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Research Article

Evaluating the Incidence and Impact of Poisoning Cases: A Prospective Descriptive Study at Sher-i-Kashmir Institute of Medical Sciences Soura, a Tertiary Care Hospital in Jammu & Kashmir

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A B S T R A C T

Poisoning is a condition in which a person swallows, inhales, touchs or injects various drugs, chemicals , venoms or gases that leads to his/her injury or deterioration of health condition, alteration in his/her consciousness, physiological imbalances in the body, or even death. Some of the drugs that are used on a daily basis for the treatment of various diseases become poisonous only when they are used in higher concentration or used in bulk quantities deliberately in order to induce some other effects for which the drug is not actually prescribed or advised. The common example of this may be benzodiazepine, tricyclic antidepressants and other antipsychotic drugs. Nowadays we are just observing the trends that the young population is consuming certain types of bathroom cleaners like phenyl, harpic etc that only become harmful when they are taken in large quantities or have potential to emit gases and fumes or produce harmful substances in the body. To these harmful gases or chemicals the children are most sensitive and get poisoned by a small amount of these drugs.

The main aim and objective of this study was to get an estimate about the magnitude and burden of poisoning cases in SKIMS soura which is the care hospital in Jammu and Kashmir. In order to get a brief account of poisoning cases in Sher i Kashmir Institute of Medical Sciences Soura Srinagar we just selected the emergency medicine department and department of anaesthesiology and critical care for the selection of study subjects in the year 2019-2020 and prospective study was done under quantitative research approach. In our study the sample size was 40 and the purposive sampling was done.

The results of the present study depicted that (18) 45 % were males and (22) 55 % were females. The Maximum number 15 (37.5%) of patients belonged to (21-30) years of age group. The maximum 31 (77.5%) of the study subjects were from rural areas. The results showed that 24 (60%) of study subjects were unmarried. The maximum 14 (35%) of the study subjects were students, and the maximum number 10 (25%) of study subjects were received in the emergency department in the

month of October.The maximum 15 (37.50%) were having a history of Depression/suicidal tendency. The study revealed that majority 26 (65%) of study subjects had consumed OP compounds,gastric lavage sample was collected from majority 24 (60%) of study subjects, majority 26 (65%) of the study subjects received PAM as antidote for poisoning, in muscarinic symptoms the majority 36 study subjects had complained of abdominal pain, majority 29 (72.50%) of study subjects had consumed poison deliberately with the intention of suicide, out of total (40) study subjects only 2 (5%) deaths occured out of which 1 was male and 1 was female. The death percentage for male study subjects were 5.55 % (n=18) and for females the death percentage was less with 4.54 % (n=22).

Keywords: Venoms, Antipsychotic Drugs, Benzodiazepine, Antidepressants

Introduction

We are well aware of the quote of Swiss physician and chemist Paracelsus that he proposed in the principles of toxicology that "All things are poison and nothing is without poison; only the dose makes a thing not a poison." This can be alternatively cited as the statement that it is the dose that makes a thing poisonous. Thus we can say that right dose differentiates a poison and a remedy.[1]

A poison is a substance that may produce death, serious illness, or harmful effects when introduced into the body in a relatively small quantity.[2] According to World Health Organization (WHO) poisoning occurs when people drink, eat, breathe, inject, or touch enough of a hazardous substance (poison) to cause illness or death.[3]

Poisoning is a condition in which a person consumes aur inhales aur takes a poisonous or toxic substance that has severe harmful effects on the organism or a person. It has been noted worldwide that almost 700 people die from poisoning related cases everyday. Moreover several thousand cases are reported on daily basis that are affected due to one or the other reason of poisoning.[4]

Acute poisoning is exposure to a poison on one occasion or during a short period of time. Symptoms develop in close relation to the degree of exposure. Absorption of a poison is necessary for systemic poisoning.

