

Development of Quick Reference Manual for the Management of Drug Overdose and Poisoning

Alan Tom¹, Mohammed Salih¹, N Venkateswaramurthy¹, R Sambathkumar¹

¹Department of Pharmacy Practice, J.K.K.Natraja College of Pharmacy, Kumarapalayam, Namakkal, TamilNadu, India

Abstract

Aim: To develop a reference manual for the management of drug overdose and poisoning.

Methods: A prospective developmental study was performed for a span of six months at a tertiary care hospital in Erode. Information on the management of cases of drug overdose and poisoning was provided based on queries received at the Drug Information Center and the poisoning cases identified in the respective hospital over the past three years. Further attention was paid to detecting local poisons. Such information was collected on the basis of literature reviews, magazines and newspapers. In addition to drug and poison monographs; android applications, toxicological databases and links, standard reference books and articles on drug overdose and poisoning were included. Locally reported cases have been given more focus.

Results: A formulary was prepared which includes the management information for 100 drugs and 57 toxic substances that were identified after extensive research. The signs and symptoms of the various poisoning cases were graded as mild, moderate and severe based on poison severity scale (PSS) and respective antidotes were mentioned.

Conclusion: As per our knowledge, this is the first formulary that focus on local poisons. The implementation of the formulary may have a significant impact on healthcare professionals to improve the quality of life of patients. This provides important information of localized poisoning and drug overdose in a nutshell and therefore offers as a quick data to the enquirer.

Key words: Drug overdose, Formulary, Monograph, Poisoning

Introduction

Poisoning and drug overdose are important health problems in developing countries.¹ The WHO reports annually that 0.3 million people are killed by specific poisoning agents. Acute pesticide poisoning is one of the most common causes of intentional death worldwide.² High doses of analgesics, tranquilizers and antidepressants are widely used for intentional poisoning in industrialized countries and agricultural pesticides are used in Asia for self-poisoning, especially in rural areas with a fatality range of 10-20 percent.^{3,4}

Almost a million people die each year as a result of suicide, and chemicals account for a significant number of these deaths. An estimated 370,000 deaths each year

are caused by deliberate ingestion of pesticides.⁵ On average, because of an accidental drug overdose, India loses at least two people every day. According to the latest data released by the Ministry of Health and Family Welfare, in three years from January 2014 to January 2016, 2381 people died from drug overdose, with 5 states responsible for 53% of all cases. Tamil Nadu peaks at 20%, followed by Punjab with 15%.

In India, especially in southern India, the incidence of drug overdose poisoning, organophosphates, and plant poisoning is growing. Tamil Nadu is topping deaths because of a drug overdose, according to the National Crime Records Bureau.^{6,7}

To save the patient's life, providing timely information about poison and drug toxicity is very important. Poison information centers are a ready source of help in handling poisoning cases as they can provide reliable first aid information and guidance and emergencies related to chemical exposure. For developing nations, the number of poison and drug information centers is limited relative to developed nations. The number of poison centers that operate 24x7 for our country, particularly in southern India, is very minimal. In addition to the poison information centers, hospital formularies play an important role in the management of drug overdose and poisoning.

In developed nations, hospitals have own formularies that include local and regional poison management information. A hospital formulary on the treatment for drug overdose and poisoning is very limited in our region. In order to provide reliable and timely information, a quick reference manual is essential. Hence the objective of the study was to prepare a quick reference manual for drug overdose and poisoning treatment in the tertiary care hospital. As per our knowledge, this is the first poison management formulary in our region.

Materials and Methods

A prospective developmental study was performed for a span of six months at a tertiary care hospital in Erode. The endorsement of the study was obtained from the institutional ethics committee (*JKKNCP/ETHICS_PRACTICE/019PDS07*). Information regarding the management of drug overdose and management of poison cases were included based on queries received at the Drug Information and the poisoning cases reported at the respective hospital over the past three years. More attention has been paid to the detection of local poisons.

Such information was collected on the basis of literature reviews, magazines and newspapers. Locally reported cases have been given more focus.

Monograph on all drugs and poisons in the formulary were prepared from primary, secondary and tertiary drug information resources. In addition to drug and poison monographs; android applications, toxicological databases and links, standard reference books and articles on drug overdose and poisoning were included. Depending on the ratings and reviews in the play store, android applications were selected.

Results and Discussion

Nearly 13 drug overdose and poisoning queries were collected from Drug Information Centre (DIC), out of which 2 were herbal related, 5 drugs and 2 insecticides queries as shown in Table 1. In addition, an extensive literature search was performed and categorized to local, South Indian and Indian poisons and it was found that in South India during a period of 2013-2018, there were 8 categories of herbal poisoning followed by 7 drugs and 4 insecticides queries. And in India during a period of 2013-2017, there were 25 categories of drug poisoning followed by 8 herbal, 6 others and 4 insecticides. Simultaneously, drug details of all the drugs that were available in the hospital were collected to suggest an antidote, in case of overdose. Along with this poison information scale or poison severity scale, a list of toxicological databases and links, lists of standard reference books regarding poisoning and toxicity monitoring, lists of android applications regarding poisoning and drug overdose, Journals regarding primary poison information and Poison Information Centers in India were included in the formulary.

