Pesticide surveillance and deaths by suicide

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Highly hazardous pesticides are among the leading causes of death by suicide in low-income and middle-income countries. National bans on these products have led to substantial reductions in pesticide-attributable deaths in many countries and, in some nations, falls in overall suicide mortality.[1] These bans are a potentially cost-effective and affordable intervention for reducing suicide deaths in countries with a high burden of suicide deaths attributable to pesticides.[2] In *The Lancet Global Health,* Nicholas Buckley and colleagues document not only a decline in overall case fatality of pesticide poisoning from 10·5% for 2002–06 to 3·7% for 2013–19 in Sri Lanka coincident with its nationwide bans, but also how human data for toxicity can facilitate further reductions in these deaths.[3] These data spanning 18 years offer four distinctly valuable lessons to reduce global suicide deaths.

First, Buckley and colleagues highlight the high case fatality (7·2–8·6%) in episodes of poisoning with five commonly ingested pesticides, which together account for nearly a quarter of pesticide deaths in Sri Lanka since 2013. Notably, these five pesticides are class II products according to WHO's hazardous pesticide classification, which is based primarily on acute oral and dermal toxicity in rats.[3,4] Buckley and colleagues argue that many more lives could be saved worldwide if human data for the toxicity of pesticides after ingestion were used for hazard classification and regulatory action, in addition to the current basis for this classification. They suggest eliminating all pesticides with a case fatality of more than 5%. Such an approach would have averted the many thousands of deaths worldwide from paraquat, a commonly used herbicide classified as class II by WHO, but with a case fatality in humans of more than 40%. These findings exemplify WHO guidance to pesticide regulators to identify and act on the pesticides most commonly used in fatal self-poisoning.[1]

Second, the marked reduction in suicide deaths from pesticide poisoning in Sri Lanka shows the potential of a data-driven approach based on good quality surveillance. The pesticides that were banned in Sri Lanka included those that contributed the most to poisoning deaths at any particular time, in addition to those categorised as most hazardous by WHO.[3,5] A key strength of Buckley and colleagues' study is their prospective collection of data for all hospital admissions for acute pesticide poisoning, with careful identification of the specific pesticide involved.[3] Such detailed interview-based surveillance might not be feasible in many settings. However, urgent attempts are needed to improve the identification and documentation of the pesticides involved in poisoning episodes in hospital records, as part of routine injury surveillance in countries with the highest numbers of suicide deaths by pesticide poisoning.[6] Such data have facilitated Sri Lanka's bans on the pesticides accounting for the most deaths and provided credible evidence of the effectiveness of pesticide regulation in reducing not only pesticide suicide deaths but also overall suicides, despite a small rise in suicide deaths via other methods.[5] As similar preventive actions are taken in countries with a substantial burden of pesticide suicide mortality, good quality surveillance is also needed to monitor, and facilitate public health responses to, the potential substitution of pesticides with different methods of suicide with a higher lethality, in addition to monitoring the change in pesticide-related suicide deaths.[5,7]

Third, the fall in case fatality over time for poisonings due to several specific pesticides in Sri Lanka highlights the potential impact of improved medical management of poisoning on mortality. Buckley and colleagues note the availability of more emergency departments, postgraduate training in toxicology, updated treatment guidelines, and wider availability of antidotes in Sri Lanka over the study period.[3] Data from several low-income countries highlight the limited and variable availability of treatment resources for managing poisoning,[8,9] flagging the potential for improvements in care alongside pesticide regulation in averting deaths from pesticides.

Lastly, credible evidence now exists from many countries that national bans on hazardous pesticides have resulted in fewer suicide deaths without affecting agricultural yield. Previously favoured policies of advising farmers to store their pesticides securely have not been shown to be effective.[10] Pesticide registrars and regulators have a key role to play in suicide prevention as restricting access to hazardous pesticides is an opportunity to save many

lives.[1] Ministries of agriculture in countries with a high burden of pesticide mortality, in consultation with ministries of health and farmers, now need to act on this evidence by implementing bans on hazardous pesticides.[10] Efforts to improve the quality of surveillance that provides ongoing credible data to act upon is an investment that is urgently needed to prevent deaths by suicide in these countries.

DG was an expert adviser to WHO's Consultation on cost-effectiveness of suicide prevention interventions, including pesticide regulation (2019). He provided technical assistance for the development and publication of a WHO resource tool for suicide prevention: a resource guide for pesticide registrars and regulators (2019). He was a member of the scientific advisory group for a Syngenta-funded study to assess the toxicity of a new paraquat formulation (2002–06); a member of the scientific advisory group for a pesticide storage project funded by Syngenta (2005–07); and chaired the data monitoring and ethics committee for a Syngenta-funded trial of the medical management of paraquat poisoning (2007–10); he received travel costs to attend research meetings but no other fees. DG was also an expert adviser to WHO's First Consultation on Best Practices on Community Action for safer access to pesticides (2006). RD declares no competing interests.

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