

Research Article

# Magnitude and Burden of Deliberate Self-harm (Poisoning) Cases in SKIMS Soura - A Prospective Study in A Tertiary Care Hospital

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## I N F O

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## A B S T R A C T

**Introduction:** Some of the drugs, like benzodiazepine, tricyclic antidepressants, etc. that are used on a daily basis for the treatment of various diseases become poisonous only when they are used in higher concentrations or in bulk quantities deliberately in order to induce some other effect for which the drug is not actually prescribed or advised.

**Methods:** The main aim of this study was to get an estimate of the magnitude and burden of poisoning cases in SKIMS Soura (a tertiary care hospital in Jammu and Kashmir). A prospective study was done using a quantitative research approach in the year 2019–2020. Purposive sampling was done. The sample size was calculated to be 40.

**Results:** The results of the present study depicted that 45% of participants were male and 55% were female. The maximum number of subjects (37.5%) belonged to the age group of 21–30 years. A history of depression/ suicidal tendencies was seen in 37.5% of subjects. The study revealed that 65% of study subjects had consumed OP compounds. The majority (65%) of the study subjects received PAM as an antidote for poisoning. Most (36) of the subjects complained of abdominal pain and it was found that 72.5% of the study subjects had consumed poison deliberately with the intention of suicide. Out of the total (40) study subjects, only 2 (5%) deaths occurred, of which 1 was male and 1 was female. The death percentage for male study subjects was 5.55% and for females, the death percentage was less (4.54%).

**Conclusion:** The study concluded that females were more affected than males though the mortality rate in males was more than that in females. It was observed in the research that the 21–30 years of age group was more affected and it came to the fore that students are more affected by poisoning than any other group.

**Keywords:** Organophosphorus Substance, Gastric Lavage, Muscarinic Symptoms, Nicotinic Symptoms

## Introduction

We are well aware of the quote of the Swiss physician and chemist Paracelsus proposed in the principles of toxicology stating 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 it is the dose that differentiates a poisonous substance and a drug as a remedy.<sup>1</sup>

Any substance that is taken in a body even in minute quantities and has the potential to cause death or induce mild, moderate or severe life-threatening conditions in a patient or have harmful effects on the mind and body is treated as a poison.<sup>2</sup> WHO has observed that poisoning is said to have occurred when a person inhales, breathes, eats, drinks, or injects a harmful substance that can be life-threatening to him or her.<sup>3</sup>

Poisoning is a condition in which a person consumes, inhales or takes a poisonous or toxic substance that has severe harmful effects on the organism or a person. It has been noted that almost 700 people worldwide die from poisoning-related causes every day. There are several cases reported on a daily basis of people who have consumed one or the other form of poison.<sup>4</sup>

When a person is exposed to poisoning at a particular occasion at one point in time or over a short period of time, it is said to be acute poisoning. The manifestations depend on the length and route of exposure.

When manifestations don't occur rapidly after exposure to harmful substances but are delayed over a particular period of time, it is called chronic poisoning. It generally occurs after being exposed to poisons that may bioaccumulate, or biomagnify, like lead, gadolinium, and mercury.<sup>5</sup>

The WHO estimated that in 2015-17, more than 30 lakh cases of poisoning were reported worldwide, among which 2.5 lakh cases succumbed to death after consuming poison or coming in contact with it. The agricultural workers like farmers suffer the most in developing countries. World Health Organization (WHO) estimated that 0.3 million people die every year due to various poisoning agents.<sup>3</sup>

The factors that determine the poisoning and its types are the availability of poisons, religious beliefs, socio-cultural-economic factors, occupation etc.<sup>6</sup>

There are various forms of poisoning. Organophosphate groups of poisons are those compounds or substances that affect the systems of the body with the activity of accumulation of acetylcholinesterase enzymes in nearby junctions, producing their toxic effect. This process leads to a cholinergic crisis by the accumulation of the

neurotransmitter acetylcholine in the neuromuscular junctions. Lungs constitute the main organ affected by the absorption of organophosphates. These are also absorbed across the mucous membrane (including the gut) and the integumentary system as well. On absorption, these poisons induce the development of various signs and symptoms that occur within minutes and last for longer periods of time like weeks.

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. One of the main antidotes commonly used in the treatment of poisoning is an anticholinergic drug called atropine.<sup>7</sup>

One of the medical emergencies associated with poisoning is acute severe organophosphorus pesticide poisoning. In Sher-i-Kashmir Institute of Medical Sciences in Soura, Srinagar, emergency measures involved the maintenance of an open airway for the patient and thus assisted ventilation, which too is done when a patient is exposed to poisoning via skin or ingestion. It is necessary to make sure that the patient has an open airway and is breathing. The saturation must be good enough to support adequate oxygenation to tissues and cells.

