

One-Year Study on Pattern of Acute Pharmaceutical and Chemical Poisoning Cases Admitted to a Tertiary Care Hospital in Thrissur, India

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Abstract

Background: Identification of regional pattern of poisoning is essential for health care authorities for proper planning on prevention programs and optimized management of antidote stockpiles. This study was designed to evaluate one-year epidemiologic pattern of acute poisoning cases treated at a tertiary care hospital in Thrissur, India.

Methods: In this retrospective cross sectional study, medical records of patients with the diagnosis of acute pharmaceutical and chemical poisoning admitted to Jubilee Mission Hospital (JMH), during 1st October 2012 to 30th September 2013 were reviewed.

Results: During the study period, 168 poisoned patients (59.5% women) were treated at emergency department of JMH. Married patients outnumbered unmarried ones (55.4% vs. 44.6%). The highest number of patients aged 21 to 30 years (31.5%) followed by patients with 11-20 years of age (17.3%). Most of the poisonings occurred following suicidal ideation (72.6%). Familial disharmony (14.3%) was the most common reason behind suicidal ingestions, followed by mental disorders (11.3%). Drug poisoning made up the largest proportion of poisoning-related admissions (43.5%) followed by pesticide poisoning (37.5%). Among poisoning with pharmaceutical agents, most cases were due to paracetamol (13.7%) followed by anti-psychotics and sedatives (5.4%). In pesticide poisonings, the most common classes ingested by the patients were rodenticides and organophosphates. The most common household items ingested by the patients were petroleum products. The average length of hospital stay was 5.5 days. Seven patients (4.2%) died, of which 4 were due to organophosphates followed by 2 due to carbamates and one due to rodenticide ingestion.

Conclusion: Pharmaceutical and pesticide products were identified as the main cause of poisoning. This finding warrants educational programs for adequate safety measures on storage and use of these substances.

Keywords: Chemically-Induced Disorders; Epidemiology; India; Pesticides; Poisoning

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INTRODUCTION

Poisoning has been considered as a highly disabling condition (1). In South-East Asian countries, poisonings have been responsible for 1,840 disability-adjusted life year losses (2). It has been estimated that annual incidence of acute poisonings in India ranks among the top countries in the world (3). Experts have emphasized that identification of regional pattern of poisoning is essential for health care authorities for proper planning on prevention programs and optimized management of antidote stockpiles (4-6). Type of available medications or toxic agents in the market, prevalence of addiction and racial differences as well as health infrastructure, pre-hospital care and availability of antidotes may affect outcome of poisoned patients in each region (1). Moreover, poisoning-associated morbidity and mortalities vary from region to region and changes over a period, due to introduction and use of new-brand illegal drugs and toxic chemicals (4,7,8).

With respect to these facts, this study was designed to evaluate: 1) one-year epidemiologic pattern of acute

poisoning cases treated at a tertiary care hospital in Thrissur, India, 2) pattern of toxic agents used and 3) reasons behind each poisoning event. This study can be helpful in formulating recommendations for prevention and reduction of poisoning-related morbidities and mortality.

METHODS

Catchment area and Medical setting

Thrissur is the fourth largest city in Kerala state in south-west region of India and the 20th largest in India with a population of 325,474 persons according to 2011 Indian national census. Jubilee Mission Hospital (JMH) is a 1600-bed tertiary care hospital affiliated with Jubilee Mission Medical College and Research Institute in Thrissur. It is one of the three main medical care settings in the region. Department of emergency medicine in this hospital consists of 40 beds that provides specialized services for poisoned patients.

Study design and subjects

In this retrospective cross sectional study, medical records of patients with the diagnosis of acute pharmaceutical and chemical poisoning admitted to JMH, during 1st October 2012

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to 30th September 2013 were reviewed. Diagnosis was based on patients' history, laboratory findings and characteristic toxidrome features. Cases with venomous animal envenomation, food poisoning and drug reaction were not included in this study. Ethical approval for the study was obtained from institutional research and ethics committee.

Data collection and analysis

The patients' data were collected on a pre-structured proforma. Data collected were age, gender, marital status and occupation of patients, type of poison, route of exposure, intention of poisoning, treatment delivered to the patients and final outcome. Patients' age was categorized into 7 groups based on 10-year ranges; i.e. 0-10, 11-20, 21-30, 31-40, 41-50, 51-60 and > 60. Data were analyzed using Microsoft Excel (Microsoft, Redmond, USA). Results are presented with frequency and percentage and illustrated within charts and tables.

