

## Pattern of poisoning cases reported at Kasturba Hospital, Manipal

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### ABSTRACT

**Introduction:** Poisoning is an important health hazard and one of the leading causes of morbidity and mortality worldwide. **Aims & Objectives:** The study aims to gather epidemiological information regarding poisoning in Manipal such as the incidence, age, gender, religion, type of poisoning, circumstance of poisoning and outcome, so as to formulate recommendations that could probably help to reduce the morbidity and mortality due to poisoning, and preventable health hazard. **Materials & Methods:** The study comprises 592 cases of acute poisonings; admitted to Kasturba Hospital, Manipal, which is a tertiary care teaching hospital, situated in coastal Karnataka, South India, for a period of 3 years (January 2006 to December 2008). **Results:** Of the total 1,49,454 patients admitted in the hospital for treatment during the three years study period, 592 patients were for acute poisoning. This was less than 1% of all admissions. Of these 57% were males and 43% females. The majority (30%) cases were from age group of 21-30 years. Most (63.7%) poisonings were suicidal and only 35.8% were accidental in nature. The mortality outcome was 66 out of 592 cases. It is important to realize that the present study is restricted to this tertiary health care centre; hence it may be thought to be difficult to draw conclusions for the whole population of Udupi District. However, it emphasizes the need for giving priority for prevention and treatment of poisoning in the health care of the population of Karnataka especially of Udupi District.

**Key words:** Poisoning; Pattern of poisoning; Suicide; Mortality; Organophosphorous poison.

### INTRODUCTION

Acute poisoning is an important clinical emergency and contributor to morbidity and mortality. Nearly one million people are affected globally every year...<sup>1</sup> Poisoning, though common

has remained a largely neglected area of research in India. The word poison means "a substance that causes injury, illness, or death, especially by chemical means". Consumption of such substances either intentionally or accidentally results in death or serious injuries. The health impact of chemical exposures and poisoning is well recognized in most industrialized countries, where chemical safety and poison control programmes are established. The Toxic Exposure Surveillance System (TESS) data, compiled by the American Association of Poison Control Centers, for example, provides evidence about toxic exposures and subsequent health effects throughout the United States, and is utilized to identify emerging hazards, to focus prevention

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and education programmes and to guide clinical research and training.<sup>2</sup> In contrast, most developing countries like India have not yet fully recognized the risks posed by chemicals on human health and the environment. One reason is the lack of sound national epidemiological data on toxic exposures and poisoning. Some case studies and hospital-based retrospective and prospective studies have documented poisoning-related morbidity and mortality and the changing trend of chemical exposures. According to World Health Organization, more than three million poisonings occur in developing countries, particularly among agricultural workers.<sup>3</sup> Pattern of poisoning in a given area depends upon the availability of poisonous substance, occupation prevalent in the society, religious and cultural influences. The present study attempts to gather epidemiological information regarding poisoning in Manipal such as the incidence, age, gender, religion, type of poisoning, circumstance of poisoning and outcome, so as to formulate recommendations that could probably help to reduce the morbidity and mortality due to poisoning, a preventable health hazard.

## MATERIAL AND METHODS

The study comprises 592 cases of acute poisonings; admitted to Kasturba Hospital, Manipal, which is a tertiary care teaching hospital, situated in coastal Karnataka, South India, for a period of 3 years (January 2006 to December 2008). It is a tertiary level hospital, which caters to wide variety of people of Karnataka and border district of Kerala. Patients with idiosyncratic or adverse reaction to prescribed drugs and food poisoning excluded from this study. The data regarding the incidence, age, gender, religion, type of poisoning, circumstance of poisoning and outcome collected from the medical records. The nature of poison/agents involved was determined from the circumstantial evidence, reliable history, presentation of remaining stuff/container from which the poison had been consumed and suggestive clinical feature. The poisons/drugs classified in different groups based on their

characteristics. The data collected using the proforma was entered in the computer in data base and analyzed using SPSS 11.0 software.

## RESULTS

One lakh forty nine thousand four hundred fifty four patients were admitted in the hospital during the period of 3 years (January 2006 to December 2008). Of these, 592 patients admitted with acute poisoning, as depicted in the Table No. 1. This was less than 1% of the total admission.