Chronic poisoning is a condition where symptoms do not occur immediately or after each exposure. It commonly occurs following exposure to poisons that bioaccumulate, or are biomagnified, such as mercury, gadolinium, and lead.[5]

According to the WHO, more than three million poisoning cases with 251,881 deaths occur worldwide annually, of which 99% of fatal poisonings occur in developing countries, particularly among agricultural workers. Pattern of poisoning in any region depends on availability of poisons, socio economic status of the population, religious and cultural influences, occupation prevalent in the region and likewise.[6]

There are various forms of poisoning that can affect a person while he or she consumes it. Organophosphate groups of poisons are those compounds or substances that, if with the activity of acetylcholinesterase enzymes nearby, produce their toxic effect. This process leads to the accumulation of neurotransmitter acetylcholine in the neuromuscular junctions that lead to the cholinergic crisis. Organophosphates are absorbed across the lung, mucous membrane (including gut), skin and symptoms may appear within a few minutes which may last up to 12 hours.

The various types of drugs that are used in the treatment of organophosphorus poisoning are Atropine, Pralidoxime (PAM), Diazepam, Dopamine and others for symptomatic treatment. Atropine, an anticholinergic compound is the mainstay of the treatment.[7]

Acute severe organophosphorus pesticides poisoning is a medical emergency. In our hospital; emergency measures involved maintenance of an open airway and assisted ventilation, especially after extensive skin exposure or ingestion of highly fat soluble agents were followed. Treatment ensures that the patient has a patent airway and adequate breathing and circulation oxygen was provided at the first opportunity.

Rodenticides are a heterogeneous group of substances that exhibit markedly different toxicities to humans and rodents. They are among the most toxic substances regularly found in homes. The varieties of rodenticides used over the years.

Opioids are a powerful class of drugs that inhibit the transmission of pain signals to the brain and spinal cord. An opioid overdose is toxic due to excessive opioids.[8] Examples of opioids include morphine, heroin, fentanyl, tramadol, and methadone. The signs and symptoms include insufficient breathing, small pupils, and unconsciousness.[9] As non-opioid pharmaceutical options to relieve pain are limited, clinicians often prescribe opioids to manage painful medical and surgical conditions.[10]

Benzodiazepines are the substances that enhance the effectiveness of gamma-aminobutyric acid. When a person takes a prescribed benzodiazepine in an amount greater than the prescribed, this overdose can lead to the appearance of various signs and symptoms including central nervous system depression, impaired balance, slurred speech, respiratory depression and even coma. For the treatment of benzo desapine overdose support to care is of utmost importance there researchers are using flumazenil for the treatment of benzodiazepine overdose however it is use is in control overseas whether it has required effect or not.[11]

Tricyclic antidepressant most commonly used in the treatment of depression and related disorders it it was in

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the late 1950s and late 1980s that these drugs wire most commonly used for the management of depressive disorders and other psychiatric and mental health disorders tricyclic antidepresents can be taken by a person by accident or deliberately in order to go for suicide or deliberate self harm.

Poisoning Management

While receiving cases of poisoning in the emergency areas the treatment and objective or we can say goal remain focused to prevention of further poison absorption to enhance elimination of poison from the body available and administration of appropriate antidotes for the poison having a close visual on vital science of a person and prevention of exposure of person to the poisonous substance. While receiving patients in the emergency areas the majority of the poisonous clients require support for treatment only. However in case of heavy overdose we may consider initial therapy and subsequent management for the poisoned clients.

Initial Therapy

Immediate management of life threatening conditions in victims of poisoning with coma, seizures or marked airway obstruction should be as follows.

A. Keep Airway open
B. Obtain Arterial Blood Gas measurements
C. Gain Intravenous Access
D. Treat Coma and related conditions by antidotes
E. Maintain Circulation
F. Treat Seizures
G. Start ECG monitoring
H. Perform Gastric lavage
I. Search for associated Illness
J. In case of unresponsiveness go for Endotracheal Intubation

Objectives

1. To List out the Common poisonous materials.
2. To collect the Poison cases from Sher-I-Kashmir Institute of Medical sciences Soura Srinagar Kashmir.
3. To collect the data about mode of poisoning, nature of Poisoning, common Treatment to patients, and nature of death in poison cases.

