



CASE REPORT

Organophosphate Poisoning and Suicide in Nepal: A Reflection on the limitations of Behavioral Health Resources

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Abstract

Background: Organophosphate poisoning is the most common cause of suicide attempt in Nepal. Mortality rates of organophosphate poisoning are 41 times higher than they are in the United States, even with appropriate treatment. In low middle income countries organophosphate poisoning is much more prevalent than any other forms of suicide due to the easy availability in these agricultural countries. The most common cause of organophosphate poisoning for intentional suicide is from depression. Social reforms within the country to address the stigma related to mental health problems and improved data collection on suicide information should lead to enhanced public health programs to address the underlying mental health problems facing this population.

Conclusions: The lack of mental health services in Nepal, compounded with a readily available means to carry out suicide, has bred an intentional OPP endemic in Nepal. It is imperative that federal regulations on organophosphate availability in a country that so heavily depends on its use for sustenance, be incorporated to combat its abuse as a means to carry out suicide.

Introduction

Organophosphates are the most commonly used form of pesticide in rural Asia, therefore is readily available in the local population of agricultural countries. Organophosphate pesticide poisoning is a prevalent emergency care problem found in Nepal. Since Nepal is primarily an agricultural country and organophosphate pesticides are prevalent throughout the region,

poisoning is a much more common problem here as a low middle income country (LMIC) compared to more developed countries such as the United States. Worldwide there are approximately 3 million cases per year of organophosphate poisoning, which is almost uniformly from self-poisoning suicide attempts revealing a mortality ranging from 6 to 30% in LMIC [1-4].

Suicide has now become the number one cause of unnatural death in Nepal noting 5,317 people committed suicide in the fiscal year 2017-2018 [5]. It has been reported that there are nearly 15 suicides in Nepal each day according to Nepalese police [5]. The most common cause of suicide attempts are related to depression, but due to the social stigma of mental disorders these people are often untreated and there are limited public resources available for psychiatric conditions, such as depression and suicidal ideation [6,7]. There is a slight increase in predominance for men over women in these organophosphate suicide attempts, but suicide represents the number one cause of death for young females between 15 and 49 years of age [2]. In the most recent World Health Organization (WHO) report, Nepal ranks 7th in overall suicide globally [8], but is the 3rd highest country in suicide for women and the 17th highest for men [8].

There is a significant problem with underreporting of suicide and suicide attempts within the country. This is due to the common misconception that suicide at-



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tempts are illegal within Nepal, therefore attempts are made to avoid any potential reporting to the police who are primarily responsible for collecting these statistics within the country [9]. In fact, there is no law against suicide attempts but there clearly still remains a significant social stigma leading to social isolation and denigration of individuals with mental health problems, including depression, psychotic disorders and suicidal ideations [2]. With organophosphate poisoning as the clear leader in utilization for suicide attempts, ready access to this pesticide is the main reason that it has such an astronomically higher incidence in LMIC compared to developed countries such as the United States. Organophosphates are not readily available in the US and cannot be purchased over the counter at retail stores for public use but commonly are available throughout Nepal and other LMICs.

Discussion

OPP represents approximately 0.9-1.0% of the patient admissions to hospital emergency departments within the country. This compares to an incidence of approximately 1 out of every 2 million patients in the US presenting to emergency departments therefore realizing an incidence 18,000 times greater in Nepal than in the US. The management of OPP requires prompt identification of toxin and rapid administration of atropine to counteract the cholinergic crisis of OPP. Further management requires adequate supportive care including IV fluids, airway management, seizure control and Pralidoxime to reactivate acetylcholinesterase.

Suicide continues to be a significant but largely preventable public health issue in Nepal. The readily available organophosphate pesticides are the most common form of suicide attempt and poisoning within the country. As one of the leading countries in successful suicide throughout the world, particularly with a much higher incidence within the female population than most countries, a comprehensive national suicide-prevention program needs to be developed. In coordination with local civic and community leaders, the government of Nepal must develop clear action plans and interventions to address these social cultural issues leading to this significantly high suicide rate. As Luitel, et al. explain in their *Mental Health update in Nepal; Mental health problems are highly stigmatized in the community. No mental health awareness programs have been carried out in the public health system* [10].

