

Yellow Oleander Poisoning and Suicide in Sri Lanka

Shobitha Puvaneswaralingam (4th year MBChB; BMSc)

Correspondence to: Shobitha Puvaneswaralingam : S.Puvaneswaralingam@dundee.ac.uk



MEDSIN GLOBAL HEALTH SERIES



ABSTRACT

Intentional yellow oleander poisoning is a growing problem that is straining the health care services of Sri Lanka as it is a readily available method of suicide. The country remains to have one the highest suicide rates in the world, and the trend of oleander poisoning has been difficult to halt due to the lack of resources to manage the problem. As mental health issues are becoming a serious public health problem in Sri Lanka, it is timely to consider what efforts could be made to manage this unique phenomenon.

Key Words: global health; psychiatry; self-harm

Introduction

Everyday someone takes their own life by ingesting yellow oleander seeds in Sri Lanka. In the last three decades the country has seen a worrying trend of yellow oleander ingestion in an attempt to commit suicide. As a readily available method of poisoning oneself, the growing figures of oleander poisoning have caused concern for the health care services and the native population. Sri Lanka, an island nation south of India with a population of roughly 21 million, spends approximately 4% of its Gross Domestic Product (GDP) on health that is significantly less than developed countries¹. Sri Lanka is best known for its Ceylon tea or its civil war, but not much is known of the local disease burden or trends by those who have never been in its health care setting.

Yellow oleander poisoning has been described as an epidemic and largely affects Northern Sri Lanka where one of the two largest ethnic groups lives, the Tamils. The clash between this group and the largest ethnic group, the Sinhalese, was the cause of the tensions in the country and the cause of the civil war which ended in May of 2009. The north of Sri Lanka can seem isolated from the rest of the country, but this is starting to improve. It is in this setting that doctors and nurses receive daily cases of yellow oleander poisoning in hospital. This phenomenon has been difficult to halt but it is timely to consider what efforts could be made to slow this tragic trend. The issue of intentional oleander poisoning is quite specific to Northern Sri Lanka but it deserves a greater awareness from the outside world as it is likely to present to unsuspecting medical students on their electives.

Yellow Oleander [*Thevetia peruviana*]

Yellow oleander is found throughout most of the tropics as a decorative tree or shrub. It grows extensively in gardens throughout Northern Sri Lanka². The plant has yellow trumpet-like flowers and produces green fruits which turn black with time, and these contain two seeds each^{2,3}. The skin of the seed can be taken off to reveal the kernel, the part that is commonly ingested².



Ingesting an oleander seed is equal to that of swallowing 100 digoxin tablets in one container.

Just like digoxin, which is used to treat cardiac arrhythmias, an oleander seed acts to slow the heart by exerting a positive inotropic effect^{3,5}. The seeds contain cardiac glycosides that are extremely toxic to cardiac muscle; including thevetins A and B, and neriifolin². The basic mechanism causing cardiotoxicity is the inhibition of plasmalemma Na^+ , K^+ ATPase⁵. Yellow oleander poisoning is similar to that of digoxin poisoning, i.e. the person experiences symptoms of vomiting, diarrhoea, dizziness, bradycardia and sinus and AV node block². Severely poisoned patients can die of shock-resistant ventricular fibrillation. Those with moderate poisoning have shown PR interval prolongation that can develop into atrioventricular dissociation⁶.

Yellow oleander poisoning is the commonest method of suicide after pesticide poisoning in Sri Lanka⁷. This trend of self-poisoning is very different from the UK where physical injury such as gun shots and hanging are more common⁸. The number of seeds required for poisoning to be fatal varies between different sources but a research study conducted at one of the hospitals in Northern Sri Lanka showed no distinct correlation between the number of seeds ingested and the outcome². Of six patients who died during the study period, the number of seeds ingested ranged from one to ten seeds, with five seeds being the average. Of seven patients who ingested ten or more seeds, only one died, two were transferred to CCU and four were discharged to go home as they were well². It has been estimated that approximately 10% of self-poisoning cases are fatal, which is higher than in the Western world due to lack of facilities, whilst approximately 40% require temporary cardiac pacing².

History of Yellow Oleander Poisoning

Sri Lanka has often had an alarmingly high rate of suicide in a global context. In 1991, Sri Lanka had the highest suicide rate in the world at 47 per 100,000 population⁹. Figures of suicide rates in Sri Lanka have since remained high (Figure 2).