Material and Methods

Quantitative research approach was selected to achieve the objectives of this study and eventually a hospital based prospective study was conducted in the Sher i Kashmir institute of medical sciences Soura srinagar from September 2019 to March 2020. Data was collected from the patients/caregivers who were above the age of 2 years admitted in the emergency medicine department and Surgical ICU of the department of anesthesiology and critical care, admitted as poisoning cases. The total number of cases included in the study over the above mentioned time period were 40 only.

The inclusion criteria set for this study was that all those patients would be included who are above the age group of 2 having a doubtful or deliberate history of taking poison irrespective of signs and symptoms, accompanied or unaccompanied by poison container, having intoxication or not. All cases of chronic poisoning, snake bites, scorpion bites, idiosyncratic reactions to drugs and food poisoning were excluded from the study.

Patients admitted with a history of poisoning in the department of emergency medicine and Surgical ICU of the department of anesthesiology and critical care during study period were studied regarding age, sex, socio-demographic data. Informed consent obtained from parents and caregivers/attendants of the patients before including them in the study. Details of the poison were noted as, name, type of agent, manner of poisoning. Clinical examination were done by seeing vital signs,clinical presentation of the patient like muscarinic symptoms, nicotinic symptoms, central effects, and treatment were also noted.

Results

The results of this study are presented in the form of tables given below. These tables represent the details of demographic variables and research variables, information related to magnitude and burden of poisoning in SKIMS soura.

Table 1.Frequency and percentage distribution of study subjects according to poisoning cases studied

Demographic Variable		Frequency	Percentage (%)
Gender	Male	18	45%
	Female	22	55%

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Age	<10 years	01	2.5%
	11-20	13	32.5%
	21-30	15	37.5%
	31-40	07	17.5%
	41-50	02	5%
	51-60	01	2.5%
	61-70	0	0%
	>71	01	2.5%
Residence	Urban	09	22.5%
	Rural	31	77.5%
Marital Status	Married	16	40%
	Unmarried	24	60%
Occupation	Student	14	35%
	Housewife	10	25%
	Unemployed	07	17.5%
	Worker	04	10%
	Non-worker	03	7.5%
	Driver	02	5%
Month of the year	September 2019	03	7.5%
	October 2019	10	25%
	November 2019	05	12.5%
	December 2019	07	17.5%
	January 2020	07	17.5%
	February 2020	04	10%
	March 2020	04	10%
Addiction History	Smoker	11	27.5%
	Non Smoker	26	65%
	Drug addict	02	5%
	Alcoholic	01	2.5%

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Past illness History	**Depression/Suicidal tendency**	**15**	**37.5%**
	Anxiety	10	25%
	Result Failure/Depression	07	17.5%
	Accidental	03	7.5%
	BPAD	02	5%
	Schizophrenia	01	2.5%
	Mania	01	2.5%
	Love Failure	01	2.5%

Table 2.Frequency and percentage distribution of study subjects according to nature of poison

Nature of suspected/Poison	Frequency	Percentage (%)
OP compounds	26	65%
Rodenticides	09	22.5%
Opioid Substances	02	5%
Benzodiazepines	01	2.5%
Quetiapine	01	2.5%
Unknown	01	2.5%
Total	40	100%

Table 3.Frequency and percentage distribution of study subjects according to nature of sample collected

Nature of sample collected	Frequency	percentage (%)
Gastric lavage	24	60%
Blood	10	25%
Urine	06	15%
Total	40	100%

The data in table 1 represents that study subjects comprised (18) 45 % males and (22) 55 % females. The Maximum number 15 (37.5%) of the study subjects belonged to 21-30 years of age group. Most of the patients (15) 37.50 % were in the age group of (21-30) years followed by the age group of (11-20) years (13) 32.50%.

The data also revealed that 31 (77.5%) were from rural areas & 09 (22.5%) patients resided in urban areas. While analysing the marital status this came forward that 24 (60%) were unmarried and 16 (40%) patients were married.

The data also depicted that while analysing their occupational status it became evident that maximum 14 (35%) study subjects were students, 10 (25%) were housewives and 07 (17.5%) were unemployed, 04 (10%) were workers and 03 (7.5%) were non-workers and only 02 (5%) were having occupation as driver. The table 1 also depicted that the maximum number 10 (25%) of patients were received in the emergency department in the month of October followed by december and january having 07 (17.5%) in each month.