Toxicity can develop in patients who have consumed poison in one or the other form which can lead to life-threatening conditions. This toxicity also develops in those insects or rodents for whom the poison is actually being made like insecticides or rodenticides.

These insecticides and rodenticides constitute some of the most toxic substances that are commonly present in homes in rural areas.

The inhibition of pain signals from peripheral receptors to the brain and spinal cord is done by a special group of drugs called opioids. An opioid overdose is toxic when used in excess.<sup>8</sup> The commonly used opioids that can have adverse effects or can even lead to addiction are morphine, heroin, fentanyl, tramadol, and methadone. The adverse reactions can be observed in the form of various manifestations like laboured breathing patterns, pinpoint pupils, unconsciousness, coma and cyanosis.<sup>9</sup> Opioids and narcotics under controlled conditions are used to treat chronic pain or cancer pain by oncologists or registered medical practitioners.<sup>10</sup>

Benzodiazepines are the substances that enhance the effectiveness of gamma-aminobutyric acid. When a person takes benzodiazepines in an amount greater than the prescribed one or even over the counter, 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 benzodiazepine overdose, supportive care is of utmost importance. Though medical experts and researchers are using flumazenil for the treatment of benzodiazepine overdose, however, its use is controversial regarding whether it has the required effect or not.<sup>11</sup>

Tricyclic antidepressants were the most commonly used in the treatment of depression and related disorders. In the late 1950s and late 1980s, these drugs were most commonly used for the management of depressive disorders and other psychiatric and mental health disorders. Tricyclic antidepressants can be taken by a person by accident or deliberately with the intention of suicide or deliberate self-harm.

### Poisoning Management

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

### Initial Therapy

The victims of poisoning having seizures, marked airway obstruction, or in coma should be treated immediately for life-threatening conditions. This management should be done as follows:

- Keep the airway open
- Obtain arterial blood gas measurements
- Gain intravenous access
- Treat coma and related conditions with antidotes
- Maintain circulation
- Treat seizures
- Start ECG monitoring
- Perform gastric lavage
- Search for associated illness
- In case of unresponsiveness, go for endotracheal intubation

### Objectives

1. To list out some of the commonly used poisonous substances used by study subjects admitted in Sher-i-Kashmir Institute of Medical Sciences, Soura, Srinagar, Kashmir
2. To collect the selected demographic details of poisoning cases from Sher-i-Kashmir Institute of Medical Sciences, Soura, Srinagar, Kashmir
3. To collect the data about the mode of poisoning, nature of poisoning, common treatment received, symptoms present, and mortality rate in poisoning cases

### Material and Methods

A prospective study was conducted by the investigators using a quantitative research design. The study was conducted at the Sher-i-Kashmir Institute of Medical Sciences, Soura, Srinagar from September 2019 to March 2020. Data were collected from the patients/ caregivers who were above the age of 2 years and were admitted as poisoning cases to the Emergency Medicine Department and Surgical ICU of the Department of Anaesthesiology and Critical Care. The total number of cases included in the study was 40 only.

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

The patients who had a history of intake of poisons in the Emergency Medicine Department of SKIMS, Soura and were shifted or were already admitted to the Surgical ICU of the Department of Anesthesiology and Critical Care during the study period were also selected. The attendants (parents and brothers/ sisters of the patients) were explained the purpose of data collection and informed consent was obtained from them. Details of the poison (name, agent, and manner of poisoning) were noted. Clinical examinations were done by seeing vital signs, and clinical presentations of the patient like muscarinic symptoms, nicotinic symptoms, central effects, and treatment were also noted. The data were collected using a self-structured questionnaire, which was validated by experts from the medical field. Ethical clearance for the study was obtained from the Institutional Ethics Committee, SKIMS.

