ORIGINAL ARTICLE

Acute Chemical and Pharmaceutical Poisoning Cases Treated in Civil Hospital, Ahmedabad: One year study

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Abstract

Background: To study the pattern of acute chemical and pharmaceutical poisoning in Ahmadabad, Gujarat, India.
Methods: This was a prospective study of patients with chemical and pharmaceutical poisoning who were admitted to the emergency department of Civil Hospital Ahmadabad, from 1st October 2006 to 30th September 2007. Socio-demographic details, intention of poisoning, type of poison, duration of hospitalization and outcome were recorded in a data checklist.
Results: In total, 366 cases were studied over one year. Of these, 70.8% were male. The majority (45.08%) of cases had 21 to 30 years of age. 71.6% of cases lived in rural area and 28.4% of cases lived in urban area. The most common type of poison was pesticides in 33.9% of cases, followed by household chemicals in 26.8% of cases. In 74.6% of cases, intention of poisoning was self-harm. Case fatality rate among the patients was 18.6% while this index in patients poisoned with household chemicals was the highest (19.9%) followed by pesticides (17.7%).
Conclusion: The prevention and treatment of poisoning with pesticides and household chemicals should merit high priority in the health care of Gujarat population. A specific concern should be raised toward pesticides availability and terms of sale. A national concern should be raised toward providing more laboratory and diagnostic facilities in hospitals in India.

Keywords: Acute poisoning; Pesticide; Household chemicals; Pharmaceutical agents; Emergency department

INTRODUCTION

The growing incidence of poisoning due to accidental, occupational or intentional exposure to chemical agents has drawn worldwide attention (1). It is estimated that up to half a million people die each year as a result of poisoning, especially due to exposure to pesticides (1). World Health Organization (WHO) conservatively estimated that approximately 50% of pesticide poisonings occur in developing countries though only 15% of worldwide use of pesticides is allocated to these countries (2). The exact magnitude of the problem is not known due to inadequate epidemiological data from the region. However, hospital-based studies and public health surveillance reports clearly indicate increasing incidence of poisonings due to medications and chemicals (particularly pesticides) (3-5).

A number of hospital-based retrospective studies in India showed an increasing incidence of poisoning with pesticides during last decades (6,7). Among pesticides, poisoning with organophosphourous compounds (OPC), and aluminium phosphide were the most common (6). Following pesticide substances, drugs were shown to be the most common agents abused in poisonings in India (6,7).

Pesticides are comprised of a wide range of compounds including insecticides, herbicides, fungicides, rodenticides and disinfectants (8). Thus, far more than 1,000 active substances have been incorporated in approximately 35,000 preparations of pesticides used in agriculture. OPCs are the most commonly used among them and their use is gradually increasing with high morbidity and mortality rates, especially in developing countries (7). OPC pesticide self-poisoning is estimated to kill approximately 200,000 people each year worldwide, mostly in the Asia-Pacific region and the mortality rate varies from 10-20% (9).

In most developing countries, trained personnel for poisoning care, and also diagnostic and treatment facilities are limited. Furthermore, due to lack of epidemiologic information of poisonings and complexity of ingredients of various chemical products, planning and developing national poison policies has been difficult. Thus, there is a necessity to provide more detailed national information on chemical and pharmaceutical poisonings.

In this study, we aimed to investigate the pattern of acute chemical and pharmaceutical poisoning in Ahmedabad, India.

METHODS

This was a prospective study of poisoned patients admitted to the Emergency Department of Civil Hospital Ahmadabad, from 1st October 2006 to 30th September 2007.

Ahmedabad is located in Gujarat state in western part of India on the banks of the River Sabarmati. This city is it is the fifth largest city and seventh largest metropolitan area of India with a population of approximately 6 million.

Data of poisoned patients including socio-demographic profile, type of Poison, period of hospitalization and outcome (survived or death) were recorded in a preset checklist.

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RESULTS

Sociodemographic

In total, 366 cases were studied. Of these, 70.8% were male and the majority (45.08%) of cases had 21 to 30 years of age (Table 1).71.6% of cases lived in rural area and 28.4% of cases in urban area. Regarding patient occupation, private service workers, housewives and unemployed persons were the most common (Table 1).

Characteristics of poisonings

The most common type of poison abused was pesticides in 33.9% of cases, followed by household chemicals in 26.8% of cases and pharmaceutical agents in 15.3% of cases (Table 2). Among household chemicals, acids and among pharmaceutical agents, antipsychotic medications and diazepam were the most common (Table 2). In 20.8% of cases, the toxic agent could not be identified because some patients were conscious or did not cooperate in answering questions during history taking and also laboratory facilities for detection of some specific toxic substances were not available. Self-harm was the main intention of poisoning, responsible for 74.6% of cases.