RESULTS

Sociodemographic features

During the study period, 53494 patients were treated at emergency department of JMH, of which 168 cases (0.3%) were due to drug and chemical poisoning. The majority of poisoned patients were women (59.5%). According to marital status, married patients (93 cases, 55.4%) outnumbered unmarried ones (73 cases, 43.5%). The remaining 2 patients were divorced. According to age-groups, the highest number of patients aged 21 to 30 years (31.5%) followed by patients with 11-20 years of age (17.3%) as shown in figure 1. It is important to note that children (< 18 years of age) were the greatest proportion of patients affected with poisoning (45 patients, 26.7%) after young adults (18-30 years of age: 54 patients, 32.1%).

Circumstances of poisoning

Month-wise distribution of poisoned patients admitted to JMH is illustrated in figure 2. The highest number of poisoning-related admissions occurred during the month of March.

Most of the poisonings occurred following suicidal ideation (72.6%) (Table 1). Familial disharmony (14.3%) was

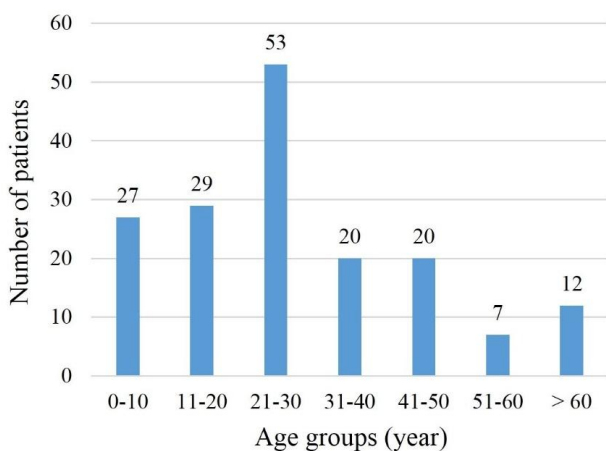


Figure 1. Distribution of poisoned patients based on age-groups (n = 168)

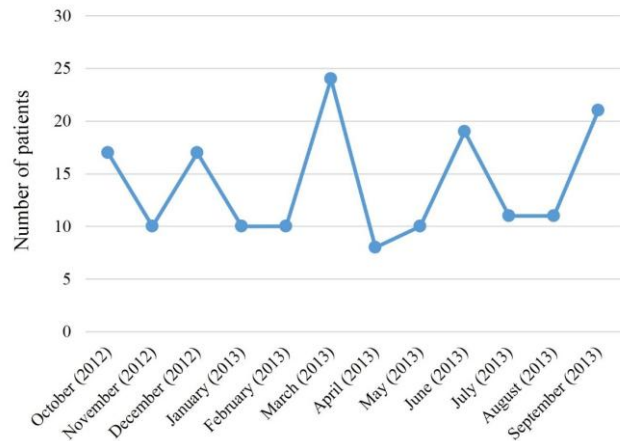


Figure 2. Month-wise distribution of acute poisoning cases admitted to JMH, 2012-2013 (n = 168).

the most common reason behind suicidal ingestions, followed by mental disorders (11.3%). Accidental ingestions was the only reason behind poisoning in the patients under 14 years old. Route of exposure in all cases was oral.

Type of poisons

Drug poisoning made up the largest proportion of poisoning-related admissions (43.5%) followed by pesticide poisoning (37.5%) (Table 2). Among poisoning with pharmaceutical agents, most cases were due to paracetamol (13.7%) followed by anti-psychotics and sedatives (5.4%). In pesticide poisonings, the most common classes ingested by the patients were rodenticides and organophosphates. The most common household items ingested by the patients were petroleum products.

Treatment and hospital stay

Gastric lavage was given to 121 cases (72.0%) and activated charcoal was administered to 78 patients (46.4) irrespective of the nature and type of poison. Atropine was given to all organophosphate and carbamate poisoning cases (29 patients, 17.3%). Nineteen patients with organophosphate poisoning received pralidoxime. Eleven patients with severe paracetamol poisoning received N-acetyl cysteine. The average length of hospital stay was 5.5 days and 109 cases (64.9%) stayed in the hospital for more than 5 days.

Outcome of patients

Seven patients (4.2%) died, of which 4 were due to organophosphates followed by 2 due to carbamates and one due to rodenticide ingestion. Among these 7 cases, 6 were men with suicidal ideation and one was a two-year girl who accidentally ingested carbamate.

