Commentary: Time for a re-assessment of the incidence of intentional and unintentional injury in India and South East Asia

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In this issue of International Journal of Epidemiology, Gajalakshmi and Petö publish their results from a community study of deaths from injury in a rural district of Tamil Nadu, south India. The results reported are just one component of a large verbal autopsy study in which families were interviewed about the cause of death of 38,836 people. The study adds greatly to our knowledge of the epidemiology of injury in rural South Asia.

The authors found that 7167 (18.5%) of 38,836 deaths in Villupuram district (population 2.5 million) were due to injury—an incidence of 130/100,000 per year, with incidences in men and women of 160 and 98/100,000, respectively. Intentional self-harm was responsible for 3429 (47.8%) of these deaths—an incidence of 62/100,000 per year (men 71, female 53). The most common method was self-poisoning (nearly always with pesticides), responsible for 53% of deaths. Hanging caused 34% and burning 13% of self-harm deaths. Three-quarters occurred in the 15–44 age group. This rate of fatal self-harm is dreadful—it is more than five times the rate in western countries and almost three times the rate in China.1,2

Gajalakshmi’s and Petö’s results are very similar to those of the excellent prospective community study being run by the Christian Medical College, Vellore, in the Kaniyambadi Block of Tamil Nadu (Figure 1).3–5 In these 85 villages (population 108,000), injury causes 18.9% of deaths with an incidence of 137/100,000 per year. Self-harm is responsible for a higher proportion compared with Villupuram—60% vs 48%—but hanging and poisoning are, again, the most common means, causing more than 85% of self-harm deaths.3,5 It is possible that the rates of self-harm are higher due to a reporting bias in Villupuram. Since suicide is still illegal in India,6 the fact that the recorders in Kaniyambadi were local people, living in the village, rather than outsiders visiting the village, may have meant that the recorders were able to perceive more accurately whether the deaths were due to self-harm or not.

The incidence of both injury and intentional self-harm in these community studies are much higher than generally reported for India. For example, extrapolation of the Villupuram findings to the 2005 population of India (1.093 billion7) suggests that around 1.42 million deaths may occur from injury each year in India. This contrasts with recent WHO estimates of 1.47 million deaths from injury in the whole South East Asia region (population 1.59 billion8) and suggests that the latter is likely to be an underestimate. Efforts to prevent deaths from injury in Asia will be hindered by inaccurate estimates of incidence.9

Both studies were set in rural India in which vehicles and road traffic injuries are less common than in urban areas. For example, deaths from road traffic injuries in the Kaniyambadi block make up only 12.9% of injury deaths.5 Although detailed community studies of injury deaths in Indian cities have not been done, the importance of road traffic injuries in urban India is starkly shown in a study from Chandigarh in which 50.3% of judicial post-mortems (2982/5933) were performed for road traffic injuries compared with just 10.5% for poisoning.10

However, it is not just the incidence of road traffic injuries that differs between urban and rural areas. In North Central Sri Lanka, road traffic crashes are responsible for 10.8% of injury deaths compared with death from the consumption of pesticides, which are responsible for 28%. However, animals (particularly elephant attacks and snake bite) are responsible for two-thirds as many deaths as road traffic in this rural area (7.6%; M. Eddleston, unpublished data).

Road traffic injuries are likely to be underestimated when extrapolating rural data to the Indian nation. However, if global estimates on deaths from road traffic crashes11 are based on data from urban areas, the number of road traffic deaths will be markedly overestimated. A clear answer on the national importance of various forms of injury are not going to be available until more detailed community studies of injury deaths are done across representative rural and urban regions of India. The RGI-CGHR Prospective Study being performed by Gajalakshmi and colleagues12 may well provide us with the data to allow generation of more accurate estimates.

The commonly cited figure of 100,000 deaths each year from suicide in India1,13 is based on government statistics.14 However, Gajalakshmi and Petö extrapolate their results to the Indian nation and suggest that as many as 686,626 suicides occur in India every year. Again, it is not clear whether extrapolation of this data from rural south India to the nation is reasonable. However, this number does suggest that the current estimate is far too low.

