E-ISSN: 2706-9575
P-ISSN: 2706-9567
IJARM 2019; 1(2): 201-204
www.medicinepaper.net
Received: 01-10-2019
Accepted: 02-11-2019

Pusparaj Samantasinghar
Department of Forensic Medicine and Toxicology, IMS and SUM Hospital, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, India

Corresponding Author:
Pusparaj Samantasinghar
Department of Forensic Medicine and Toxicology, IMS and SUM Hospital, Siksha 'O' Anusandhan University, Bhubaneswar, Odisha, India

Clinical patterns and outcomes of acute poisoning cases in a tertiary care hospital in Bhubaneswar, India

Pusparaj Samantasinghar

DOI: https://doi.org/10.22271/27069567.2019.v1.i2b.538

Abstract
Background and Objective: Acute poisoning constitutes a critical medical emergency, necessitating a comprehensive understanding of its characteristics, severity, and prognosis. Such insights are crucial for formulating effective strategies in planning, prevention, and management. This research endeavours to examine the incidence and outcomes of acute poisoning cases within a tertiary care facility located in Bhubaneswar.
Materials and Methods: This retrospective study was conducted utilizing hospital records from a tertiary care facility affiliated with a medical institution in Bhubaneswar. The investigation encompassed 136 cases, gathering information on variables such as age, gender, time since ingestion, circumstances surrounding the poisoning, specific toxic substances involved, chemical classifications, length of hospital stay, severity of poisoning, and ultimate outcome. Data collection was carried out using a pre-structured proforma.
Results: The incidence of acute poisoning was notably higher among males (75.4%) than females (24.3%). The most prevalent age group affected was 20 to 29 years (31.2%), closely followed by the 12 to 19 year age bracket (30.2%). Organophosphorus compound (OPC) poisoning accounted for the majority of cases (36.0%). The overall mortality rate was determined to be 15.4%. Mortality resulting from corrosive substance ingestion was significantly higher compared to OPC poisoning ($p \leq 0.04$). Among the 56 patients diagnosed with OPC and carbamate poisoning, 13 patients (23.2%) experienced respiratory arrest and necessitated respiratory support. Time elapsed since ingestion played a significant role in the mortality rate of acute poisoning cases ($p \leq 0.01$).
Conclusion: Poisoning appears to be more prevalent among young males, with a notable proportion of cases resulting in mortality. This high mortality rate is primarily attributed to self-poisoning incidents involving insecticides and corrosive substances. Timely intervention provided in a tertiary care center holds promise for mitigating mortality rates associated with poisoning incidents in India.

Keywords: Poisoning, organophosphorus, drugs, corrosives, rat poisoning

Introduction
Acute poisoning poses a significant medical emergency globally, with the nature of poisons varying across different regions and even within the same country due to socioeconomic factors and cultural diversity. Accurate identification of common poisoning causes is vital for improving the management of critically ill patients [1].
Pesticide self-poisoning constitutes a substantial portion of suicides worldwide, with underestimations likely in official data from India. The proportion of suicides involving pesticides varies significantly among regions, influenced by factors beyond mere quantity, such as toxicity and usage patterns [2].
The industrial and agricultural sectors, alongside advancements in medical sciences, have introduced a plethora of insecticides, many of which pose severe toxicity upon exposure. However, comprehensive information regarding acute poisoning in adults, particularly hospitalized patients, remains limited in our country. Generally, accidental poisoning predominates in children, while suicidal poisoning is more prevalent among young adults, as evidenced by studies from Vellore indicating a rising trend of self-poisoning among this demographic [3-7]. In general, accidental poisoning is more common in children, whereas suicidal poisoning is more common in young adults [3]. A study from Vellore has shown an increasing trend of self-poisoning, especially among young adults [7]. Understanding the nature and severity of poisoning is crucial for implementing effective preventive measures. Studies of this nature serve as valuable tools for planning and managing critically ill acute poisoning cases.

Therefore, the present study aims to investigate the pattern of acute poisoning cases within a tertiary care hospital in Bhubaneswar.

Materials and Methods

This retrospective hospital record-based study was conducted at a tertiary care hospital affiliated with a medical institution in Bhubaneswar. It involved the analysis of 136 cases of acute poisoning attributed to drugs and chemicals among individuals aged 12 years and above during the year 2017. Additionally, cases of snake bites were included in the study, while instances of food poisoning and allergic reactions to drugs were excluded.