Suicide was uncommon in the early 20th century but has increased in incidence over time, with a peak reached in the mid 1980's. The rate has since reached a plateau of a lower rate but it is still significantly high as any rate above 15 per 100,000 population is considered excessive¹⁰. Although the numbers of suicide are already quite high, it is estimated that the actual figures may be even higher in Sri Lanka. The under-reporting is due to deaths not being recorded or being misclassified for different reasons such as stigma, legal harassment or insurance benefits¹¹. Suicide has not been considered a criminal offence in Sri Lanka since 1998¹².

Peaks in the rate of suicide are seen at various years (Figure 2). In 1958 there was a sharp rise in suicide rates as a result of the Green Revolution that introduced pesticides and fertilisers to Sri Lanka due to demands for a higher agricultural yield¹³. Since these dangerous chemicals could be found in most homes self-harm increased, as did suicide due to the extremely toxic nature by which people self-harmed⁷. Before the 1980's, accidental yellow oleander poisoning was unheard of but in 1980 two school girls committed suicide through the ingestion of oleander seeds in Northern Sri Lanka, in the city of Jaffna. This might be the reason there was another spike in suicide rates in 1980. The incident was highly publicised in the local media and might have been the trigger for the suicide trend that pursued. The following year there were 23 cases of yellow oleander poisoning, 46 cases the next year and 126 cases the year after that³.



Reasons for Yellow Oleander Poisoning

The suicide trend is highest among late adolescents and young adults; and worryingly it is increasing amongst the elderly population. The high suicide rate reflects the large amount of social, emotional and physical stress that is present in the population¹⁴. These communities have high levels of poverty, unemployment and social tension. Set against a background of a long gruesome civil war spanning almost three decades, the risk of psychological distress is great. Such high incidence of suicide may also demonstrate the lack of mental health care services that are available to people¹⁴.

The reasons for attempting suicide in Sri Lanka vary from person to person but the motives can seem quite trivial². Factors such as mental health problems, physical illness, substance abuse, money and job problems are leading causes of suicide in the UK¹⁵. However in Sri Lanka, young people ingest yellow oleander seeds to poison themselves because they were scolded by their parents, caught misbehaving, wanting attention or trying to spite others³. Older people might do it because they could not marry off their children, their children have moved away from home or because they lost a family member. These leading reasons for suicide seem to differ greatly from the UK where suicide is primarily to hurt oneself rather than expressing a message to others. Doctors who see these patients in hospital will testify

that of the young people self-harming by ingesting oleander seeds, very few actually wish to die².

Yellow oleander is common throughout the tropics but the ingestion of oleander seeds has only been a significant problem in Sri Lanka and Southern India². Other countries where yellow oleander is widely available, such as Thailand, Malaysia and Indonesia, have not reported on the use of yellow oleander for suicide. However accidental oleander poisoning has been noted in countries such as Brazil, Australia and the Solomon Islands, but intentional poisoning is uncommon here². Intentional oleander poisoning in countries such as Brazil and Thailand has been for reasons such as abortion, homicide or herbal remedies for heart failure and atrial fibrillation¹⁶.

Managing Yellow Oleander Poisoning

Yellow oleander poisoning overwhelms the health care services as more and more hospital admissions are due to intentional self-poisoning³. The problem is not that more people self-harm or self-poison in the developing world, but it is that a larger proportion is fatal because they do not have the drugs or facilities to properly manage the admissions¹⁶.

An antidote for oleander poisoning exists in Western countries in the form of anti-digoxin, or Digibind, which is very expensive³. The price is set high due to its use in the American market where the main clients are doctors who need to get their patients' hearts functioning again after accidental over-prescription of digoxin³. Anti-digoxin is extremely valuable to these doctors and thus the market can afford to keep the prices high. Some doctors will pay just about anything to avoid getting a lawsuit³.

Anti-digoxin is still not widely available in Sri Lanka, nor is it used frequently due to its high price. The drug was introduced in Sri Lanka in July 2001 but due to the cost, stocks ran out in July 2002¹⁴. The brief period in Sri Lanka when anti-digoxin was available reduced case fatalities. Once stocks ran out, the number of deaths increased threefold¹⁷. Cultural biases are not as predominant when considering drug treatments for oleander poisoning as would be expected. A concern was that people would not support producing cheap anti-digoxin treatment for a condition that patients brought onto themselves. However most doctors empathise with these individuals and they want to desperately reduce the number of admissions to hospital caused by oleander poisoning³.

