

## SHORT COMMUNICATION

# Profile of Acute Poisoning Cases Treated in a Tertiary Care Hospital: a Study in Navi Mumbai

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## Abstract

**Background:** Periodic epidemiological studies are necessary to understand the pattern of poisoning in each region. This study was designed to evaluate the pattern of acute poisoning cases treated in a tertiary care hospital in Navi Mumbai, India.

**Methods:** This cross sectional study was conducted at Dr. D. Y. Patil Medical College, Hospital and Research Centre during July 2012 to July 2013. All cases of poisoning admitted to the hospital were included in this study. The patients' data were obtained from medical records and were documented on a pre-structured proforma.

**Results:** A total of 74 cases of acute poisoning were studied, of which 51.4% were men. Most of the patients aged 20 to 29 years (44.6%). In majority of cases, the route of exposure to poison was oral (86.5%). Most of the patients reside in urban areas (52.7%). Most of the patients were Hindus (85.1%) followed by Muslims (14.9%). The exposure mostly occurred between 6:00 pm to 12:00 am (30% of cases). The majority of poisonings (44.6%) was due to consumption of household products followed by pesticides (14.9%) and pharmaceutical agents (13.5%). Neurologic manifestations were the most common clinical findings (64.8%) followed by gastrointestinal manifestations (37%). All patients were treated successfully with no mortality. There was a significant correlation between gender and intention of poisoning ( $P < 0.001$ ), as the suicidal attempts were higher in women (69.4%). Moreover, a significant relationship existed between marital status and intention of poisoning ( $P = 0.016$ ) as the suicidal poisonings were most common among married individuals (45.7%).

**Conclusion:** The trend in poisoning is never static. Household products were identified as the main cause of poisoning in urban areas of India. Educational programs with more emphasis on preventive measures are necessary to create awareness among the general public.

**Keywords:** Epidemiologic Studies; Household Products; India; Poisoning; Tertiary Care Centers

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## INTRODUCTION

Acute poisoning is a major global health problem with significant morbidity and mortality affecting people of all age groups. Earlier reports demonstrated that everyday almost 700 people die from poisonings around the world and for every person that dies, several thousands more are affected by poisoning (1,2). It is estimated that up to half a million population die every year as a result of poisoning particularly due to pesticide poisoning (2). The exact magnitude of the problem can be elucidated by countrywise or regionwise epidemiological studies. Some hospital-based studies and public health surveillance reports clearly indicated increasing incidence of poisoning due to medications and chemicals particularly pesticides (3-5).

The pattern of poisoning varies from country to country and region to region depending on factors like geography, accessibility and availability of poison, socio-economic conditions, cultural and religious influences. In high income countries such as Norway, benzodiazepines, ethanol and

paracetamol are the most common causes of poisoning (6). In India, because the majority of the population is employed in agriculture, poisoning due to pesticides and agrochemical products is more common (7). Several studies done in India have shown organophosphates as the commonest agents of poisoning (8-11). Some recent studies have found change in the trends of poisoning in northern and southern parts of India with increasing incidence of poisoning with aluminum phosphide (12,13). After pesticides, drugs were shown to be the most common agents abused in poisonings in India (14,15).

Acute poisoning forms one of the most common causes of emergency hospital admissions. It has been reported that acute poisoning approximately constitutes 10% of admissions in medical emergency departments in India (16). Periodic epidemiological studies are necessary to understand the pattern of poisoning in each region. Studies of this nature will act as a useful planning tool for providing healthcare facilities to reduce the poisoning associated mortality rate. This study was designed to assess the pattern

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of acute poisoning in Navi Mumbai, India.

## METHODS

This cross sectional study was conducted at Dr. D. Y. Patil Medical College, Hospital and Research Centre, Nerul, Navi Mumbai during the one-year period of July 2012 to July 2013. The city of Navi Mumbai is a planned township located on the western coast of Maharashtra State of India near to the city of Mumbai. Nerul is an affluent residential and commercial node of the city of Navi Mumbai. It is the biggest and the most populated residential node of the city.

All cases of poisoning admitted to the hospital were included in this study. The data including demographic profile of patients, time of exposure to poison, time interval between poisoning and hospitalization, duration of hospital stay, nature and class of poison, clinical manifestations of patients, treatments delivered to patients, outcome and circumstances of poisoning were obtained from medical records and were documented on a pre-structured proforma. The diagnosis of poisoning was based on history given by the patients or their entourage and clinical examination. Necessary laboratory tests were also performed to confirm the diagnosis of poisoning (if available). The poisons were categorized in different groups depending upon their usage and/or chemical classification. Cases of food poisoning and adverse drug reaction were excluded from the study. The collected data were analyzed using Microsoft Excel software (Microsoft Corp., Redmond, WA, USA). P values of equal or less than 0.05 were considered as significant. Ethical clearance was taken from the institutional ethics committee before initiation of this research project.