Around 50% of self-harm deaths in the two studies were due to pesticide ingestion. Pesticide poisoning is a rural problem and
may well be responsible for the higher rate of suicide found in rural areas of Asia compared with urban parts.\textsuperscript{2,15} Since access to pesticides is lower in urban areas of India, the real national number of suicides is likely to be somewhat lower than 686,626. However, many Indians live in rural areas\textsuperscript{16} with easy access to pesticides. It is unclear whether rates of pesticide self-harm vary across the country—high suicide rates have been noted amongst farmers in many States.\textsuperscript{17} In addition, it is possible that the rate of fatal pesticide self-poisoning in rural north India is actually higher than in the south due to the common ingestion of the highly toxic pesticide aluminium phosphide for self-harm.\textsuperscript{18} Organophosphorus pesticides are the commonest pesticide ingested in the south and around 70–80% of patients presenting to hospitals will survive;\textsuperscript{19} in contrast just 20–30% of aluminium poisoned patients presenting to hospital survive.\textsuperscript{19} Thus, it seems likely that pesticide self-poisoning will be found to be a major cause of fatal self-harm across the country.

More community studies are also required across other Asian countries. While the incidence of fatal pesticide self-poisoning in rural Sri Lanka is similar to the incidence reported here,\textsuperscript{20} the incidence of injury and pesticide poisoning in Bangladeshi women seems to be lower than that found in Tamil women.\textsuperscript{21}

The World Health Organization estimated in 1990 that around 200,000 people die each year from pesticide self-poisoning—more than 90% from self-harm and more than 99% in the developing world.\textsuperscript{22} Despite these alarming numbers, very little

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\textbf{Figure 1} A map of India with a detail of the state of Tamil Nadu (shaded). The lower section shows the districts of Tamil Nadu and the locations in which the two community-based injury studies have been performed. Clearly, the two studies are from two very similar locations in just one state. More studies are required from across India to better describe the patterns of intentional and unintentional injuries in the country as a whole.
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has since been done about pesticide self-harm. Four years ago, Michael Phillips and colleagues published the results of their study of a representative sample of self-harm deaths in China. They found that pesticide ingestion caused 62% of deaths from self-harm. With an estimated annual incidence of 287,000 self-harm deaths, pesticides may be responsible for around 175,000 deaths in China alone. Taking these deaths into account, and studies that suggest that around 60% of self-harm deaths in Asia are due to pesticides, we have estimated that at least 300,000 deaths occur from pesticide self-poisoning in the Asia Pacific region each year. However, if the findings of these studies from rural Tamil Nadu are replicated across India, then this number may still be a seriously underestimated figure by hundreds of thousands of deaths, reinforcing the urgent need to develop a comprehensive public health approach to this major public health problem.

Studies are required to find ways to bring down the number of deaths from self-harm in rural Asia. Current strategies for global suicide prevention are based on research performed in industrialized countries, yet the risk factors for fatal self-harm in rural societies may well be quite different. In particular, pesticide self-poisoning is now considered by the WHO to be the commonest method of fatal self-harm worldwide, but is rarely seen in the West. It seems likely that reducing the toxicity of widely available pesticides, improving their storage, and improving medical management will reduce the number of deaths, but studies are needed to fully assess the public health and agricultural effects of this approach and whether people who can no longer kill themselves with pesticides will then jump into a well or hang themselves. Until studies of risk factors and interventions are done in rural Asia, we will not know how to prevent deaths or whether interventions to prevent suicides transposed from the West will be effective in these regions.

India is a huge country, with around one-sixth of the world’s population and two-thirds of the WHO South East Asia region’s population. Major revisions of the estimated incidence of injury in India will have profound implications for regional and global public health. More high quality studies, like those of Gajalakshmi and Peto and of the Christian Medical College, Vellore, are urgently needed to better assess the incidence of both intentional and unintentional injury across the region.

Acknowledgements
We thank David Gunnell and Srijit Mishra for their comments. ME is a Wellcome Trust Career Development Fellow, funded by grant GR063560. The South Asian Clinical Toxicology Research Collaboration is funded by a Wellcome Trust/National Health and Medical Research Council International Collaborative Research Grant GR071669.

References


