Original Article

Indian Journal of Forensic Medicine and Pathology
Volume 9 Number 3, July - September 2016
DOI: http://dx.doi.org/10.21088/ijfmp.0974.3383.9316.10

A Study on the Establishment of Poison Control Centre: A Need for the Region of Warangal

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Abstract

Background: Poison information centers are those, which provide immediate round the clock toxicity assessment and treatment recommendations for the effective management of poisoning cases. *Objectives*: The objectives of study to evaluate the needs of poison control center and Analytical services in this area. *Material and Methods*: Data was collected by Self- Administered structured questionnaire,Individual interviews, and group discussions in the department. The received data was analyzed according to establish the poison control center in the region. *Results*: A total 683 cases of Poisoning were intentional and 233 cases were unintentional in 2008 and 2009. Out total 916 cases only 450 cases admitted in the hospital. Out of that only 225 cases were diagnosed by using different methods, about 43% cases were diagnosed by history, 32% by clinical symptoms, 16% by detailed physical examination and 9% by laboratory investigation. Remaining 225 case faced problem in diagnosis due to various reasons like in 62% case it is dueto lack of analytical facilities, 21% cases due to no definite group of symptoms and 17% cases due to signs and symptoms mimic with some diseases. Conclusion: The management of poisoning cases requires cooperation between analytical toxicology laboratory services and the physicians (clinical toxicology) dealing with the poisoning cases.

Keywords: Poisoning; Poison Control Centers; Analytical Services; Antidotes.

Introduction

The massive expansion in the availability and use of chemicals, including pharmaceuticals, during the past few decades has led to increasing awareness - on the part not only of the medical profession but also the public and various authorities – of the risks to human health posed by exposure to those chemicals. Moreover, each country has a variety of natural toxins to which its population may be exposed.

Every individual is exposed to toxic chemicals, usually in minute, sub-toxic doses, through environmental and food contamination. In some instances, people may be subjected to massive, or even fatal, exposure through a chemical disaster or in a single accidental or intentional poisoning. Between these two extremes, there exists a wide range of intensity of exposure, which may result in various acute and chronic toxic effects.

Poisoning that involves individual eg. Suicidal, Homicidal , Iatrogenic accidental has certainly the greatest medico-legal significance. Poisoning is a medical emergency and the cases are quickly Rushed to the nearest available hospital. Most of these cases are suicidal or accidental in nature but rarely homicidal. The role of *Forensic Toxicology* is the detection, identification and measurement for poisons in human biological material [1].

It has been estimated that some form of poison directly or indirectly is responsible for more than 1 million illnesses worldwide annually, and this figure could be just the tip of the iceberg since most cases of poisoning actually go unreported , especially in third world countries. The problem is getting worse with time as newer drugs and chemicals are developed in vast numbers. The commonest agents causing

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poisoning in India appear to be pesticides (organophosphates, carbamates, chlorinated hydrocarbons, and pyrethroids), sedative drugs, chemicals (corrosive acids and copper sulphate), alcohol, plant toxins (datura, oleander, strychnos, and gastro- intestinal irritants such as castor, croton, calotropis, etc),and household poisons (mostly cleaning agents) [2,3]. Of late aluminium phosphide has begun to emerge as a major player in the toxicological field , particularly in some northern Indian states [4,5]. Acute pesticide poisoning is now an important cause of morbidity and mortality worldwide (Jeyaratnam 1990). In 2006, the World Health Organization (WHO), estimated the global pesticide poisoning at 3 million cases [7] with 220,000 deaths occurring annually .about 99% of these deaths occur in developing countries. More recent studies suggests that the number of deaths may actually be around 300,000 [6]. The incidence of poisoning in India is among the highest in the world and it is estimated that more than 50,000 people die every year from toxic exposure [7]. Underreporting and misclassifi-cation are extremely common and actual numbers could be much higher. Acute poisoning, a common pediatric emergency is one of the important cause of morbidity and mortality in children specially in developing countries. Among the children the common culprits include kerosene, household chemicals, drugs, agricultural pesticides, industrial chemicals garden plants, bites and stings, miscellaneous products [8,9]. The main causes of pediatric poisoning are negligence and ignorance, many deaths and disabling sequelae could very easily be prevented if more attention were given to implementing preventing measures at home.