Data encompassing age, gender, time since ingestion, circumstances surrounding poisoning, specific toxic substances involved, chemical classifications, duration of hospitalization, severity, and outcomes were systematically collected using a pre-structured proforma. Circumstantial evidence such as empty bottles and tablets were also gathered from patients.

Comprehensive physical examinations, including systemic evaluations, were conducted, and all collected data were meticulously entered into a computer database. Analysis was carried out utilizing proportions and the chi-square test to discern patterns and associations within the dataset.

Results

A total of 136 patients were studied for various poisoning cases. The incidence was notably higher among males (75.4%) compared to females (24.3%), with a ratio of 3:1. The majority of acute poisoning cases occurred in the age group between 20 and 29 years (31.2%), followed closely by the 12 to 19-year age bracket (30.2%).

Regarding occupation, manual labourers comprised the largest portion of cases (44.8%), followed by housewives (13.2%), students (12.5%), farmers and the unemployed (10.2%), and businessmen (8.8%).

The leading cause of poisoning cases was organophosphorus compound (OPC) poisoning (36.0%), followed by snake bites (16.2%), drugs (11.0%), rat poison (7.3%), and others. Drugs involved included phenobarbitone, diazepam, alprazolam, cough syrups, and a mixture of tablets/capsules. Rat poison ingestion led to jaundice secondary to hepatotoxicity in all cases, whereas only one patient with drug poisoning experienced hepatotoxicity. Corrosives consisted of acids and kerosene.

The total mortality rate was 15.4% (21 cases). Among patients with corrosive poisoning, the mortality rate was 62.5%, followed by 26.5% in OPC poisoning cases. Patients who succumbed to OPC poisoning experienced respiratory arrest (9 cases), pneumonia, and septicaemia (3 cases), sudden cardiac arrest (1 case), aspiration pneumonia (2 cases), and nosocomial pneumonia (1 case). Mortality in snake bite poisoning cases (2 cases) was attributed to respiratory paralysis (1 case) and severe hemorrhage (1 case). No mortality was observed in organocarbamate and organochlorine compound poisonings. The mortality rate due to corrosives was significantly higher compared to OPC poisoning (p<0.04). [Table 1].

Table 1: The mortality due to different types of poisoning

Type of poisoning	Number of patients (%)	Mortality (%)
Corrosives	8 (5.9)	5 (23.8)
Drugs	15 (11.0)	0 (0)
Organophosphorus	49 (36.0)	13 (61.9)
Organocarbamates	7 (5.1)	0 (0)
Organochlorine	5 (3.7)	0 (0)
Rat poison	10 (7.4)	0 (0)
Snake bite	22 (16.2)	2 (9.5)
Miscellaneous (plant and unknown)	20 (14.7)	1 (4.8)
Total	136	21

Maximum patients (7) expired when there was a delay in admission to hospital by more than 8 hours after ingestion, followed by a time period of 5-8 hours (6). Patients admitted within 2 hours of ingestion had the least mortality (2). Time lapse had a significant role in the mortality in cases of acute poisoning (p≤0.01) [Table 2]. The relationship between time lapse of more than 5 hours and mortality pattern among males and females are comparable in each type of poisoning [Table 3]. First aid was not found to be significant in minimizing the mortality of patients (p≤0.768). A total of 13 (13.3%) and 8 (21%) patients expired out of total 98 patients who received first aid and 38 patients who did not receive first aid, respectively. When we subdivided the cohort according to the type of poison, again the role of first aid did not have any significant bearing on the outcome.

Table 2: The Hospital arrival and mortality time elapsed since exposure

Time lapse (hours)	Total cases	Total cases
< 2	30	2 (6.7)
2-4	38	5 (13.2)
5-8	28	6 (21.4)
>8	22	7 (31.8)
Unknown	18	1 (5.6)
Total	136	21 (15.4)

Table 3: Relationship between time lapse and mortality of each type of poisoning among males and females (N =50)

Type of poisoining	Time lapse (5 hours and more)		Mortility	
	Males (N)	Females (N)	Male (%)	Female (%)
Organophosphorus	15	5	6 (40.0)	2 (40.0)
Snake bite	3	1	1 (33.3)	0
Drugs	4	1	0	0
Rat poison	3	1	0	0
Corrosives	3	2	2 (66.7)	1 (50)
Organocarbamates	2	1	0	0
Organochlorine	1	1	0	0
Miscellaneous (Plant and unknown)	4	3	1 (25.0)	0
Total	35	15	10 (28.6)	3 (20.0)