The data presented in the table 1 also depicted that maximum 15 (37.50%) were having a history of Depression/ suicidal tendency in the recent past, followed by anxiety in 10 (25%) study subjects, followed by result failure in 07 (17.50%) study subjects. The data further revealed that just 03 (7.5%) had accidental poisoning, 02 (5%) had history of BPAD 02, 01 (2.5%) had schizophrenia, 01 (2.5%) having mania & 01 (2.5%) having love failure.

The data presented in table 2 depicted that the majority 26 (65%) of study subjects had consumed OP compounds, followed by 09 (22.5%) in the rodenticide category and 2 (5%) had consumed opioid substances.

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The data presented in table 3 revealed that the majority 24 (60%) of study subjects who were considered for gastric lavage sampling, followed by 10 (25%) of study subjects who were studied for blood and only 06 (15%) study subjects for study of chemical/poison.

The data presented in table 4 represented that majority 26 (65%) of the study subjects received PAM as antidote for poisoning, followed by 09 (22.50%) who received phytomenadione, followed by 02 (5%) who received naloxone as antidote, followed by 01 (2.5%) study subjects who received adrenaline, flumazenil and supportive care each.

The data presented in the table depicted the distribution of study subjects as per reported muscarinic symptoms. The majority 36 study subjects had complained of abdominal pain, followed by 26 who complained of tachycardia, followed by 25 who complained of profuse sweating, 24 were suffering from hypotension, 22 were suffering from vomiting, 21 were suffering from miosis, 20 study subjects had reported bronchospasm, and in 19 study subjects increased tracheobronchial secretions were noted.

The data presented in the table depicted the distribution of study subjects as per reported muscarinic symptoms. The majority 37 study subjects complained of confusion, 36 study subjects had complained of headache, 26 study subjects reported restlessness, 21 study subjects complained of muscle weakness, 14 study subjects reported twitching, 13 reported fasciculation, 03 each had suffered from paralysis and coma and two deaths were reported among 40 studied cases.

The data presented in table 7 represented that majority 29 (72.50%) of study subjects had consumed poison deliberately with the intention of suicide, 10 (25%) had taken the poison accidentally and only 01 (2.5%) has reported homicide.

Table 4.Frequency and percentage distribution of study subjects according to nature of antidote used for treatment of poisoning

Nature of antidote used for treatment of poisoning	Frequency	Percentage (%)
Pralidoxime(PAM)	26	65%
Phytomenadione (vit-k1)	09	22.5%
Naloxone	02	5%
Adrenaline	01	2.5
Flumazenil	01	2.5%
Supportive care	01	2.5%
Total	40	100%

Table 5.Frequency and percentage distribution of study subjects according to muscarinic symptom of poisoning

Symptom	Frequency		
	Present	Absent	Total
Abdominal pain	34	06	40
Tachycardia	26	14	40
Profuse sweating	25	15	40
Hypotension	24	16	40
Vomiting	22	18	40
Miosis	21	19	40
Bronchospasm	20	20	40
Increased tracheobronchial secretions	19	21	40

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Table 6.Frequency and percentage distribution of study subjects according to nicotinic symptom of poisoning

Symptoms	Frequency		
	Present	Absent	Total
Confusion	37	03	40
Headache	36	04	40
Restlessness	26	14	40
Muscle weakness	21	19	40
Twitchings	14	26	40
Fasciculation	13	27	40
Paralysis	03	37	40
Coma	03	37	40
Death	02	38	40

Table 7.Frequency and percentage distribution of study subjects according to mode of poisoning

Mode of poisoning	Frequency	Percentage(%)
Suicidal	29	72.5%
Accidental	10	25%
Homicidal	01	2.5%
Total	N=40	100

Table 8.Table showing number of deaths due to poisoning according to gender

Gender	No. of deaths	Percentage
Male (N=18)	01	5.55%
Female (N=22)	01	4.54%
Total	02	5

The data presented in the table 8 represented that out of total (40) study subjects only 2 (5%) deaths occured out of which 1 was male and 1 was female. The death percentage for male study subjects were 5.55 % (n=18) and for females the death percentage was less with 4.54 % (n=22). Both of the deaths were due to organophosphorus poisoning.