At present there are various ways of managing yellow oleander poisoning. Those who present in rural health centres are immediately transferred to secondary hospitals for induced vomiting and cardiac monitoring¹⁶. Emesis is induced by giving the patient activated charcoal as it also works to prevent absorption of poison in the patient's stomach¹⁸. Patients who are noted to have cardiac conduction block are transferred to CCU for temporary cardiac pacing¹⁶. It is evident that intentional self-poisoning drains a lot of resources from the health care services since it is the most prevalent condition in ICU by the number of occupied beds¹⁹.

Personal work experience at Jaffna General Hospital demonstrated the lack of aftercare of oleander poisoning patients. In 2010, an 18-year-old female was admitted to CCU having ingested a yellow oleander seed because she had come home late one night and her mother had scolded her. In an attempt to get back at her mother, and relieve her own guilt, she swallowed an oleander seed. She was kept in CCU and monitored regularly for two days before she was discharged. Her discharge was not preceded by any form of psychological assessment or therapy. She was kept under strict supervision in the ward, but had no social or psychological evaluation.

Over the next two days in A&E, there were two more cases of young girls who had ingested oleander seeds. When asked why they had done so, they did not answer and instead sat there silently. Along with the uncomfortable symptoms of oleander poisoning, these girls were given activated charcoal to induce emesis. This was followed by either continuous vomiting or passing out from sheer exhaustion. Despite the limited availability of medical treatment, the abundance of oleander poisoning admissions leaves staff exhausted too and psychological support is often not provided for the patients.

Discussion

It is important to think of measures to reduce the number of admissions and deaths due to yellow oleander poisoning because it frequently presents in Sri Lankan hospitals. If medical treatment is proving to be costly, emphasis should be placed on preventing oleander poisoning and promoting health. One idea would be to cut down yellow oleander trees where oleander poisoning is common. However it is a plan that is difficult to execute as the plant is so widespread and individuals may not necessarily agree with this proposal. Since times are changing, this idea may grow on people as they do not want it on their conscience that someone attempted suicide using their plants. If yellow oleander trees were to be discouraged, it would have to be something that the government would have to recommend and implement. Just as safe pesticide storage was promoted by the government and specific pesticide bans were introduced to combat pesticide poisoning, cutting down yellow oleander could be endorsed as part of public health measures^{7,19}.

Health education could be a significant factor in decreasing the incidence of oleander poisoning. The incidence might decline if young people are targeted early and spoken to about the dangers of yellow oleander. There is a risk when talking to them about suicide because the idea should not be promoted, but an overall education on the triviality of some of the reasons for oleander poisoning could be attempted. This is difficult to implement on a large population like Sri Lanka but priority should be placed on the Northern provinces where this trend is more prevalent.

Within the health care services there is a need for different levels of care to help prevent, manage and rehabilitate patients with suicidal ideation²⁰. However suicide is not recognised as a serious public health problem and mental health does not make up a large part of the health services since it is mostly present at large institutional levels. Staff and resources for dealing with psychiatric complaints are lacking in rural and local hospitals. The way forward would be to develop psychiatric or psychological management facilities and educate staff so that they are better equipped to deal with the serious admissions²⁰. However, training and resources need funding which is not readily available.

It seems that oleander poisoning increased in popularity following the deaths of the two young girls in Jaffna, which was widely described in the media. The subsequent media attention heightened people's awareness of the availability of yellow oleander and its effects, making it an extremely popular method of suicide. To avoid copycat suicides and following the example of other countries, it may be necessary to enforce a ban or restrict media reporting on suicide. If it is considered important to report on suicide, details of method and location should be omitted. The less attention oleander poisoning gets in the media, the less potential there is for suicide trends.

Conclusion

Yellow oleander poisoning and suicide is a sad story but is one that continues in Sri Lanka. The burden on the health care services grows with the increasing incidence of oleander poisoning. With a lack of resources to comprehensively treat it, oleander poisoning will continue to take people's lives. Although treatment is utilised to its maximum capacity, this phenomenon will not subside until the root of the problem has been tackled. Mental health issues deserve more attention and respect in Sri Lanka than they currently receive so therefore primary health education and mental health care are the best solutions to this tragedy.