The lack of mental health services and stigmatization of suicide in Nepal have been a clear driving force of Organophosphate abuse as means to carry out suicide. In addition, Nepal's status as an agrarian society has further facilitated the suicide endemic, making the herbicide readily available.

Agriculture remains Nepal's principal economic activity, employing 80% of the population [11]. In com-

parison, less than 2% of the United States population farms. Yet in the United States, the U.S. Environmental Protection Agency (EPA) has taken steps to limit the availability of organophosphate to the American public, asking manufactures to voluntarily eliminate its use for residential purposes due to its potentially hazardous side effects [12]. Such regulations do not exist in Nepal, as organophosphates can be purchased legally by anyone, for any reason.

Restricted access to organophosphate pesticides needs to be strongly considered to reduce the availability of this most common cause for Nepalese suicide. Furthermore, national campaigns addressing the social stigma of depression, mental illness and other disorders could provide increased access to resources and healthcare programs with successful management of these disorders commonly leading to excessive suicide attempts within the country.

Conclusion

The lack of mental health services in Nepal, compounded with a readily available means to carry out suicide, has bred an intentional OPP endemic in Nepal. It is imperative that federal regulations on organophosphate availability in a country that so heavily depends on its use for sustenance, be incorporated to combat its abuse as a means to carry out suicide. In addition, there is very limited consistency in the reporting of suicide data within the country. Most of this comes from gathering police reports, but there must be collaboration and better communication among health administration and police departments for accurate suicide information. This will lead to an improved and reliable data base on suicide mortality and attempts. Integration with healthcare facilities also is necessary to achieve reliable information on this critical topic.

Declarations

Note: Please complete all subsection under declaration section. Follow the format below:

Ethics approval and consent to participate

Not applicable.

Consent for publication

Manuscript was submitted to IRB for review and was waived by University of Toledo College of Medicine IRB.

Availability of data and material

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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Authors' contributions

TJ was the Primary Author who cared of the patient in the Emergency Department and wrote the original manuscript. KB is also a primary author who performed the majority of manuscript revision work. RS, AS, and SA were all secondary authors who contributed in the for of revision and literature research.

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Competing Interests

The authors declare that they have no competing interests.

References

1. Christine Licata, Lawrence Liu, Dale Mole, Jonathon Thorp, Rajesh Chand, et al. (2019) Social and cultural factors leading to suicide attempt via organophosphate poisoning in Nepal. *Case Rep Psychiatry*.
2. Suresh Thapaliya, Anoop Krishna Gupta, Suraj Tiwari, Mohan Belbase, Shreya Paudyal (2018) Pattern of suicide attempts in southern Nepal: S multi-centered retrospective study. *Med Phoenix* 3: 41-47.
3. Michael Eddleston, Nick A Buckley, Peter Eyer, Andrew H Dawson (2008) Management of acute organophosphorus pesticide poisoning. *Lancet* 371: 597-607.
4. CH Srinivas Rao, V Venkateswarlu, T Surender, Michael Eddleston, Nick A Buckley (2005) Poisoning in south India - opportunities for prevention and improved medical management. *Trop Med Int Health* 10: 581-588.
5. Shrestha S (2019) Interpol (NCB).
6. Shrestha B, Singh PM, Bharati U, Dhungel S (2011) Poisonings at nepal medical college teaching hospital. *Nepal Med Coll J* 13: 199-204.
7. Marahatta SB, Singh J, Shrestha R, Koju R (2009) Poisoning cases attending emergency department in Dhulikhel Hospital- Kathmandu University Teaching Hospital. *Kathmandu Univ Med J* 7: 152-156.
8. Marahatta K, Samuel R, Sharma P, Dixit L, Shrestha BR (2017) Suicide burden and prevention in Nepal: The need for a national strategy. *WHO South East Asia J Public Health* 6: 45-49.
9. (2019) Suicide among women in Nepal. Nepal health sector support programme.
10. Nagendra P Luitel, Mark JD Jordans, Anup Adhikari, Nawaraj Upadhaya, Charlotte Hanlon, et al. (2015) Mental health care in Nepal: Current situation and challenges for development of a district mental health care plan. *Confl Health* 9: 3.
11. (2019) Central Bureau of Statistics.
12. Than Ker (2013) Organophosphates: A common but deadly pesticide. *National Geographic*.