Discussion

The present study revealed that the highest incidence of poisoning occurred in females (55%) than Males (45%).This is similar to many studies, where a Female preponderance was found.

The study findings are supported by a study conduced by Nazima S, Bashir Y, Nabi S, Bashir N on "Intensive care management of organophosphorus poisoning patients: an experience from tertiary care centre" which revealed that out of a total of 1258 organophosphorous poisoning cases, males were (34.5%) and females were (65.5%).[12]

The present study also revealed that the majority of the cases were from the age group of (21-30) years. The reason behind this might be the fact that the person from this age group suffers from more stress and other life related events that are demanding and require more attention than capacity of a person. The stress factors may be financial, marital, professional, family problems and impulsive behaviour. It is pertinent to mention here that in our study 2 case admitted was less than 10 years of age, including the youngest case who was 3 years old and the oldest case was 72 years old. The study findings are supported by a study conduced by Sidiq S, Shah MA, Mir AW, Sofi KP on "Clinicoepidemiological profile of organophosphorus poisoning in a tertiary care center", which revealed that total number of male patients were 33 (32.35%) with mean age of 24.64 years compared to females who constituted a total of 69 cases (67.64%) with a mean age of 26.02 years. [13]

The findings in the present study revealed that most of the poisoning victims were residents of rural areas 31 (77.5%), as compared to urban residents 09 (22.5%). These findings

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are analogous to the findings of study conducted by Sidiq S, Shah MA, Mir AW, Sofi KP on "Clinicoepidemiological profile of organophosphorus poisoning in a tertiary care center", which revealed that 86 (84.3%) cases were from rural areas while as only 16(15.7%) were from the urban areas. 50.9% (52) of the patients were married. Housewives were the largest group (37.25%) followed by students and farmers.[13]

The present study concluded that 24 (60%) of study subjects were unmarried and 16 (40%) patients were married. These findings are contradictory to the findings of study conducted by Sidiq S, Shah MA, Mir AW, Sofi KP on "Clinicoepidemiological profile of organophosphorus poisoning in a tertiary care center", which revealed that 50.9% (52) of the patients were married and rest 50 (49.1%) were unmarried.[13.]

The present study also found that maximum 14 (35%) study subjects were students and 10 (25%) were housewives. It also depicted that maximum number 10 (25%) of study subjects were received in the emergency department in the month of October followed by december and january having 07 (17.5%) in each month. The results also revealed that maximum 15 (37.50%) were having a history of Depression/ suicidal tendency in the recent past and 10 (25%) study subjects were having anxiety in the recent past.

The reason for the poisoning varies from areas, geographical regions and countries. In this study, the motive of the poisoning was found to be suicidal in majority 29 (72.5%) of the study subjects. The organophosphorus substances in the form of easily available pesticides were the most common implicated agents in deliberate poisonings. It is to add here that study subjects hailing from rural areas have easy access to pesticides and are available in nearly every household having agricultural background.

The findings of the present study are in concurrence with findings of the study conducted by Sharma R, Neelanjana, Rawat N, Panwar N on "mortality and morbidity associated with acute poisoning cases in north-east India: A retrospective study" which revealed that in majority of poisoning cases, 310 (61.38%) patients consumed organophosphorus compound (OPC).[14]

In the present study the most common mode of clinical presentation was confusion (n=37), Headache (n=36), abdominal (n=34) followed restlessness (n=26), muscle weakness (n=21), twitching (n=14), fasciculation(n=13) , 03 each had suffered from paralysis and coma

In our study patients received various forms of treatment. In most of the cases treatment was supportive including gastric lavage ,oxygen, intravenous fluid and other supportive therapy.

Among the 40 patients, 38 received specific antidotes like atropine, PAM, Phytomenadione, Naloxone, Flumazenil.

The findings of the present study also added that out of total (40) study subjects only 2 (5%) deaths occured out of which 1 was male and 1 was female. The death percentage for male study subjects were 5.55 % (n=18) and for females the death percentage was less with 4.54 % (n=22). Both of the deaths were due to organophosphorus poisoning.

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