

From pesticides to medicinal drugs: time series analyses of methods of self-harm in Sri Lanka

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Objective To explore if recent changes in methods of self-harm in Sri Lanka could explain the decline in the incidence of suicide.

Methods Time series analyses of suicide rates and hospitalization due to different types of poisoning were carried out.

Findings Between 1996 and 2008 the annual incidence of hospital admission resulting from poisoning by medicinal or biological substances increased exponentially, from 48.2 to 115.4 admissions per 100 000 population. Over the same period, annual admissions resulting from poisoning with pesticides decreased from 105.1 to 88.9 per 100 000. The annual incidence of suicide decreased exponentially, from a peak of 47.0 per 100 000 in 1995 to 19.6 per 100 000 in 2009. Poisoning accounted for 37.4 suicides per 100 000 population in 1995 but only 11.2 suicides per 100 000 in 2009. The case fatality rate for pesticide poisoning decreased linearly, from 11.0 deaths per 100 cases admitted to hospital in 1997 to 5.1 per 100 in 2008.

Conclusion Since the mid 1990s, a trend away from the misuse of pesticides (despite no reduction in pesticide availability) and towards increased use of medicinal and other substances has been seen in Sri Lanka among those seeking self-harm. These trends and a reduction in mortality among those suffering pesticide poisoning have resulted in an overall reduction in the national incidence of accomplished suicide.

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Introduction

Although adoption of new modes of self-harm by a population does not occur often, when it does happen it can have an impact on the incidence of suicide in that population (in this article we use the word suicide only to mean death by self-harm, excluding failed attempts at fatal self-harm). Many such changes result from reduced access to a means of suicide.¹ In the United Kingdom of Great Britain and Northern Ireland, for example, the removal of carbon monoxide from the gas supply was associated with a reduction in the overall suicide rate.² Introduction of catalytic converters, which reduced the amount of carbon monoxide emitted by car exhausts, was also associated with a fall in the overall incidence of suicide.³

Sri Lanka is a developing country that once recorded very high suicide rates. During the period from 1985 to 1989, for example, the national suicide rate for males was the second highest in the world.⁴ Before 1960, hanging was the commonest method of suicide in Sri Lanka. In the 1960s, 75% of all suicides by poisoning were caused by ingestion of acetic acid, which was used in rubber processing.⁵ The national incidence of suicide rose rapidly between 1970 and 1995 and peaked at 47.0 suicides per 100 000 population in 1995.⁶ This increase, which was mainly attributable to pesticide-related deaths, coincided with the increasing pesticide imports that followed the adoption of open economic policies in 1977.

Since 1995 the incidence of suicide has gradually declined in Sri Lanka,⁷ although this encouraging trend has gone almost unnoticed. Globally, most suicides in low- and middle-income countries are caused by pesticide poisoning.⁸ It is estimated that 300 000 people die annually in Asia from pesticide ingestion.⁹ The general means of self-poisoning is very different in high-income countries, where analgesics, tranquillizers and other medicinal drugs are commonly used in overdose.¹⁰ Compared with pesticides, many such drugs are

relatively non-toxic.⁸ The much higher case fatality rate (CFR) from pesticide poisoning (compared with that of medicinal drug overdose) is a major contributor to deaths from suicide in developing countries.^{11,12}

In the absence of any restriction on the availability of the methods previously used, method substitution in self-harm (i.e. the abandonment of one common method of self-harm and its substitution with another method) has not been widely reported. Although, as in many developing countries, pesticide poisoning is a major cause of death in Sri Lanka,^{8,13} medicinal drugs were found to be the commonest substances used by the self-poisoning patients investigated at a tertiary care hospital in the city of Colombo in 2007.¹⁴ We set out to investigate recent changes in the methods of self-harm in Sri Lanka – particularly the changes in the methods employed by people attempting suicide – and to explore if such changes could explain the substantial decline in suicide rates.

Methods

Data were collected for the period from 1995 to 2009. Data from the records of the Sri Lanka police force were used to calculate annual incidence rates of suicide. As a coroner's inquest is conducted into every unnatural death in Sri Lanka, the police records on suicides were viewed as comprehensive. The data collected were for suicide by any method, suicide by poisoning and suicide by any method other than poisoning. Until the year 2002, when a new coding category was introduced, the cause of large numbers of unnatural deaths was simply classified as "other means". Since the results of previous studies indicate that most such deaths by "other means" were the result of poisoning,^{6,15} they were all attributed to poisoning in the present analysis. Annual health statistics from the national ministry of health were used as the source of data

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