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Choice of poison for intentional self-poisoning in rural Sri Lanka

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Abstract

Background—Although intentional self-poisoning is a major public health problem in rural parts of the Asia-Pacific region, relatively little is known of its epidemiology. We aimed to determine why Sri Lankan self-poisoning patients choose particular poisons, and whether acts of self-harm with highly dangerous poisons were associated with more premeditation and effort.

Methods—We interviewed 268 self-poisoning patients presenting to two district general hospitals in rural Sri Lanka.

Results—85% of patients cited easy availability as the basis for their choice of poison. There was little premeditation: more than 50% ingested the poison less than 30 minutes after deciding to self-harm. Patients had little knowledge about treatment options or lethality of the poison chosen. We found no difference in reasons for choice of poison between people ingesting different poisons, despite marked differences in toxicity, and between people who died and those who survived.

Conclusions—Poisons were chosen on the basis of availability, often at short notice. There was no evidence that people using highly toxic poisons made a more serious or premeditated attempt. Restrictions on availability of highly toxic poisons in rural communities must be considered in strategies to reduce the number of intentional self-poisoning deaths in the Asia Pacific region.

Introduction

Intentional self-poisoning is a major public health problem in the Asia Pacific region, with at least 300,000 deaths a year.^{1,2} Despite the scale of the problem, relatively little is known about the epidemiology of, or reasons for, fatal self-harm in these communities. The reasons most commonly stated for the large number of self-harm deaths relate to mental illness associated with war, poverty, unmet expectations, and changing or breaking down of local cultures.^{1,3}

At least part of the problem seems to be the common use of highly toxic poisons, in particular pesticides, for acts of self-harm. Therefore an alternative hypothesis for the high number of deaths is the increased availability of toxic pesticides in households with the

Green revolution. The increase in suicides in Sri Lanka over the last 50 years mirrors the increased use of pesticides in agriculture and self-poisoning.⁴

To find out why people chose particular poisons, and whether more thought and effort was put into acts of self-harm with highly toxic poisons, we interviewed patients recruited to a study in Sri Lanka. Because of their differences in case fatality, we were particularly interested to interview patients with pesticide, oleander, and medicine poisoning (case fatality 15%, 8% and <1%).⁵ We believe that this information will be useful to guide strategies for reducing fatal self-harm in the region.

Methods

As part of a prospective study in two Sri Lankan general hospitals, study doctors interviewed patients on the medical ward. Inclusion criteria for interview was that the patient had been admitted within the last 48hrs, was alert and conscious, willing to be interviewed, and had given consent to a randomised controlled trial (RCT) of activated charcoal (Carbomix, Norit, NL) in the management of acute self-poisoning. Ethics approval was obtained from Oxford and Colombo.

Interviewers administered a structured questionnaire; all questions were open except that addressing expected outcome. This was changed after the first 47 patients from a simple live/dead outcome to one used in previous work on paracetamol poisoning⁶ to better assess the patient's understanding of the likely effects of self-poisoning.

Results

We interviewed 268 patients who were conscious soon after admission and willing to be interviewed about their reasons for choosing the poison they had ingested. They had ingested oleander seeds (137), paraquat (24), pesticides other than paraquat (41), medicines (63), or others poisons (1 hydrocarbon, 1 alkali, 1 plant). With only one patient in each of these groups, these three patients are not analysed with the patients in the four poison categories.

Not all patients could be interviewed – we saw a selected opportunistic sample of patients based on their medical fitness, willingness to enter the trial and be interviewed, and the staff time and availability to carry out the interview. Inevitably, this resulted in selection bias against more severely ill patients and those under the influence of alcohol (almost exclusively male). The 268 patients differed from the whole population of poisoned patients by being more likely to be female, young, have ingested poisons other than non-paraquat pesticides, and survive (table 1).

Choice of poison

The stated reasons for choosing particular poisons were similar: >75% of patients using each substance cited easy availability (often in the home) or lack of an alternative as the reason for their choice (table 2). Only rarely was the poison chosen because it was considered either harmless or lethal.