## RESULTS

### General findings

A total of 74 admitted cases of acute poisoning were included in this study, of which 38 cases (51.4%) were men. Most of the patients aged 20 to 29 years (44.6%) and the patients in the age group above 50 years were the lowest in number (2.7%) (Table 1). The mean (SD) age of all patients was 23.7 (13.1) years. The minimum age of the patients was 11 month in both sexes and the maximum age was 52 years in women and 64 years in men respectively. In majority of cases, the route of exposure to poison was oral (86.5%) followed by injection (12.2%). Most of the patients reside in urban areas (52.7%). Most of the patients were Hindus (85.1%) followed by Muslims (14.9%). A higher frequency of poisoning was seen in unmarried cases (40.5%)

The exposure mostly occurred between 6:00 pm to 12:00 am in 30% of patients, followed by 12:00 pm to 6:00 pm in 18% of patients. Most of the patients (78.4%) were hospitalized within less than 6 hours of toxic exposure (Table 1). The mean duration of hospital stay for hospitalized patients was 3.9 (6.1) days. Most of the cases (74.3%) were treated in the intensive care unit and medical ward (24.3%) while 1 case (1.4%) was successfully treated in the emergency department of the hospital. Previous history of poisoning was seen in 7 cases (9.5%).

### Type of poison

The majority of poisonings (44.6%) was due to consumption

of household products followed by pesticides(14.9%) and pharmaceutical agents (13.5%) (Figure 1). Among poisonings with household items, most cases (66.7%) were due to phenol poisoning while the rest were due to petroleum products (20%) and camphor (13.3%). Pesticides were the second commonest cause of poisoning seen in 11 cases (14.9%) that compromised of baygon, organophosphorus compounds, rat poison, and insect repellents. All 9 cases (12.2%) of envenomation were due to snakebites. The causes of poisoning in children (less than 10 years of age) were pesticides (23%), petroleum products (23%), camphor (15.4), snakebite (15.4), pharmaceuticals (15.4) and phenol (7.7%).

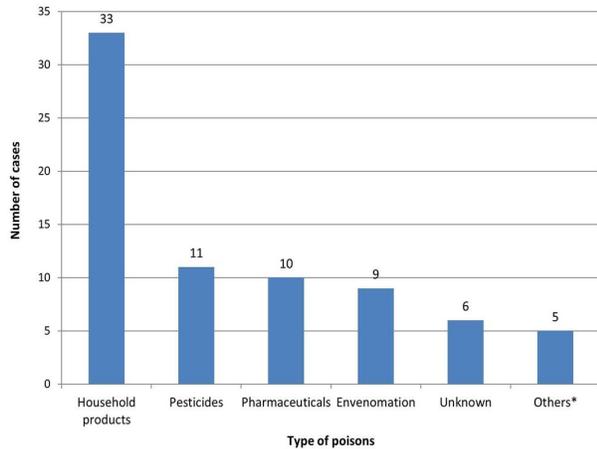
### Clinical findings and treatments

In figure 2 the frequency of each organ system involvement in the study population is shown. As it can be seen, neurologic manifestations were the most common findings (64.8%) followed by gastrointestinal manifestations (37%).

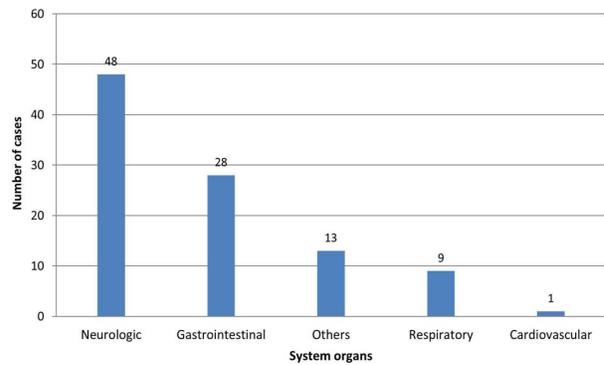
The procedure of gastric lavage was done for 11 patients (14.9%). Specific antidotes were given to 11 patients (14.9%). All patients received adequate symptomatic and supportive treatments. Lifesaving treatment in the form of

**Table 1.** Demographic features of patients and time of poisoning (n = 74)

Variable	Results (n (%))
<b>Gender</b>	
Male	38 (51.4)
Female	36 (48.6)
<b>Age group (years)</b>	
0-9	13 (17.6)
10-19	10 (13.4)
20-29	33 (44.6)
30-39	13 (17.6)
40-49	3 (4)
50-59	1 (1.4)
≥ 60	1 (1.4)
<b>Time of exposure</b>	
12 a.m. - 6 a.m.	6 (8.1)
6 a.m. - 12 p.m.	16 (21.6)
12 p.m. - 6 p.m.	18 (24.4)
6 p.m. - 12 a.m.	30 (40.5)
Undetermined	4 (5.4)
<b>Time interval between poisoning and hospitalization (hour)</b>	
< 1	26 (35.1)
1-6	35 (47.3)
6-12	1 (1.4)
12-24	2 (2.7)
>24	9 (12.1)
Undetermined	1 (1.4)



**Figure 1.** Type of Poisons (\*others include poisoning with: acetone cyanide, multiple poisoning, psychotics, yellow phosphorus and unknown poison)



**Figure 2.** System symptomatology (Details of manifestations: neurologic (headache, drowsiness, loss of consciousness and dizziness), gastrointestinal (nausea, vomiting, pain in abdomen, difficulty in swallowing), others (swelling at the site of bite, chemosis, fever, burning of eyes), respiratory (tachypnea, breathlessness, cough), cardiovascular (palpitation, tachycardia, dysrhythmia))

mechanical ventilation and intubation were used for critical cases (23%). All patients were treated successfully with no mortality.