Maximum numbers of poisoning cases were found to be in the age group of 21 to 30 years, followed by the age group of 11 to 20 years, and 31 to 40 years respectively, as depicted in the Table No. 2. In our study, we observed that males outnumbered females, it constitute 57% (male) as depicted in the Table No. 3. 94.6 % of the victims were Hindus, followed by 2.7% Christians and 2.7% Muslims, as depicted in the Table No.4.

The most common poison was organophosphorous insecticides followed by therapeutic medications and snakebite envenomation as depicted in the Table No. 5. It was observed in our study that most common circumstance of poisoning was suicidal followed by accidental and homicidal respectively, as depicted in Table No. 6. It was observed in our study that, 88.8% of cases reported to our hospital had survived while 11.2% cases had expired, as depicted in the Table No.7.

## DISCUSSION

Morbidity and mortality due to acute poisoning is a worldwide phenomenon and has enormous medical, legal and social significance. Self poisoning is one of the oldest methods tried for intentional self harm (suicide). There are reports available from different parts of the world highlighting various substances abused for acute poisoning and their toxicity. From Western countries, drugs have reported as the commonest substances abused with mortality rates varying

between 0.4% and 2.0%.<sup>4</sup> Reports available from certain Asian (Sri Lanka) and African countries (Uganda) describe organophosphates and drugs as the commonly abused toxic substances with reported mortality rates varying from 2.0% to 2.1%.<sup>5, 6</sup>

Nearly one million people are affected by poisoning globally every year.<sup>1</sup> The mortality worldwide is estimated to be 0.6% of all deaths per year as per WHO. In India deaths due to poisoning accounts for more than 50,000 people every year.<sup>7</sup> The age group with maximum incidence of poisoning was between 21 - 30 years and the poisoning is significantly less in the extremes of age. The high incidence of poisoning in the above age group is in accordance with the trends observed nationally and globally.<sup>8-11</sup> It is obviously due to the fact that this age group is the determining factor of the life in terms of studies, service, marriage and other life settlement factors. Therefore, they are subjected to substantial amount of mental stress and strain during this period. Prevalence of males was more in our study when compared to females, corroborating with other studies.<sup>12, 13</sup> Male preponderance in this study could be accounted to the fact that males are more often exposed to the stress and strain of day to day life, as well as to the occupational hazards than the females in this part of the world. However, studies from the some parts of India, United Kingdom, Iran, Turkey, and Tokyo reported more cases of poisoning in females, indicating the varying trends at different places.<sup>14-18</sup>

Majority of the poisoning victims belong to the Hindu faith reflecting the distribution of population following different religion. Hindus constitute around 84% of the regional population, 12% follow Islam and 2% are Christians.<sup>19</sup> Hindus are predominantly engaged in agriculture related occupations. The fact that farming community is more prone to poisoning may be responsible for this high rate of poisoning among Hindu community. Harming ones own life is considered 'haram' and strictly forbidden in Islam, the Muslim religion. This may be the reason for low incidence of poisoning among Muslims as such.<sup>19</sup>

Bulk of the poisoning (38.34%) cases were due to Organophosphorous insecticide poisons and was in accordance with studies conducted at national and international levels.<sup>13, 20</sup> The use of certain poisons depends on the availability and accessibility of the agent to an individual. Organophosphates continue to be the most commonly used agrochemicals in southern and western part of the country because of its easy availability and low cost.<sup>21</sup> However, the pattern of poisoning observed in the western studies revealed, prescription related drugs to be the most preferred poison.<sup>15, 22</sup>