The majority of poisons were obtained from the house or close neighbourhood. 40% of oleander-poisoned patients found the seeds in their own garden; an additional 37% obtained them from their neighbour's garden or nearby roads. Only 9% travelled more than one kilometre to obtain seeds. Similarly, the majority of patients ingesting paraquat, pesticides or medicines (75%, 71%, 84%, respectively) obtained the poison from their home. Few

patients (17%, 20%, and 16%) had bought the poison from a shop for the attempt. The particular pesticide was sometimes chosen by the shop assistant.

Premeditation

There was little premeditation for many patients. More than half of people using each poison ingested them after less than 30min of thought, often straight after an argument.

Expected outcome

In the 219 patients for whom a graded classification of expected outcome was used, more than half of those ingesting oleander or pesticides (other than paraquat) believed that the poison would kill (table 2). In contrast, only 36% of people taking medicines and 43% taking paraquat believed that they would die.

71% of oleander-poisoned patients knew someone in their family or village who had died after ingesting oleander seeds. In contrast, less than 50% of patients taking any pesticide and only 11% of people taking medicines knew someone who had died due to these poisons.

Knowledge on antidotes for the selected poison

Antidotes exist for poisonings due to oleander, organophosphate, carbamate and propanil pesticides, and paracetamol. However, they are variably available in the hospitals of the North Central Province – an antidote for oleander was only available from March to July 2002⁷. The ideal propanil antidote, IV methylene blue, was never available, while antidotes for OP and carbamate poisoning, and for paracetamol poisoning, were present throughout the study period.

The majority of patients did not know whether there was an antidote for the poison they had ingested. Only 7% of oleander patients had heard of the antidote. 4% and 5% of patients ingesting paraquat or other pesticides thought that antidotes existed. There was poor knowledge about the expected effectiveness of the antidotes.

Choice of poison who those who subsequently died

Thirteen of the 268 patients interviewed died during their admission: five women and eight men, aged from 18 to 60. Eleven (85%) had ingested paraquat; two (15%) had ingested oleander seeds. Since the sample of patients interviewed was systematically biased towards less severely poisoned individuals, we wished to determine whether these patients differed in the reasons for their choice of poison from the whole sample.

Easy availability was again the most common reason given (8/13; 61%). Nine (69%) had obtained the poison from their house or garden while four had bought paraquat from a shop. There was no difference in expected outcome from those who survived: five (38%) thought that the poison would kill them, five (38%) did not know, while three (23%) thought it would have mild short term effects or be completely safe. There was no evidence that the four (31%) patients who bought paraquat from a shop were seeking a particularly lethal poison. Only one thought it would be lethal; the others thought it would be harmless or have mild effects. There was again little evidence of marked premeditation – 7/13 (54%) patients took the poison after less than 30 minutes of thought.

Discussion

There have been no previous studies of poison choice or a patient's understanding of toxicity reported from the developing world. Since poison choice affects outcome, it is important to

find out why people chose particular poisons in a region where so many die from self-poisoning.^{2,5}

Poisoned patients chose their poison on the basis of availability; most had obtained the poison either in or near to their home. Many got hold of it within minutes after little premeditation – more than half of people taking pesticides or oleander had thought about the act for less than 30mins.

There have been two British studies of poison choice, both in acetaminophen (paracetamol) poisoned patients. While Hawton similarly found that most patients chose acetaminophen because of its ready availability,⁶ he also found that 53% of patients bought tablets specifically for the ingestion from nearby shops.⁸ Few patients bought any poison for the self-harm act in Sri Lanka.

30-75% of Sri Lankan patients expected to die, according to the poison ingested. Most patients taking oleander knew someone who had died from oleander poisoning. However, less than 50% of paraquat-poisoned patients knew someone who had died from it, or thought they would die, despite its high toxicity.