Outcome of patients

Most patients recovered (81.4%) and the majority of them were discharged during first 4 days post-admission (Figure 1). Sixty-eight patients died during admission which means case fatality rate (CFR) was 18.6%. Majority of deaths occurred within the first 24 hours post admission (53%) (Figure 2). According to class of toxic agents, most deaths were among patients who were poisoned with undetermined agents (Table 2). Followed by undetermined poisons, the highest CFR was among patients who were poisoned with household chemicals (19.9%). Nevertheless, after considering specific poisons in each class, the CFR of phorate was the highest (75%) followed by monocrotophos and chlorpyriphos (60%). Among household chemicals, acid ingestion induced the highest CFR (25%).

Table 1. Sociodemographic characteristics of patients

Variable	Frequency (%)
Gender	
Female	107 (29.2)
Male	259 (70.8)
Age Groups	
1-10	29 (7.9)
10-20	71 (19.4)
21-30	165 (45.1)
31-40	68 (18.6)
>40	33 (9.0)
Place of Residence	
Rural	262 (71.6)
Urban	104 (28.4)
Occupation	
Private service worker	161 (44)
Housewife	73 (19.9)
Unemployed	60 (16.4)
Student	27 (7.4)
Unknown	17 (4.6)
Farm laborer	12 (3.3)
General labour worker	12 (3.3)
Prisoner	3 (0.8)
Government service	1 (0.3)

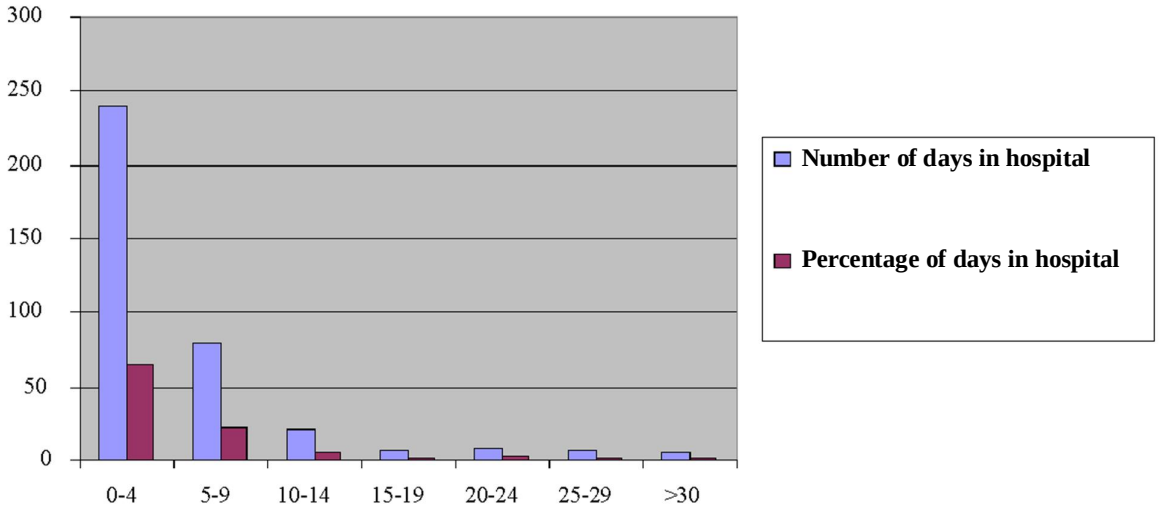

Figure 1. Length of hospital stay of poisoned patients treated in Civil Hospital, Ahmedabad

Table 2. Poisons incriminated in acute poisoning in Civil Hospital Ahmedabad, Gujarat, India from 1st October 2006 to 30th September 2007 (n; 366)

Type of Poisons	Poison	No. of Cases	No. of deaths	Case fatality (%)
Pesticide	Monocrotophos	5	3	60
	Chlorpyriphos	5	3	60
	Phorate	4	3	75
	Insecticide stick	10	1	10
	Other OPCs*	100	12	12
	Total	124	22	17.7
Pharmaceutical agents	Alprazolam	10	0	0
	Anti-tuberculosis	1	0	0
	Antipsychotic	20	2	10
	Chloroquine	3	0	0
	Diazepam	11	0	0
	Narcotics	2	0	0
	Paracetamol	3	0	0
	Antihypertensive	2	0	0
	Analgesic	2	0	0
	Ointment	2	0	0
	Total	56	2	3.57
Household chemical	Acid	53	13	25
	Kerosene	12	1	8.33
	Mosquito coil	4	0	0
	Others	31	5	16.1
	Total	99	19	19.1
Industrial chemicals (dyes, toxic fumes, heavy metals)		11	1	9.09
Not clearly identified		76	24	31.6
Total		366		