Snake-Bite is an important and serious medico-legal problemin many parts of the world specially in South Asian Countries. It has been estimated that 5 million snake-bite cases occur world wide every year, causing about 100000 [10] deaths. On an average, nearly 200000 persons fall prey to snake - bite per year in India and 35000-50000 of them die every year [11]. But the data on morbidity and mortality of snake-bite are unreliable due to improper reporting system The snakes most commonly associated with human Mortality in India are Cobra (NAJA najanaja),Krait (BungurusCaeruleus), Russels Viper (ViperaRusseli),and Saw Scaled Viper (Echis Carinitus) [12]. Snake-bite cases are observed in almost all age groups , the majority in males aged 21-50 years, while the male to female ratio being 3:1. A study reported an incidence of 7 to 15% in children less than 10 years [13]. So, there is a need in the existing knowledge regarding the deleterious effects of toxicants and their preventive or therapeutic measures.

Objectives of the Study

The objectives of poison control center varies widely from patientOriented emergency care to preventive care in the society, *24X7* hours poison information services Analytical services – To Provide immediate expert treatment & management advise about household products, pesticides, food poisoning, medicines, plants, bites and stings etc. and Provide training and education sessions to health care professionals, community, and institutions.

Material and Methods

This study was done in 2008 and 2009. The central objective of the study is to elicit the opinion on the need to establish a poison control centre in the region.

Two Main Samples are Selected Namely

Health care professionals (public and private)

Health care consumers (general population including students)

The Sample Size in this Study Included

Teaching hospitals – 3, Nursing homes – 24, Other government hospitals – 7,Government and private practitioners – 225,General population including students – 100

The present study was an explanatory study combining elements of qualitative & quantitative research, which tries to assess the need of establishing a poison control center in the region.

Data was collected by Self- Administered structured questionnaireIndividual interviews. Group discussions in the department. The received data was analyzed according to establish the poison control center in the region.

Results

Reason for Exposure to Poison

Intentional exposure occurred on 683 cases in 2008 and 2009. In this suicidal cases were 532.74(78%), drug abuse cases were 54.64 (8%), misuse cases were 54.64 (8%), unknown cases were 40.98(6%).unintentional cases were 233, out of 43% cases were due to snake bite /scorpion sting, 21% people these were effected by poisoning in the agriculture fields,19% due to contaminated food/

drink, 9% were due to over use of medicine, 6% due to occupational exposure, and 2% people suffered by therapeutic drug use.

Total 916 persons suffered with poisoning in 2008 and 2009, among these males 531.28 in majority(58%) and females were 384.72 (42%).233.64(44%) adult male were suffered with pesticides, 106.2 (20%) were due to unknown poisoning, 95.58 (18%) were due to house hold cleaning substances,42.48 (8%) due to prescribed drugs, 26.55(5%) due to alcohol and 26.55(5%) due to food poisoning.184.8(48%) adult female were suffered with pesticides, 53.9 (14%) were due to unknown poisoning, 69.3 (18%) were due to house hold cleaning substances, 23.1(6%) due to prescribed drugs, 34.65(9%) due to alcohol and 19.25(5%) due to food poisoning. Total 129 children with an average of 4 to 9 years suffered with poisoning in 2008 and 2009.39.99(31%) children were suffered with kerosene, 29.67(23%) were due to drugs/medicine, 28.38 (22%) were due to house hold cleaning substances,14.19 (11%) due to pesticides, 9.03(7%) due to cosmetics and 7.74(6%) due to poisonous plants and seeds. The main reason attributed in this age group was their innovative and exploratory nature and mouthing tendencies [14-15].

In years of 2008 and 2009, total 450 cases admitted in the hospital in this 225 case diagnosed by various methods, 43% cases were diagnosed by history, 32% by clinical symptoms, 16% by detailed physical examination. 9%by laboratory investigation. And in remaining 225 case faced problem in diagnosis, in 62% case it is due to lack of analytical facilities in the living, in 21% cases it is due to no definite group of symptoms and in 17% case it is due to signs and symptoms some disease mimic the poisoning.