Suicidal poisoning forms a bulk of the total poisoning victims, which is not only a national phenomenon but also a global one.<sup>4, 12, 23</sup> This high incidence of suicide by poisoning is attributed to a general belief that poisoning kills with a minimal suffering. Human life is full of stress. Hormones, peer pressure, self-esteem, confusion, self-doubt, expectations, pressure to succeed, academic responsibilities, maladjustment, financial uncertainty and physical diseases are some of the factors contributing to this stress during different age groups. Suicide is often an impulsive act resulting from the inability to adjust with their surroundings and cope with the stress they are exposed to. In the absence of emotional support and understanding, one may resort to suicide as a solution to ones problem and stress. Three poisoning cases belonging to the age group less than 10 were homicidal in nature. Homicidal pediatric poisoning cases were also reported by Surjit S *et. al.*<sup>24</sup> and Teresa A *et. al.*<sup>25</sup> Mother was the perpetrator of the crime of the homicidal cases in our study. The mortality rate in poisoning victims was 11.2%, where as the mortality rate ranged from 2.4% to 15% in various national and international studies.<sup>4, 26, 27</sup> No deaths were reported in study conducted at Sultanate of Oman.<sup>28</sup>

## CONCLUSIONS AND RECOMMENDATIONS

1. Poisoning constitutes less than 1% of the total hospital admissions.

2. Males are affected more often than the females; male to female ratio being 1.4:1.
3. Sixty eight percent of poisoning victims were in the 2<sup>nd</sup> to 4<sup>th</sup> decade of life.
4. Organophosphorous insecticide poison was the most common type of poison that was observed in 38% of the cases.
5. Most of the poisoning victims belong to Hindu faith.
6. Among the circumstances of poisoning, suicidal poisoning was predominant (63.7%) followed by accidental (35.8%) and homicidal (0.5%).
7. The mortality rate in our study is 11.2%.

Prevention of poisoning rests on a number of strategies. To develop any intervention programmes, a clear understanding of problem, risk factors and causes, situation-context of occurrence are required. To facilitate this understanding, good research delineating human, product and social/environmental factors are required to identify what can be done before any poisoning occurs, in the event of an act or after such instances. Good documentation helps in developing strategies and approaches to prevent such acts occurring in future. In addition, it requires cooperation of Governments, industry, health professionals and all others to develop integrated approaches.

Organophosphates were responsible for deaths in the majority of cases; but organophosphate compounds are important to sustain crop production. In agricultural country like India, loss of crops due to insects or pests can't be taken lightly, hence instead of banning a particular pesticide, the following measures could be adopted : all chemical should be properly labelled ; storage and sale of insecticide should be controlled through strict legislation and regulation ,and open market sale of this chemical should be banned; a fixed quota as needed per individual should be available through the specialized agency; and the public should be educated about the hazards of pesticides and their sale and proper handling.

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**Table 1. Year wise distribution of cases of poisoning**

<b>Year</b>	<b>Total admissions</b>	<b>Poisoning cases</b>
	<b>No</b>	<b>No</b>
2006	44,966	188
2007	51,320	201
2008	53,168	203
	1,49,454	592

**Table 2. Age incidence (n=592)**

Age group in years	No of cases	Percentage (%)
< 10	50	08.5
11-20	132	22.3
21-30	180	30.3
31-40	91	15.4
41-50	57	09.6
51-60	41	6.9
>61	41	6.9

**Table 3. Gender distribution (n=592)**

Gender	No. of cases	Percentage (%)
Male	340	57.4
Female	252	42.6

**Table 4. Religion-wise distribution of poisoning victims (n=592)**

Religion	No. of cases	Percentage (%)
Hindu	560	94.6
Muslim	16	2.7
Christian	16	2.7

**Table 5. Type of poisoning (n= 592)**

Nature of poison	No. of cases	Percentage (%)
Oragnophosphorous insecticides	227	38.34
Carbamates	22	3.71
Rodenticides	47	7.93
Chlorinated hydrocarbons	6	1.00
Petroleum products	25	4.22
Therapeutic drugs	91	15.37
Narcotics	10	1.68
Corrosives	32	5.40
Irritants	28	4.72
Plant poisons	19	3.20
Snake bites	79	13.34
Insect bites	6	1.00

**Table 6. Circumstance of poisoning (n=592)**

<b>Circumstances</b>	<b>No. of cases</b>	<b>Percentage (%)</b>
Suicidal	377	63.7
Accidental	212	35.8
Homicidal	3	0.5

**Table 7. Outcome (n=592)**

<b>Outcome</b>	<b>No. of cases</b>	<b>Percentage (%)</b>
Survival	526	88.8
Expired	66	11.2