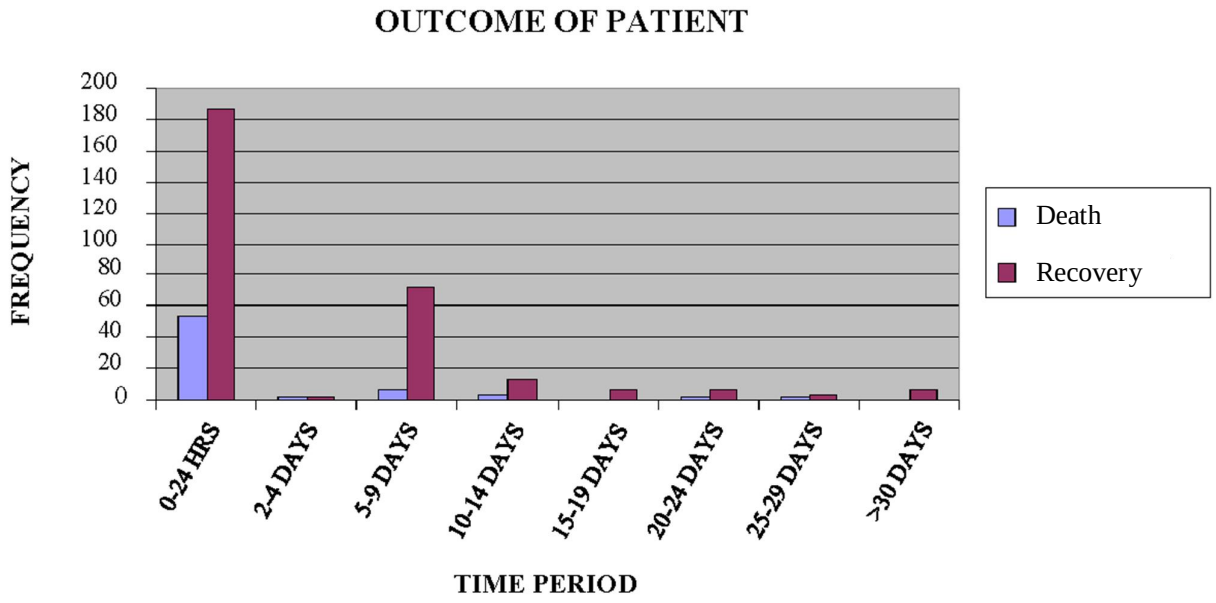

Figure 2. Outcome of poisoned patients treated in Civil Hospital, Ahmedabad

DISCUSSION

In this study, pattern of acute chemical and pharmaceutical poisoning cases treated in Civil Hospital Ahmadabad, was investigated. Epidemiologic studies on poisonings help to clarify most common poisons used, to recognize most vulnerable ages and other sociodemographic risk factors and to identify mortality of specific toxic agents. This will further help health policy makers in each region and higher administrators in each hospital to better manage hospital stockpiles and plan for providing mostly needed antidotes (1). Furthermore, it will assist to control availability of certain poisons in each community and to educate public about the dangers of most commonly used poisons (1).

In this study, it was found that pesticides, particularly OPCs; were the most common poisons responsible for acute poisoning in Ahmedabad. Poisoning with OPCs has been found to be very common in India and other Southeast Asian countries causing large number of deaths (4-7,9-12). However, in other parts of the world including Middle East and Europe they are among the least causes of acute poisoning (13-15). This could be due to easy availability of these agricultural poisons in the countries of Southeast Asia region. Strict terms of sale of pesticides in Europe has decreased poisoning with this kind of toxic substances approximately to none (14,15).

Household chemicals were the second toxic agents which were abused in poisonings in our study, however; they caused the highest mortality. This finding is very important as occasionally emergency physicians may underestimate the severity of household chemicals. Among household chemicals, acids are of great concern since poisoning with them has been found to induce poorer prognosis similar to our findings (16,17), and additionally they look like water especially when they are kept in bottle (16).

Considering specific toxic substances, the CFR of phorate, monocrotophos and chlorpyriphos which are potent organophosphate insecticides was the highest. The high mortality following OPC poisoning is a fact that has been previously shown in many studies (4,6,7,18).

In this study, it was found that the majority of cases were young people (age group of 21-30 years). This is similar to the findings of Singh and Unnikrishnan in Mangalore, south India (7). Moreover, Sarkar et al. in Bangladesh and Hovda et al. in Norway similarly showed that acute poisonings were more common in young ages (20-40 years) (4,14). This can be explained by the fact that young individuals are more vulnerable to poisoning as they are more prone to impulsivity and have more social and economic stresses (19). We also found that private service workers and housewives constituted the highest number of poisoned patients. This is quite similar to a recent study in Bangladesh which reported housewives as the highest number of poisoned patients (4). In this regard, there is no clear explanation at the current level, however; public and governmental attention should be raised to decrease the frequency and to study about the risk factors of poisoning in this stratum of society (housewives).

Poisonings in most parts of the world have shown an increasing trend (20,21). Tertiary care hospitals play a crucial role to treat and manage them (6,10). Since we were not able to determine the toxic agent in one fifth of cases, a national concern should be raised toward providing more laboratory and diagnostic facilities in hospitals in India.

LIMITATIONS

In this study, intention of poisoning in most cases was self-harm. These patients were less cooperative to answer the treating physicians and give reliable history. Moreover, in some cases, the responsible poison was recorded based on patient's history while it was not confirmed with laboratory testing. Furthermore, laboratory facilities in our hospital are limited to detect all kind of poisons.

CONCLUSION

The prevention and treatment of poisoning following pesticide and household chemicals should merit high priority in the health care of Gujarat population. A specific concern should be raised toward pesticides availability and terms of sale.

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