DISCUSSION

In this study, one-year epidemiological profile of acute drug and chemical poisoning cases admitted to JMH was evaluated retrospectively. Women outnumbered men, a finding contrary to most studies conducted on epidemiology of poisoning in India (5,8-10). Likewise, in the studies by Bari et al and Sarkar et al on poisoning epidemiology in Bangladesh, male predominance was reported (11,12). Nonetheless, in the studies by Hovda et al in Oslo, Norway

Table 1. Intention of poisoning (n = 168)

Intention	N (%)
Accidental	46 (27.4)
Suicidal	122 (72.6)
Unknown	48 (28.6)
Familial disharmony	24 (14.3)
Mental disorders	19 (11.3)
Economical problems	10 (6.0)
Alcohol-related	8 (4.8)
Impulsive reaction to failures (e.g. exam failure)	7 (4.2)
Chronic illness	6 (3.6)

Table 2. Toxic agents ingested by the patients (n = 168)

Poison type	N (%)
Drugs	73 (43.5)
Paracetamol	23 (13.7)
Antipsychotics	9 (5.4)
Sedatives	9 (5.4)
Antihypertensives	6 (3.6)
Bronchodilators	6 (3.6)
Alternative Medicine	6 (3.6)
Antidepressants	5 (3.0)
Antihistamines	4 (2.4)
Anticonvulsants	4 (2.4)
Levothyroxine	1 (0.6)
Pesticides	63 (37.5)
Rodenticides	33 (19.6)
Organophosphates	23 (13.7)
Carbamates	6 (3.6)
Organochlorines	1 (0.6)
Household products	26 (15.5)
Plants (seeds, leaves)	6 (3.6)

and Avsarogullari et al in Kayseri, Turkey, women made up the majority of poisoned patients (4,14). This discrepancy might be related to socio-economic characteristics of each region. Moreover, socio-psychological problems such as marital disharmony, family conflicts and loss of family members are more intolerable for women (15). In addition, in the present study, venomous animal envenomations which are more common in men (16-18), were not included in the final evaluation, and so when compared with other studies in India and Bangladesh that such cases were included (5,8-12), an inconsistency between the gender distributions arises. One of the interesting findings of our study was that married cases outnumbered unmarried ones. Zhang et al similarly found that suicide attempts including suicidal poisonings are

more common in women in China (15). They speculated that marital problems are the major causes of suicide in women. Moreover, economic pressure which is the main motivating factor for suicide in men increases after marriage especially in countries experiencing economic tensions (9,10,15).

The present study showed that the highest number of patients belonged to young adults followed by children. Similar finding was noted by Hamed et al in United Arab Emirates (18), Sarker et al in Bangladesh (13), Patil et al and Singh et al in India (5,8), and Afshari et al in Iran (19). This is probably due to the stress of modern life-style, interfamily conflicts and high unemployment rates especially among young population. Moreover, risk taking behaviors are more common in young ages (20). Among children, in addition, accidental ingestions of hazardous household items such as indoor decorative plants and cleaning products frequently occurs (20,21). Hence, for health care and social planning authorities, it is essential to particularly focus on these age-ranges and their problems. In this respect, educational programs about poisons and toxic exposures for children and adolescents in schools, and raising awareness on proper storage of hazardous items at homes for parents is essential (20,22).

In the present study, higher number of poisonings was due to pharmaceutical products compared with chemical products (pesticides). This resembles to the findings by Hovda et al in Norway, Avsarogullari et al in Turkey, Hameed et al in UAE and Afshari et al in Iran (4,14,18,19). However, this is in contrast to the findings by other studies performed in India which agrochemicals and household chemicals were responsible for the majority of poisoning cases (5,8-10). The predominance of drug poisonings in this study may be related to the increase in over-the-counter pharmaceutical sales and availability of different kinds of medicine (especially psychiatric medicines) at homes. In this study, paracetamol was responsible for the greatest proportion of pharmaceutical poisonings. This can be attributed to the fact that paracetamol is an easily available medicine at each home. Studies done in western India (10), Turkey (14) and Dubai (22) also revealed paracetamol as one of the main drugs taken by the poisoned patients. Pesticides, the second commonly used poisons and the first cause of death in the present study, are generally great health threats in Southeast Asia. They are responsible for the greatest proportion of deaths due to poisoning (23,24). There is lack of surveillance over sale of these products. They are easily available especially in rural areas and among farmers (23). The high incidence of pesticide poisoning in this study and other studies in the region should bring the attention of policy makers over this public health threat.

LIMITATIONS

The present study reported the clinico-epidemiologic profile of chemical and drug poisoning in a university hospital in southwest India. Nonetheless, statistics of a hospital-based study during a limited period might not be reflective of the accurate situation of poisoning in that region. Hence, an extensive evaluation and data collection from other referral hospitals in the region can depict the regional

poisoning status more clearly. Short duration of this study was one of the limitations of the study. Another limitation is that laboratory analyses to confirm the poisoning cases were not done for some of the cases.

CONCLUSION

In the present study, pharmaceutical and pesticide products were identified as the main cause of poisoning. This finding warrants adequate safety measures for storage and use of these substances. Parental supervision and educational programs are necessary to curb the high incidence of poisoning amongst children and adolescents. Community psychiatry programs and psychological consults are required to identify high risk young adults prone to commit suicide.

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