**Table I. Frequency and Percentage Distribution of Study Subjects (N = 40)**

Demographic Variables		Frequency	Percentage
Gender	Male	18	45.0
	Female	22	55.0

Age (years)	< 10	1	2.5
	11–20	13	32.5
	21–30	15	37.5
	31–40	7	17.5
	41–50	2	5.0
	51–60	1	2.5
	61–70	0	0.0
	> 71	1	2.5
Residence	Urban	9	22.5
	Rural	31	77.5
Marital status	Married	16	40.0
	Unmarried	24	60.0
Occupation	Student	14	35.0
	Housewife	10	25.0
	Unemployed	7	17.5
	Worker	4	10.0
	Non-worker	3	7.5
	Driver	2	5.0
Month of the year	September 2019	3	7.5
	October 2019	10	25.0
	November 2019	5	12.5
	December 2019	7	17.5
	January 2020	7	17.5
	February 2020	4	10.0
	March 2020	4	10.0
History of addiction	Smoker	11	27.5
	Non-smoker	26	65.0
	Drug addict	2	5.0
	Alcoholic	1	2.5
History of past illness	Depression/ suicidal tendency	15	37.5
	Anxiety	10	25.0
	Result failure/ depression	7	17.5
	Accidental	3	7.5
	Bipolar Affective Disorder	2	5.0
	Schizophrenia	1	2.5
	Mania	1	2.5
	Love failure	1	2.5

## Results

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

The data in Table 1 show that among the participants, 45% (18) were male and 55% (22) were female. The maximum number (15, 37.5%) of study subjects were in the age group of 21–30 years, followed by 32.50% (13) who were in the age group of 11–20 years.

It was also seen that 31 (77.5%) subjects were from rural areas and 9 (22.5%) patients resided in urban areas. While analysing the marital status, it was found that 24 (60%) patients were unmarried and 16 (40%) were married.

The maximum number (14, 35%) of study subjects were students, 10 (25%) were housewives, 7 (17.5%) were unemployed, 4 (10%) were workers, 3 (7.5%) were non-workers, and only 2 (5%) were drivers.

Most of the patients (10, 25%) were received in the emergency department in the month of October 2019 followed by December 2019 and January 2020 with 7 (17.5%) patients in both of these months.

It was also observed that most of the patients (15, 37.50%) had a history of depression/ suicidal tendencies in the recent past, followed by anxiety in 10 (25%) study subjects, and result failure in 7 (17.50%) study subjects. The data further revealed that 3 (7.5%) subjects had accidental poisoning, 2 (5%) had a history of bipolar affective disorder, 1 (2.5%) had schizophrenia, 1 (2.5%) had mania, and 1 (2.5%) had love failure.

**Table 2. Frequency and Percentage Distribution of Study Subjects according to the Nature of Poison**

Nature of Suspected Poison	Frequency	Percentage
OP compounds	26	65.0
Rodenticides	9	22.5
Opioid substances	2	5.0
Benzodiazepines	1	2.5
Unknown	1	2.5
Total	40	100.0

Table 2 depicts that the majority (26, 65%) of the study subjects had consumed OP compounds, followed by 9 (22.5%) subjects who had consumed a compound of

rodenticide category, and 2 (5%) who had consumed opioid substances.

**Table 3. Frequency and Percentage Distribution of Study Subjects according to the Nature of the Sample Collected**

Nature of Sample Collected	Frequency	Percentage
Gastric lavage	24	60
Blood	10	25
Urine	6	15
Total	40	100

Table 3 reveals that there was a majority (24, 60%) of study subjects from whom gastric lavage sample was collected, followed by 10 (25%) subjects from whom blood samples were collected, and only 6 (15%) study subjects from whom urine samples were collected to analyse the nature of poison/ chemical taken.

**Table 4. Frequency and Percentage Distribution of Study Subjects according to the Nature of Antidote used for Treatment of Poisoning**

Nature of Antidote Used for Treatment of Poisoning	Frequency	Percentage
Pralidoxime (PAM)	26	65.0
Phytomenadione (Vitamin K <sub>1</sub> )	9	22.5
Naloxone	2	5.0
Adrenaline	1	2.5
Flumazenil	1	2.5
Supportive care	1	2.5
Total	40	100.0

Table 4 shows that the majority (26, 65%) of the study subjects received PAM as an antidote for poisoning, followed by 9 (22.5%) who received phytomenadione, 2 (5%) who received naloxone as the antidote, and 1 (2.5%) each who received adrenaline, flumazenil and supportive care.

**Table 5. Frequency and Percentage Distribution of Study Subjects according to Muscarinic Symptom of Poisoning**

Symptoms	Frequency		
	Present	Absent	Total
Abdominal pain	34	6	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

The data presented in Table 5 depict the distribution of study subjects as per reported muscarinic symptoms. The majority (34) of the study subjects complained of abdominal pain, 26 complained of tachycardia, and 25 complained of profuse sweating. It was seen that 24 subjects were suffering from hypotension, 22 were experiencing vomiting, 21 were suffering from miosis, 20 had reported bronchospasm, and 19 showed increased tracheobronchial secretions.