Total postmortems conducted in kakatiya medical college Warangal mortuary in 2008 were 1666 in this 509 were due to poisoning. Males were 300.31(59%) and female were 208.68(41%) and in 2009 were 1560 in this 494 were due to poisoning. Males were 281.58(57%) and female were 212.42(43%)

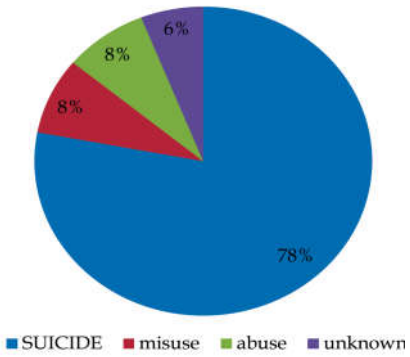

Fig. 1: Intentional Exposure-Year-2008 and 2009

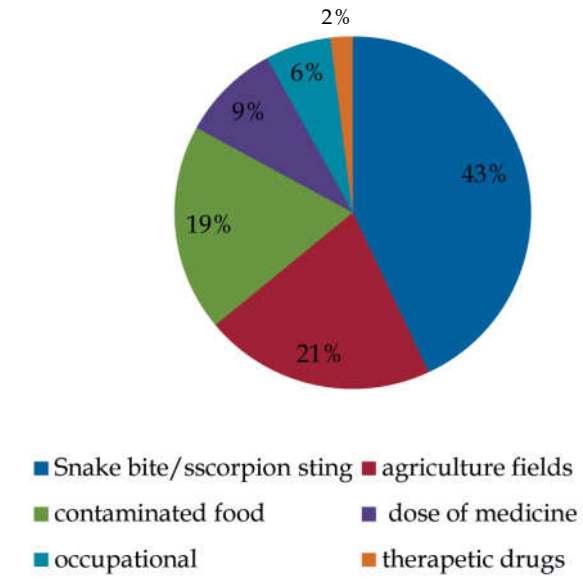

Fig. 2: Un Intentional Exposure-Year-2008 and 2009

Discussions

The aim of this discussion is to draw valid conclusions from the research findings.

The practice of establishing poison control centers is yet to catch on in a big way in India. On one hand, lack of adequate importance is given to the establishment of clinical toxicological analysis services. On the other hand, there is no clear-cut policy by the government despite the report [26] of UNCED (United Nations Conference On Environment And Development) for establishment of poison centers. Prevention and control of poisoning could be made more effectivethrough a number of appropriate actions by National and local authorities. The main drawback in the current scenario prevailing in the country dealing with poison cases in terms of treatment and prevention is the lack of trained dedicated staff required to treat the cases of poisoning. Hence, the morbidity and mortality from poisoning in the country is one of the highest in the world.

The human resources for a poison control centre consist of medical, paramedical personnel and non-medical staff responsible to perform the duties of the centre on a 24 – hours – a - day, 7 – days – a – week basis. The study has found that in the event of poisoning they rush to the nearest or available medical facility, which in most cases lacks the basics to handle such cases.Both the government and the private sectors are on the same footing. Hence, the high incidence of morbidity and mortality in the region. The financial burden on the families of the

victim is much higher as the poisoned person is rushed to the emergency ward / ICU's and exposed to all the paraphernalia of the ICU. Increased poison control centre exposure calls have been associated with reduced emergency department use for unintentional poisoning and appeared to reduce net medical expenditure [16]. Significant data exists that clearly shows that for each dollar invested in the operation of a poison control centre and other poison prevention programs, the return in terms of decreased emergency room visits and other associated health care costs is accentuated many times over.

The above findings strongly favor the establishment of poison control centre in the region.

Conclusion

The present study clearly demonstrated the need to establish a poison control center in the region. The management of poisoning cases requires cooperation between analytical toxicology laboratory services and the physicians (clinical toxicology) dealing with the poisoning cases.

As the outcome of the findings in the earlier chapter revealed the cost of management in terms of treatment of a poisoned patient is high, so also the morbidity and mortality. Thus, the service provided by the Poison information Centre offers considerable direct health benefits by reducing morbidity and mortality from poisoning and enabling the community to make significant savings in health care cost.

Recommendations

Establishing properly equipped and staffed poison control centers would constitute a major step in ameliorating the situation.

Proposed Solution

The data obtained in this study and the retrospective study data strongly recommend the Establishment of Poison Control Centre in the region.