#### *Intention of poisoning*

The intention of poisoning was found to be accidental in 38 cases (51.4%) and suicidal in 36 cases (48.6%) while none of them was homicidal in nature (Table 2). There was a significant correlation between gender and intention of poisoning ( $P < 0.001$ ), as the rate of accidental poisoning in men was higher (73.7%) while suicidal attempts were higher in women (69.4%). In addition, there was a significant relationship between marital status and intention of poisoning ( $P = 0.016$ ) as the majority of the victims of accidental poisoning were unmarried (48.7%) whereas suicidal poisoning was most commonly seen in married individuals (45.7%).

## DISCUSSION

In this study, the epidemiological profile of poisoning in the new township of Navi Mumbai was assessed for the first time. Among the cases studied, men slightly outnumbered women that was similar to findings of other studies conducted in India (13,14,17,18). This can be due to the fact that men are more exposed to stress and dangerous environmental conditions. The present study shows that the highest number of patients belonged to the age group of 20 to 29 years with a secondary peak seen in the age group of less than 10 years and 30 to 39 years that resembles the age pattern of poisoning which was found by other researchers (13,14,16-20). The possible reason for the secondary peak seen in children could be increased outdoor activity, putting objects into mouth by curiosity and consumption of unknown liquids carelessly kept in uncapped bottles (21). All cases of childhood poisoning seen in this study were accidental in nature.

Furthermore, a significantly higher frequency of

poisoning was seen in unmarried patients which was in contrast to other studies conducted in Bangladesh and India (4,16,22,23). The possible reason for this discrepancy is probably high incidence of childhood poisoning and indetermination of marital status in 28.4% of cases. Suicidal poisoning was most commonly seen in married men and women (50% and 64% respectively). This finding is similar with the study done in south Karnataka (24).

The present study showed that the highest frequency of poisoning occurred with household products followed by pesticides. However, pesticides particularly organophosphates and aluminum phosphide were the most common causes of poisoning in several studies done in India (7-14). The possible explanation to this discrepancy is the fact that most of the patients in the present study were from urban areas, and hence were less exposed to agrochemical fertilizers/compounds. Secondly, household cleaning products like phenol, bleaches, and their derivatives are stored in most houses and easy availability of such products makes them responsible for higher incidence of poisoning. Similarly, household chemicals were responsible for the highest number of accidental poisoning cases in a study done in selected hospitals of South Africa (25). Fan et al. also revealed household products as one of the most common causes of poisoning in children and adolescents less than 19 years old in New Zealand (21). Moreover, in a study done by Presgrave Rde et al. in Brazil, it was found that unintentional poisoning was most commonly occurred in children due to ingestion of household cleaning products, pesticides or corrosive agents (26). Parjapati et al. also reported household chemicals as the second most common toxic agents abused in poisonings in Ahmedabad with the highest mortality (27). It has been aptly said by various researchers that the pattern of poisoning in a region depends upon various factors such as availability, cost and access to toxic agents,

**Table 2.** Analysis of intention of poisoning

	Intention of poisoning		P value
	Accidental	Suicidal	
<b>Gender</b>			
Male	28	10	< 0.001*
Female	11	25	
<b>Marital status</b>			
Married	6	16	0.016*
Single	19	12**	
Unknown	14	7	

\* Analyzed with chi square test

\*\* Including 1 widow patient

socioeconomic status, cultural and religious characteristics of people, and regional considerations (28-30).

In this study, none of the patients died. Mortality due to poisoning depends on various factors including age, toxicity of the poison, amount consumed, health status of the patient, early hospitalization and proper management. In the present study, 78.4% of the patients were hospitalized within 6 hours of toxic exposure, and thus early management was possible. Most of the patients consumed relatively less toxic and non-fatal dose of the poison. These factors might have contributed to non-fatality seen in these cases. Similar outcomes were also noted in a research done in Brazil which household products were the most common cause of poisoning (26).

### LIMITATIONS

The small sample size and short duration of this study may be the main limitation factors affecting the results. Also, most of the cases were diagnosed on the basis of patient's history and clinical examination, while they were not confirmed with laboratory testing. This was due to non-availability of laboratory facilities in the hospital.

### CONCLUSION

In the present study, household products were identified as the main cause of poisoning in urban areas of India. This finding warrants education of the general population about the risk of poisoning at home. The health and hospital authorities should take initiatives in creating awareness about the dangers of such poisons. Establishment of a poison control center in the region will also help in preventing and controlling such poisoning events.

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