References

1. World Health Organization. Sri Lanka [homepage on the Internet]. c2009 [cited 2012 Apr 4]. Available from: <http://www.who.int/countries/lka/en/>
2. Eddleston M, Ariaratnam C A, Meyer W P, Perera G, Kularatne A M, Attapattu S et al. Epidemic of self-poisoning with seeds of the yellow oleander tree (*Thevetia peruviana*) in northern Sri Lanka. *Trop Med Int Health*. 1999; 4(4): 266-73.
3. Jenkins J. Poison plant fuels suicide bids [homepage on the Internet]. c2006 [updated 2006 Apr 10; cited 2012 Apr 4]. Available from: <http://news.bbc.co.uk/1/hi/health/4888840.stm>
4. Poligrow. Yellow Oleander [homepage on the Internet]. c2010 [cited 2012 Apr 24]. Available from: <http://www.poligrow.com/categoria.php?id=56>
5. Langford S D, Boor P J. Oleander toxicity: an examination of human and animal toxic exposures. *Toxicology*. 1996; 109(1): 1-13.
6. Eddleston M, Ariaratnam C A, Sjöström L, Jayalath S, Rajakanthan K, Rajapakse S et al. Acute yellow oleander (*Thevetia peruviana*) poisoning: cardiac arrhythmias, electrolyte disturbances, and serum cardiac glycoside concentrations on presentation in hospital. *Heart*. 2000; 83(3): 301-6.
7. Gunnell D, Fernando R, Hewagama M, Priyangika W D D, Konradsen F, Eddleston M. The impact of pesticide regulations on suicide in Sri Lanka. *Int J Epidemiol*. 2007; 36(6): 1235-42.
8. Värnik A, Kölves K, Feltz-Cornelis C M van der, Marusic A, Oskarsson H, Palmer A et al. Suicide methods in Europe: a gender-specific analysis of countries participating in the "European Alliance Against Depression". *J Epidemiol Community Health*. 2008; 62(6): 545-51.
9. Ariyananda P L. Trends in acute poisoning due to deliberate self-harm in the Southern Province of Sri Lanka. *Galle Med J*. 2010; 15(1): 17-24.
10. Integrated Regional Information Networks. Sri Lanka: Suicide rate drops, but more people using poison [homepage on the Internet]. c2009 [updated 2009 Mar 12; cited 2012 Apr 23]. Available from: <http://www.irinnews.org/Report/83435/SRI-LANKA-Suicide-rate-drops-but-more-people-using-poison>
11. World Health Organization. Suicide Prevention :Emerging from Darkness – Some Facts and Figures [homepage on the Internet]. c2006 [updated 2006 Aug 18; cited 2012 Apr 4]. Available from: http://www.searo.who.int/en/Section1174/Section1199/Section1567/Section1824_8078.htm
12. World Health Organization. Suicide Prevention :Emerging from Darkness – What can be done? (contd.2) [homepage on the Internet]. c2006 [updated 2006 Aug 18; cited 2012 Apr 4]. Available from: http://www.searo.who.int/en/Section1174/Section1199/Section1567/Section1824_8089.htm
13. Jayatilaka R D S. The impact of Green Revolution on the Sri Lanka peasantry [homepage on the Internet]. c1989 [cited 2012 Apr 5]. Available from: http://dl.nsf.ac.lk/bitstream/1/5004/1/JSS12_21.pdf
14. Jayasekara R S. Community nurses: an urgent need. *Nurs Health Sci*. 2001; 3(2): 101-4.
15. Macnair T. BBC – Health: Suicide [homepage on the Internet]. c2010 [updated 2010 Jul; cited 2012 May 3]. Available from: http://www.bbc.co.uk/health/emotional_health/mental_health/mind_suicide.shtml#what_leads_to_suicide
16. Eddleston M, Warrell D A. Management of acute yellow oleander poisoning. *Q J Med*. 1999; 92(9): 483-5.

17. Eddleston M, Senarathna L, Mohamed F, Buckley N, Juszczak E, Rezvi Sheriff m H *et al.* Deaths due to absence of an affordable antitoxin for plant poisoning. *Lancet*. 2003; 362(9389): 1041-4.
18. Wellcome Trust. Drastic solutions: Self-poisoning in Sri Lanka [homepage on the Internet]. c2001 [updated 2001 Dec 1; cited 2012 Apr 5]. Available from: <http://www.wellcome.ac.uk/News/2001/Features/WTX024274.htm>
19. Eddleston M, Sheriff M H, Hawton K. Deliberate self-harm in Sri Lanka: an overlooked tragedy in the developing world. *BMJ*. 1998; 317(7151): 133-5.
20. World Health Organization. Suicide Prevention: Emerging from Darkness – What can be done? (contd.1) [homepage on the Internet]. c2006 [updated 2006 Aug 18; cited 2012 Apr 4]. Available from: <http://www.searo.who.int/en/Section1174/Section1199/Sec>

Scottish Universities Medical Journal [Dundee] Online Healthcare Student Journal of Scotland