1. The objectives of the poison control centre would vary widely from *patientoriented emergency care to preventive care* in the society.
2. Implementation of the Poison Control Centre Enhancement and Awareness Law will further the ability of poison centers to improve the care of poisoned patients and reach the overall goal of reducing illness, injury and death due to poisoning.
3. A typical regional poison centre should ideally be located within or closely associated with a hospital. Location within a hospital has the advantage of providing ready access to a network of medical disciplines that will support and enhance the work of the centre.
4. A regional poison centre serves the population of approximately 4 million people, and handles about 35000 human exposure cases every year.
5. The poison centre should utilize the software package.TOXINZ from new Zealand which has information on thousands ofpoisonous substances encountered worldwide.
6. Access to INTOX and CHEMINFO of the WHO.
7. These packages enable the centre to answer any query on poisons or poisonings in a matter of seconds via email or phone or fax. Both health care providers and public can contact the poison control centre for any queries (free of charge) relating to poisons, poisoning (acute or chronic) drug overdose, drug adverse effects, drug abuse and food poisoning.
8. The poison centre should function round the clock i.e. 24x7 hours, 7 days a week, 365 days a year.
9. The poison centreprovides the following services. the poison control centre should have contact with other poison centers, both nationally and internationally. This helps in exchange of case data and kniwledge.
10. A poison information centre needs a multi-disciplinty team. The team may include physicians,psychiatrist, nurses, analysts, pharmacists and others.specific areas should be there to keep all basic and advanced instuments like UV and Visible spectroscopy, Fourier transform infrared spectroscope (FTIR), High Performance Thin Layer Chromatography (HPTLC), Gas Liquid Chromatography (GLC), High Performance Liquid Chromatography (HPLC) Gas Chromatography–Mass Spectroscopy (GC–MS), Liquid Chromatography – Mass Spectroscopy (LC-MS), Flame Ionization Atomic Absorption Spectrometry, Inductive Coupled Plasma Source Spectrometry.
11. The regional poison centre should also take the responsibility of education in the following way.Books, journals, and other published literature are indispensable for the work of a poison information centre.
12. Poison information centers should be officially recognized by government authorities.

13. They should have independent status, stability and neutrality to enable them to carry out their functions effectively.
14. The legal status of a centre should enable it to maintain confidentiality of the data it handles.
15. The main source of financial support is a government responsibility. Other sources of funding may be acceptable if they are available and if the autonomy of the centre is guaranteed.

Having such facilities available at least on a regional level that can be shared by several hospitals of that region could go a long way in bringing down the high mortality in poison cases by better access to latest information on diagnosis and management.

References

1. Oliver SS, Forensic Toxicology, Forensic Medicine for Lawyers byJK Mason. 2nd edition ELBS publication. 1988; 276 –84.
2. Batra AK, Keoliya AN, Jadhav GU – Poisoning an unnatural cause of morbidity and mortality in rural India. J Assoc Physicians India. 2003; 51: 955-9.
3. Siwach SB, Gupta A – The profile of acute poisonings in Haryana – Rohtak study. J Assoc Physicians India. 1995: 43: 756-9.
4. Siwach SB – Recent trends in the management of acute aluminium phosphide poisoning. Postgrad Med. 1997; 11: 411-3.
5. Multani AS, Bal BS, Singh SP , Singh TP , Surinder S, Shivcharan – Spectrum of acute poisoning in medical emergencies – a prospective study [Abstr]. J Assoc Physicians India. 2003; 51: 1199–200.
6. Buckleyet al 2004; Gunnel &Eddleston 2003.
7. Aggarwal P, Handa R, Wali JP - Common poisonings in India.J Forensic Med Toxicol. 1998; 15: 73-9.
8. Vaswani V, Patil VD – spectrum of childhood poisoning; a Belgaum experience. J Forensic Med Toxicol. 1998; 15: 50-2
9. Singh LR, Momonchand A, Singh PI – Pattern of accidental poisoning in children. J Indian Acad Forensic Med. 2001; 23: 69-71.
10. Mathew JL, Gera t. Ophitoxaemia (venomous snake bite).
11. David AW. Guidelines for the clinical management of snake bites in the SE Asia, New Delhi. 2005; 1-62
12. WhiHaker R. Common Indian snakes. A field guide. New delhi .McMillan India limited. 2001.
13. Paul VK, Chawla D, V Jatana V. Animal and insect bites. 4thed. In Singh M. editor, Medical emergencies in children. New Delhi: sagar publications. 2007; 624-83.
14. Kamanyre R, Karalliedde L. oraganophosphates toxicity and occupational exposure, occupational medicine. 2004: 54: 69-75.
15. AtkinJ.ln : Lesinjer Km (ed). Safe and effective use of crop protection products in developing countries walling fork, UK: GABI Publishing. 2002.
16. Edward Z, Ted M; paul J, Toby L; Jeffrey C, Elandrian S, Monique's; the impact of poison control centers on poison related insits to ED's- united states, 2003; American journal of emergency medicine. 2008; 26(3): 310-315.