**Table 6. Frequency and Percentage Distribution of Study Subjects according to Nicotinic Symptoms of Poisoning**

Symptoms	Frequency		
	Present	Absent	Total
Confusion	37	3	40
Headache	36	4	40
Restlessness	26	14	40
Muscle weakness	21	19	40
Twitching	14	26	40
Fasciculation	13	27	40
Paralysis	3	37	40
Coma	3	37	40
Death	2	38	40

Table 6 depicts the distribution of study subjects as per reported muscarinic symptoms. The majority (37) of the study subjects complained of confusion, 36 complained of headache, 26 reported restlessness, 21 complained of muscle weakness, 14 reported twitching, 13 reported fasciculation, and 3 each suffered from paralysis and coma. Mortality was 2 out of a total of 40 cases studied.

**Table 7. Frequency and Percentage Distribution of Study Subjects according to Mode or Reason of Poisoning**

Mode/ Reason of Poisoning	Frequency	Percentage
Suicidal	29	72.5

Accidental	10	25.0
Homicidal	1	2.5
Total	40	100.0

Table 7 shows that the majority (29, 72.50%) of the study subjects had consumed poison deliberately with the intention of suicide, 10 (25%) had consumed it accidentally and only 1 (2.5%) reported homicide.

**Table 8. Number of Deaths due to Poisoning according to Gender**

Gender	No. of Deaths	Percentage
Male (n = 18)	1	5.55
Female (n = 22)	1	4.54
Total (N = 40)	2	5.0

It is clear from Table 8 that only 2 (5%) deaths occurred among the subjects, out of which, 1 was male and 1 was female. The death percentage for male study subjects was 5.55% and for females, the percentage was less (4.54%). Both deaths were due to organophosphorus poisoning.

## Discussion

The present study showed that a higher incidence of poisoning occurred in females (55%) as compared to males (45%). This is similar to many studies, where a female preponderance was found. A study conducted by Nazima et al. revealed that out of 1258 OP cases, males were 34.5% and females were 65.5%.<sup>12</sup> These study findings are also supported by a study conducted by Sidiq et al. in which there were 33 (32.35%) male patients and 69 (67.64%) female cases.<sup>13</sup>

It was seen in the present study that the maximum number of participants belonged to the age group of 21–30 years. This could be because many people of this age suffer from stress and other demanding life-related events that require more attention than the capacity of a person. The factors causing stress may vary from person to person. It is pertinent to mention here that in our study, among all subjects, the youngest among whom was 3 years old and the oldest was 72 years old, 2 subjects were less than 10 years of age.

The findings in the present study revealed that the maximum subjects (31, 77.5%) resided in rural areas, as compared to urban residents (9, 22.5%). It was also seen that 24 (60%) study subjects were unmarried and 16 (40%) were married. These findings are analogous to those of a study conducted by Sidiq et al., in which 84.3% of participants belonged to rural areas and 50.9% were married.<sup>13</sup>

In the present study, maximum (14, 35%) study subjects were students and 10 (25%) were housewives. It was

observed that the maximum number (10, 25%) of study subjects were received in the emergency department in the month of October 2019 followed by December 2019 and January 2020 with 7 (17.5%) cases in both months. The results also revealed that most of the subjects (15, 37.50%) had a history of depression/ suicidal tendencies and 10 (25%) study subjects suffered from anxiety in the recent past.

The cause for the ingestion of poisonous substances can vary from one place to another. In this study, the most commonly observed reason for consuming poison was to end one's life which was observed in 29 (72.5%) study subjects. The organophosphorus substances in the form of easily available pesticides were the most common implicated agents. The study subjects hailing from rural areas have easy access to pesticides which are available in nearly every household having an agricultural background. These findings are in concurrence with the findings of the study conducted by Sharma et al.<sup>14</sup> It revealed that 61.38% of patients who were studied had consumed organophosphorus substances.

In the present study, the most common clinical presentation was confusion (n = 37), followed by symptoms like headache (n = 36) and abdominal pain (n = 34).

The patients received various forms of treatment in our study. Most of the patients were given intravenous fluid, oxygen support, and gastric wash as the primary intervention when received in the emergency department.

Among all patients, 38 received specific antidotes like pralidoxime, phytomenadione, naloxone, and flumazenil.

## Conclusion

It can be concluded from the study that females were more affected than males though the mortality rate of males was more than females. The most affected age group was 21–30 years and it came to the fore that students are more affected by poisoning than any other group. Most of the affected cases were from rural areas and the maximum number of study subjects had deliberately consumed poison in order to end their lives. Organophosphorus substances were consumed by most of the subjects. We should focus on the nursing management of the cases of poisoning and have to watch some signs and establish priorities to diagnose the problem and intervene accordingly.<sup>15</sup>

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