We found no evidence that people who took paraquat were more serious in their act than people taking other poisons. Although only a small sample and with a lower case fatality than normal, these data suggest that not all Sri Lankan patients are choosing paraquat because they believe it to be highly toxic and frequently fatal.

The sample of patients interviewed was biased against more severely poisoned and intoxicated patients. Both features tended to exclude men, as shown by the different ratio of men to women in the interview sample compared to all admissions (0.70 vs 1.37). The above results may therefore only represent less severely poisoned patients.

However, there are reasons why these findings may still have some relevance to more severe poisonings. First, the case fatality was 4.9% in the sample, significantly higher than that seen in industrialised countries.⁹ Second, since the sample was drawn from a secondary referral hospital, the greater severity of the poisonings amongst those included in the sampling frame may compensate for under-sampling amongst very ill patients. Third, we found no difference in reasons either for choosing a particular poison or in expected outcome between the thirteen patients who died from the self-poisoning and those who survived the episode.

Fourth, in a pilot study, we have interviewed on their discharge from ICU pesticide-poisoned patients who were too unwell on admission to be interviewed. Although only a small sample, we have not yet found a marked contrast with the main study. The majority chose the pesticide because of its availability - mostly in the home or fields, with only a few buying it for the attempt. This is similar to a Chinese study of 326 people who had carried out serious but non-fatal acts of self harm.¹⁰ Although 83% had ingested pesticides, 35% reported that they first considered harming themselves 10 minutes or less before making the attempt.

One strategy for reducing the number of deaths from pesticide and oleander self-poisoning includes improving supply and use of antidotes.² A view among some doctors in Sri Lanka has been that antidotes will increase the use of that poison. We did not find any evidence to support this view. Less than 10% of patients had any knowledge about the availability of antidotes for their poison.

These findings support a strategy of limiting easy access to pesticides and oleander, and for improving the supply and effectiveness of antidotes, as a strategy for reducing fatal self-poisoning in rural Asia Pacific.

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Table 1

Comparison of the patients reviewed on admission to hospital and those interviewed in this study.

	All patients	Interviewed patients
<i>n</i> =	2189	268
Male %	57.4	37.1
Age (median, IQR)	25 (19-35)	22 (18-30)
Ingested:		
pesticides other than paraquat %	45.8	16.0
paraquat %	3.2	9.0
oleander %	33.9	51.1
medicines %	9.2	23.5
Case fatality ratio	9.0	4.9

Table 2

Number (percent) of patients giving particular **A.** Reason for choosing the poison and **B.** expected outcome (using the questionnaire of Hawton *et al*).

	Oleander	Paraquat	Other pesticides	Medicines
A. n =	137	23 *	41	49 *
Easy availability	74 (54)	12 (52)	15 (37)	34 (69)
Only poison available	40 (29)	6 (26)	21 (51)	5 (10)
Free/cheap	2 (1)	1 (4)	0 (0)	0 (0)
Lethal	14 (10)	2 (9)	2 (5)	1 (2)
Harmless	2 (1)	0 (0)	0 (0)	1 (2)
Other	5 (4)	2 (9)	3 (7)	8 (16)
B. n =	101	21 **	34 **	61
Cause death	58 (57)	9 (43)	25 (74)	22 (36)
Permanent damage or harmful effects	0 (0)	0 (0)	0 (0)	1 (2)
Harmful but short-lasting effects	3 (3)	1 (5)	3 (9)	3 (5)
Mild short-lived effects	9 (9)	3 (14)	1 (3)	3 (5)
Completely safe	10 (10)	2 (10)	2 (6)	6 (10)
Don't know	21 (21)	6 (29)	3 (9)	26 (43)

* No reason was given by one patient ingesting paraquat and 14 patients ingesting medicines.

** No expected outcome was stated by one patient ingesting paraquat and one patient ingesting another pesticide. Part B of the table excludes the first 46 patients interviewed (36 oleander, 2 paraquat, 6 other pesticides, 2 medicines) because their expected outcome was graded as only survival or death.