Facing the stroke burden worldwide

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Age-standardised stroke incidence and mortality are declining substantially in high-income countries. However, 70% of strokes and 87% of both stroke-related deaths and disability-adjusted life-years occur in low-income and middle-income countries (LMICs), in which people have proportionally more haemorrhagic strokes and on average die of stroke at a younger age.[1] To allocate resources to deal with stroke burden in LMICs, appropriate knowledge of local stroke incidence, risk factors, and prevalence, as well as the strength of association between these factors, is needed. Additionally, information about in-hospital and long-term determinants of lethality and disability are required. No single study can provide complete information for all countries. Although robust observational studies are shedding light on some of these issues, we still need to integrate the information from several publications. In *The Lancet Global Health*, Pablo Lavados and colleagues present the results of the ÑANDU study—a prospective, population-based study in which the authors gathered data on all fatal and non-fatal strokes, hospital admissions, and community events for 1 year across the region of Ñuble in the central plains of Chile.[2] The mean age of patients with first-ever stroke was 70·3 years (SD 14·1) and 443 (49·8%) were women. The results have important implications for local health policies. At 6 months after stroke, 55·9% (432 of 773) of patients had died or were disabled, which increased to 61·0% (456 of 747) at 12 months. The proportion of patients who had died or were disabled at 12 months, and the poor quality of life reported in survivors, should lead to better hospital and home care strategies and the implementation of a stronger rehabilitation system.

The INTERSTROKE case-control study included 13 447 patients with stroke and 13 472 controls in 32 countries. It concluded that ten risk factors were responsible for 90% of stroke events. Those risk factors had a high prevalence, were easy to identify, and are potentially treatable.[3] INTERSTROKE investigators also reported that patients in LMICs had more severe strokes with a higher proportion of intracerebral haemorrhages, had poorer access to health services, and received fewer investigations and treatments. Access to a stroke unit was associated with improved use of investigations and treatments, greater access to rehabilitation services, and improved survival without severe dependency.[4] However, due to the study design, INTERSTROKE cannot provide incidence estimates.

The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) provides stroke estimates for incidence, age-specific mortality rates, years of life lost due to premature mortality, and years lived with disability for most countries. They use available data sources, assess the quality of the data, and correct the data for known bias. In 2016, there were 5·5 million deaths due to stroke and an important decrease in the mortality of 36·2% from 1990 to 2016 (and 51·9% for Chile).[5] In 2019, stroke was the second leading cause of disability-adjusted life-years worldwide in both the 50–74 years and 75 years and older age groups.[6] However, GBD estimates use extrapolation for countries for which data are limited—most of these countries are LMICs—and additionally, they do not provide estimates of risk factor attributable risk.

The PURE study was an international cohort of the general population aged between 35 years and 70 years enrolled in 21 countries.[6] In a publication including 155 722 participants without a baseline history of cardiovascular disease, with a mean follow-up of 9·5 years, they estimated a population attributable fraction of behavioural, metabolic, socioeconomic, and psychosocial factors plus grip strength and ambient pollution. Hypertension had the largest population attributable fraction for stroke followed by household air pollution, poor diet, and diabetes. However, household air pollution, poor diet, and low education level made a larger contribution in LMICs than high-income countries.[7] Additionally, in Latin America, 54% of the patients with a history of stroke in the baseline assessment of the PURE cohort did not receive any medication with a proven effect on the prevention of new outcomes.[8]

Many questions are still unanswered or only partly answered and we require additional studies to confirm initial reports. Risk factor prevalence and the strength of their associations with stroke incidence and mortality are well described in high-income countries, but data for LMICs are scarce. The information needed to assess the role of risk factors in premature stroke incidence and

mortality is crucial. Also, the finding that almost a fifth of strokes were attributable to concentrations of particulate matter with a diameter of less than 2·5 μm in the PURE cohort requires further study, given the complexity of properly assessing in-house and ambient air pollution.[9] We also need to identify institutional, medical, and in-house stroke care interventions that improve prognosis and test them in several resource settings.

The Article by Lavados and colleagues provides important information.[2] The increased incidence of ischaemic stroke, compared with the GBD estimate for Chile, should lead to strengthened preventive strategies. The study showed that high-quality epidemiological research can be done in limited-resource settings if scientifically sound methods are followed. Finally, the need to accurately assess the effect of health-care interventions in stroke incidence and prognosis will require future studies using similar methods in the same setting, with a detailed assessment of the care delivery process.

We declare no competing interests.

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