct estimates are not possible in hospital-based studies, suggesting the need for prospective representative population based surveys.

WHO Mumbai Stroke Registry (2005): Annual incidence of CVD per 100,000 per year, using verifiable methods...

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from different parts of India are scarce. For example, population based Vellore (India) stroke study (1969-71) quotes an annual incidence of 13/100,000 persons;* the WHO Rohtak (India) study (1971-74) quotes an annual incidence of 33/100,000 population for all ages and 356/100,000 population for those above the age of 70 years. On the other hand, recent prospective population based Mumbai Stroke Registry (2005) using standardized WHO STEPS Stroke protocol (version 2.0) registered an overall annual incidence of 148/100,000 /per year. (CI 95%: 120-170; age-adjusted SEG1–154/100,000, age-adjusted WHO-162/100,000).† Of 232 new stroke cases, 147(63.3%) were hospitalized whereas 85(36.6%) cases preferred domiciliary care. Of these 85 cases, 48 (21%) were treated at home and 37 cases (16%) were treated in nursing homes. The mean age was 67.7 yrs (SD = 11.89); women were older as compared to men (mean age 69.9 yrs SD± 11.65 versus 65.9 yrs SD± 11.84, respectively). CT scan data were available in 197 (85%) cases, by diagnostic tests 180 (77%) had ischemic strokes, 47 (21%) had hemorrhagic CVD and 5 (2%) were of unspecified type. There was no gender difference. Case control analysis by logistic regression model revealed that hypertension alone and in various combinations was a major risk factor in 102 cases (p=0.0006; OR 2.54, 95% CI 1.49-4.34). At 28 days after a new stroke, 146 (63%) of 232 cases were alive whereas 86 (37%) died; 50 (21%) of 86 were stroke related deaths and 36 (16%) were non-stroke deaths. Of surviving 146 patients, 73 (31.4%) had moderate to severe disability.

Available data on annual incidence rates from other population based studies from developed and developing nations report age-standardized incidence rates for strokes per 1000 persons at 2.1 for Takashima, Japan, 1.35 for China, 3.28 for Korea, 1.4 for Auckland (New-Zealand), 2.1 for Melbourne (Australia), 1.6 for Martinique (French West Indies), 1.40 for Chile. †† The incidence rate of 1.4/1000 persons for Mumbai, is broadly in agreement with the published incidence rates worldwide, suggests that India is already facing stroke epidemic. National programmes for control of risk factors and primary and secondary prevention are urgently needed. It needs to be emphasized that, on account of scarce resources, modern stroke-care (intensive units, neuro-imaging, thrombolytics etc) for evaluation and account of scarce resources, modern stroke-care (intensive units, neuro-imaging, thrombolytics etc) for evaluation and management is beyond the reach of patients in developing nations. †† The ethics and dilemmas of diverting scarce health care resources from control of infectious and nutritional disorders to control of cardiovascular diseases and stroke has been greatly debated. ‡‡

Hypertension and Stroke: Hypertension alone or in various combinations has been a major risk factor in ischaemic and haemorrhagic strokes. The ICMR multi-centric prospective case control study of ischaemic strokes revealed that i) hypertension, ii) raised blood sugar, iii) tobacco use, and iv) low haemoglobin as important risk factors (SPSS Discriminant analysis). ‡‡‡ The relationship between blood pressure and ischaemic stroke has been firmly established. For example, at mean diastolic blood pressure (DBP) of 91 mmHg the relative risk (RR) of getting stroke is 1, whereas at mean DBP of 98 mmHg the RR is 2 and at mean DBP of 105 mmHg the RR is 4. ‡‡§ In general, the RR of stroke increases three to five fold with rising DBP values. Furthermore lowering blood pressure under 140/85 mm Hg reduces the RR of stroke by 43% (95% CI 30-54). ‡‡Ⅲ In a combined metaanalysis of randomized trials (Hypertension detection and follow-up programme co-op group (HDFP), Medical research council hypertension trial (MRC), Stroke prevention with antihypertensive drug (SHEP), Swedish trial in old patients with hypertension (STOP-HI) to judge vascular endpoints (fatal and non-fatal) with antihypertensive drug treatment, only 525 strokes occurred in 23,847 treated subjects whereas 835 events were recorded in 23,806 control subjects; thus there was 38% RR reduction (95% CI 31%-45%) in favour of treated group. ‡‡Ⅳ Thus, lowering blood pressure reduces the risk of stroke and it is postulated that 10 mm reduction in systolic pressure (SBP) would result in 28% reduction in risk of recurrent stroke. ‡‡Ⅵ This is well borne out by recent studies like HOPE study, ‡‡Ⅷ PROGRESS study ‡‡Ⅸ and LIFE study. ‡‡Ⅹ

Community screening programmes are therefore vital to detect subjects having high blood pressure and advocate anti-hypertensive therapy to prevent stroke. The WHO community screening survey for hypertension‡‡‡‡ in Mumbai revealed that 15% of population was hypertensive (SBP/DBP >160/95 mmHg). In this study, crude prevalence rate for recent stroke events was 82/100,000 in normotensive subjects, whereas it was alarmingly high at 1126/100,000 in hypertensive subjects-almost 12 times higher! Similar surveys in different parts of India suggest that hypertension is a major silent killer. Recent editorial in JAPI‡‡‡ reported that hypertension (SBP/DBP 140/90 mmHg or >160/95 mmHg) was undetected and untreated in nearly 50% of subjects and in the remaining 50% it was poorly controlled (“Rule of Halves”). In other words “half of most common chronic disorders are undetected and half of those detected are not treated and that half of those treated are not controlled: the rule of halves”. And yet, in a study on compliance of a community to mass screening for casual hypertension and stroke prevention‡‡‡‡ it was found that 65% of original population complied for resurvey and appeared motivated for intervention. This is encouraging and suggests that health visitors or multipurpose worker should remain in constant contact with hypertensive or “stroke prone” (TIA with hypertension) subjects to ensure regular intake of medication.

CVD epidemics are emerging in most developing nations including India whereas CVD morbidity/mortality rates are declining or stabilizing in developed countries. ‡‡‡‡‡ Murray and Lopez reported projected estimates for 2020-61 million DALYs likely to be lost due to stroke, of these 52 million (84%) will be in the developing countries. ‡‡Ⅱ It has been postulated that intervention strategies with control of risk factors can achieve 2% reduction per annum in stroke mortality, over and above what will be achieved by “better case management”. ‡‡Ⅲ However, there is paucity of reliable and comparable data on stroke incidence, prevalence,
clinical profile, trends, management and outcome to design sustainable primary or secondary prevention strategies. Population based screening surveys are mandatory.

On the other hand, risk factors for CVD are mainly conventional. Intervention to reduce exposure to raised blood pressure, diabetes mellitus, smoking, high cholesterol, and physical inactivity will prove rewarding. Health education on low salt intake and stopping tobacco use (smoking and chewing) are cost effective methods.

In a review of epidemiology of hypertension in developed and developing countries including India, Joshi and Parikh have pointed out that with current rising incidence of hypertension, India will possibly have largest number of hypertensive subjects. They have raised a timely warning on intervention programmes on detection and prevention of hypertension. Therefore hypertension–stroke control programme is of paramount importance in primary and secondary stroke prevention. National Health Policy in support of above objective is highly recommended.

REFERENCES