Table 1: Number of Queries received in DIC Tertiary care Hospital Erode, regarding Poisonous substances (January 2015 – February 2018)

Sl.no	Queries	Number of Queries
1.	Herbal	2
2.	Drugs	5
3.	Insecticides	2
4.	Others	4

Drug Monographs contains the details of 100 drugs that could produce toxicity due to overdose and were classified based on their pharmacological class in which, 18 were in the category central nervous system, 16 in cardiovascular system, 14 in respiratory system, 13 in endocrine system, 12 in anti-infective, 9 in obstetrics, gynaecology and urinary tract disorder, 7 in musculoskeletal and joint disease, 6 in gastrointestinal system and 5 in anaesthetics as shown in Table 2.

Table 2: Pharmacological Class wise distribution of drugs in the formulary

Sl no.	Drugs Category	Number of drugs (n=100)
1.	Gastrointestinal system	06
2.	Cardiovascular system	16
3.	Respiratory system	14
4.	Central nervous system	18
5.	Anti-infectives	12
6.	Endocrine system	13
7.	Obstetrics, Gynaecology and Urinary tract disorders	09
8.	Musculoskeletal and joint disease	07
9.	Anaesthetics	05

About 57 poisonous substances were included in the monograph and they are also classified, in which 12 were blood agents followed by 11 industrial chemicals, 10 herbals, 8 organ-phosphates, 5 carbamates, 4 organo-chlorides and 2 environmental substances as shown from Table 3. Furthermore, if there is a chance of developing any toxicity, the treatment was included for the same.

Table 3: Class wise distribution of Poisonous substances in the formulary

Sl no.	Poisonous substances	Number of substances (n=57)
1.	Blood agents	12
2.	Carbamates	5
3.	Herbal	10
4.	Environmental substances	2
5.	Industrial Chemicals	11
6.	Organophosphates	8
7.	Organochlorides	4
8.	Other Chemicals	5

Monograph content: While considering the Drug section, the particular drug comprises the following details : Name, Functional Class, Mechanism of Action, Uses, Unlabeled Uses, Contraindications, Precautions, Dosage and Routes, Adverse Effects, Signs and Symptoms of Toxicity and Treatment overview. The Monograph of the particular poison contains the following details: Name, Synonym, Description, Clinical effects, Treatment overview. Signs and symptoms of toxicity are classified into mild, moderate and severe by using Poison Severity Scale (PSS).

Poison Information Scale or Poison severity scale: A standardized poison rating scale allows for qualitative assessment of morbidity caused by poisoning, better detection of real risks and comparability of results. The PSS has been published externally. PSS helps in the initial diagnosis and assessment of drug overdose and poisoning.

Toxicological Databases and Links: For further references, toxicological databases and their respective

links are provided for easy access to detailed information.

Journals Regarding Poison Information: 19 international poison information standard journals issued by different medical associations are included.

Standard Reference books regarding poisoning and toxicity monitoring: Details of Standard reference books on Toxicology, Pediatric toxicology diagnosis and management, Poisoning and drug overdose, Pharmacopoeias, Formularies, Manuals of toxicologic emergencies are included.

Android Applications: Easily access able android applications detailing poisoning and drug overdose are included in the formulary. These applications were selected based on the user’s reviews and ratings. These applications are innovative, online triage tools and guide users faced with poison emergency through a series of simple questions to denote the toxicity provides a quick guide on poisoning and antidotes.

Table 4: List of Android applications regarding poisoning and toxicity monitoring included in the formulary

SI No.	Mobile Applications	Offered by
1.	webPOISONCONTROL	National Capital Poison Centre
2.	Poison Rx	PharmITexpert
3.	Poisoning and drug Overdose	MobiSystems
4.	Poisoning & Drug Overdose ref.	AgileMD
5.	Poison information Centre	JSS Academy of higher Education and Research
6.	Poison First Aid for Children	Kigorosa UG

Poisoning is reported to be a major global public health issue. A developed country may have its own information services for its unique needs, but the Poison Information Center where it exists may be the only source of information accessible 24 hours a day on toxic

chemicals in a developing country.⁵ The reality that there are fewer poison knowledge centers in India is appalling to notice. Due to the lack of information on poisoning cases in India, the introduction of new guidelines and the updating of existing protocols requires knowledge

of demographics and the management of poisoning cases. It is necessary to understand the interventions needed in the management of poisoning and to define the role of health professional studies. Knowledge of the general pattern of poisoning in a particular region can help reduce mortality and morbidity rates in the early diagnosis and treatment of cases.

Conclusion

Drug overdose and poisoning is a serious problem that arises whether deliberately or accidentally.⁸ An overdose can be mild, moderate, or extreme. Symptoms, treatment, and recovery depend on the specific drug involved.⁹ Medical professionals are implementing new approaches for diagnosis and treatment due to the alarming rate of a drug overdose and poisoning, especially in developing countries. The introduction of new guidelines and the updating of existing protocols requires knowledge of demographics and the management of poisoning cases due to the lack of information on poisoning cases in India.¹⁰ The strategies needed to manage to poison need to be identified and the role of health professional studies established. This formulary provides the important details of localized poisoning and drug overdose into a nutshell which is easy to access and thereby provides the enquirer with quick information. The formulary is handy user-friendly, and saves the precious time of busy physicians. It may also promote the safe and effective use of medicines thereby minimizing drug-related problems in the population.

Ethical Clearance: Ethical clearance and approval was obtained from J.K.K.Nattraja Institutional Ethical committee with reference number *JKKNCP/ETHICS_PRACTICE/019PDS07*.

Conflict of Interests: The authors declare no conflict of interest.

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