It was found that 77.9% (106) of cases were of intentional poisoning for suicidal attempt and 22.1% (30) of cases had accidental poisoning. A majority (73%) of accidental poisoning were due to snake bite of a total of 21 patients (15.4%) who expired, 2 (9.5%) were secondary to accidental poisoning and the remaining 19 (90.5%) were secondary to intentional poisoning. Median hospital stay was 4 days. Only 13 patients (9.6%) stayed in the hospital for more than 15 days.

Eighty-one patients (60%) underwent psychiatric workup and were given psychiatric counselling and drug therapy. Reactive depression was seen in 48 (35%) patients secondary to failure in academic, social and financial areas and crisis in interpersonal adjustment. Other contributory factors were chronic alcoholism (21, 16%), financial stress (7, 6%) and manic depressive psychosis (5, 4%). Patients without psychiatric assessment were those who expired, were discharged at request or against medical advice.

Discussion

In the present study, pesticides followed by snake bite were the two most common types of poisoning. A study conducted in Pondicherry revealed a rapidly increasing trend in the incidence of OPC poisoning over a 3-year period [8]. Other studies also showed that OPC are the most commonly used poisoning substances [4, 7]. In contrast, some other studies showed that majority of poisoning admissions were due to pharmaceutical agents [3, 9]. A study conducted at the All India Institute for Medical Sciences, New Delhi, showed that drugs (18%) and insecticides (12.80%) are the most common agents out of a total of 726 poisoning cases. Out of this insecticide group, carbamate (47) formed the largest group followed by OPC (43) and organochlorine compounds [3]. This difference in the type of poisoning seen within the country may be due to the difference in the pattern of use and availability of pesticides.

In this study, majority of the poisoning cases presented between 12- and 29-year age group (84, 61.7%). Similar findings were observed in other studies [3-5]. Males dominated the present study with male to female ratio of 3:1. However, some other studies have shown that males are marginally higher compared to females [5, 6] and marginally more among females in others [10, 11]. This high proportion of poisoning among males might be due to change in the lifestyle and cultural patterns in this area and other studies. In our study, the overall mortality was found to be 15.4%. Similar data were also obtained by a study which reported an overall mortality rate of 17.3% [1]. Other studies showed it as 3%-4% [7, 9]. Mortality in the present study is probably higher because of a higher number of pesticide and corrosives poisoning cases and higher rate of complicated cases.

It was seen from our study on psychiatric assessment, that majority of the suicidal cases were associated with reactive depression. High degree of stress in academic, financial and social sectors as well as inability to achieve the targets on professional, educational and socioeconomic fronts leading to limited alternatives were the contributory factors in taking suicidal actions. Similar factors were observed by others [8, 12, 13]. Majority of the patients (78%) consumed the poison with suicidal intent as compared with 22% of the patients exposed accidentally. A study conducted in Kathmandu (16-65 years age group) reported that 97% of the poisoning cases admitted in a hospital were due to suicidal attempt [11]. However, this study did not include snake bite cases unlike in our study. In contrast, another study done at New Delhi highlighted that nearly half (47%) of poisoning cases were accidental (1-70 age group) [6]. But this study had included pediatric cases also unlike in our study in which we included only adolescents and adults.

It was found in our study that time lapse has a significant bearing on the total outcome. This is in comparison [13, 14] and contrast [1] to other studies. In contrast, there was no significant difference in mortality of the patients with and without first aid. This is mainly because the patients who received first aid at small peripheral hospitals, were referred by a doctor after development of complications, which could not be managed at the peripheral centers. The first aid given had considerable variations in the administration of gastrointestinal lavage, dosage schedule of various antidotes such as atropine, PAM and anti-snake venom, etc., at the referral hospital. People who did not receive first aid were probably brought to the hospital directly as they may have been geographically closer to this hospital, and hence administered appropriate treatment earlier compared to others. As it was a retrospective study, it was difficult to draw firm conclusions regarding the role of first aid in acute poisoning. We feel that a prospective multicentric study with uniform criteria regarding first aid will give a final answer regarding the role of first aid at the level of primary health care.

The retrospective record-based nature and relatively small sample size are the limitations of our study. Some of the information such as time lapse for some patients, miscellaneous poisoning and types of snakes were not there in the records for analysis. Overall, the current study has managed to contribute substantial additional information regarding the epidemiology and outcome of poisoning in a tertiary care hospital at a district level. Poisoning is more common in young males. The overall mortality is substantially high, mainly contributed by self-poisoning

with insecticides and corrosives. Timely transport and intervention of all critically ill poisoning cases is required to prevent the high mortality among victims. Educational and legislative interventions may be required to make the changes. There is a need to investigate further the high mortality rates associated with poisoning.

Conclusion

This study investigated the characteristics and outcomes of 136 acute poisoning cases at a district level hospital. Key findings include:

- Insecticides, particularly organophosphorus compounds, were the most frequent poison type, followed by snake bites.
- Young males (20-29 years old) were most commonly affected.
- The overall mortality rate was 15.4%, with significantly higher mortality associated with corrosive and insecticide poisonings.
- Timely intervention significantly improved patient outcomes.
- The majority of poisonings (78%) were intentional, with suicide attempts as the primary reason.
- A strong association was found between suicidal intent and reactive depression.

These findings highlight the importance of public education and intervention strategies to reduce pesticide availability and address mental health issues among young adults, particularly males. Additionally, improved access to first aid training and standardized protocols for early intervention are crucial for improving patient outcomes in acute poisoning cases.

Limitations of this study include its retrospective nature and relatively small sample size. Future research efforts should involve prospective multicenter studies with larger cohorts to confirm these findings and explore the effectiveness of specific first aid measures.

References

1. Kumar SV, Venkateswarlu B, Sasikala M, Kumar GV. A study on poisoning cases in a tertiary care hospital. Journal of Natural Science, Biology, and Medicine. 2010 Jul;1(1):35.
2. Mew EJ, Padmanathan P, Konradsen F, Eddleston M, Chang SS, Phillips MR, *et al.* The global burden of fatal self-poisoning with pesticides 2006-15: Systematic review. Journal of affective disorders. 2017 Sep 1;219:93-104.
3. Lee CW, Su H, Chen PY, Lin SJ, Shiea J, Shin SJ, *et al.* Rapid identification of pesticides in human oral fluid for emergency management by thermal desorption electrospray ionization/mass spectrometry. Journal of Mass Spectrometry. 2016 Feb;51(2):97-104.
4. Thakur S, Gurbani V. Study of acute poisoning cases in a tertiary Care Hospital of South-Eastern Odisha. Journal of Indian Academy of Forensic Medicine. 2017;39(2):184-9.
5. Mugadlimath A, Ingale MB, Gupta N. Study of socio-demographic profile of poisoning cases at Shri BM Patil Medical College Hospital and Research Centre, Bijapur.
6. Ramu R. A Study of serum amylase and acute pancreatitis in organophosphorus compound poisoning (Doctoral dissertation, Rajiv Gandhi University of Health Sciences (India)).
7. Thomas M, Anandan S, Kuruvilla PJ, Singh PR, David S. Profile of hospital admissions following acute poisoning-experiences from a major teaching hospital in south India. Adverse Drug React Toxicol Rev 2000;19:313-17.
8. Basu A. Study of Organophosphorus poisoning over 3 years. J Assoc Physicians India 1988;36:21.
9. Rajasuriya R, Awang R, Hashim SB, Rahmat HR. Profile of poisoning admissions in Malaysia. Hum Exp Toxicol. 2007;26:73-81.
10. Tagwireyi D, Ball DE, Nhachi CF. Poisoning in Zimbabwe: A survey of eight major referral hospitals. J Appl Toxicol. 2002;22:99-105.
11. Singh DP, Acharya RP. Pattern of poisoning cases at Bir hospital. J Institute Med. 2006;28:3-6
12. Law S, Liu P. Suicide in China: Unique demographic patterns and relationship to depressive disorder. Curr Psychiatry Rep. 2008;10:80-6.
13. Agarval SB. Study of 190 cases of organophosphorus poisoning. J Assoc Physicians India. 1989;31:66.
14. Priyadarsini CI, Rao SB, Sarma MB. Clinical profile of organophosphorous poisoning: A hospital based study. Journal of Evolution of Medical and Dental Sciences. 2015 May 14;4(39):6867-78.