

■ ORIGINAL ARTICLE

Trends of Poisoning at Belgaum Institute of Medical Sciences, Belagavi: A Prospective Study

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ABSTRACT

INTRODUCTION:

Poisoning is an important public health problem causing significant morbidity and mortality throughout the world especially in the developing countries. The cause for unintentional deaths due to poisoning may be due to easy availability and unsafe storage of poisonous substances like pesticides, insecticides etc. Modern day stressful life style may be the cause for such intentional poisoning. Pattern of poisoning in a region depends upon various factors, ranging from availability and access of poison to the socio-economic status of the individual. The present prospective study is undertaken to determine the burden of morbidity and mortality of poisoning cases at tertiary hospital of this region and to demonstrate the socio-demographic profile.

MATERIAL AND METHODS: A cross-sectional study was conducted on all cases of poisoning admitted and/or autopsied at Belgaum Institute of Medical Sciences (BIMS) Hospital, Belgaum, during a period spread over 18 months. Information about the victims, the type of poison, manner of poisoning are obtained from hospital records, police records and by direct interrogation with the relatives and others accompanying the victim & chemical examiner's report (Regional Forensic Science Laboratory).

RESULTS: Out of 9068 admitted patients, 804 cases were of poisoning, 706 patients were admitted to medical ward and 98 victims were declared brought dead to casualty. Out of 706, 568 patients were recovered and discharged and 138 victims expired. In our study mortality rate is 19.5% and morbidity is 7.78%. Peak occurrence was in the age group of 20-29 years (39.30%). Male predominance was seen (64.1%). Most of the victims are rural habitant (65.54%) and involves upper lower class group (40%). Hindu population was most affected (92.78%). More cases were reported during winter season (50.12%). Present study shows 93.15% cases are suicidal in nature, accidental poisoning constituted 5.59% and 1% of homicidal cases of total number of cases. Insecticides accounts for 57.96% in that organo phosphorous compounds constitutes (68.24%).

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CONCLUSION: The commonest poisoning agent was Organ phosphorus. The occurrence was high among married males and in the age group of 20–29 years. Maximum number of cases was reported during winter season. The incidence of poisoning and its morbidity and mortality can be reduced by developing and implementation of effective prevention strategies.

KEYWORDS | Poisoning; Insecticides; Mortality; Morbidity; Organ phosphorus

INTRODUCTION

Poisoning is a major epidemic of non-communicable disease in the present century. Among the unnatural deaths, deaths due to poisoning come next only to road traffic accident deaths. In earlier times, the poisoning deaths from pesticides were mainly accidental but easy availability, low cost and unrestricted sale have led to an increase in suicidal and homicidal cases as well. Pesticides which were invented to protect crops from rodents, insects and humans from starvation have themselves become an important contributor to unnatural deaths.¹ It can be intentional or unintentional. Globally self-poisoning with pesticides accounts for about a third of all suicides worldwide.² In many agricultural communities of low and middle income countries, pesticide self-poisoning accounts for a large proportion of these deaths.³ According to World Health Organization (WHO), globally more than three million of acute poisoning cases with 2,20,000 deaths occur annually.⁴ It has been estimated that, in India five to six persons per lakh of population die due to acute poisoning every year.⁵

In India, as agriculture is the main occupation, insecticides and other agrochemical fertilizers are used to a greater extent and the poisoning with such products are more common.⁶ A comparative data revealed that in developed countries the mortality rate due to poisoning is only 1% to 2% but in developing countries like India it varies between 15% & 30% and is the fourth main cause of mortality in rural India.⁷ According to NCRB, 19,445 persons committed suicide by consuming poison. Tamil Nadu topped the list with 3,459 cases, followed by Karnataka with 3,173 cases.⁸ On an average of 84 deaths per day occur due to Poisoning

was noticed.⁹

Pattern of poisoning in a region depends on various factors which include availability and access to the poison, socioeconomic status of an individual, cultural and religious influences, etc. Knowledge of general pattern of poisoning in a particular region will help in early diagnosis and treatment of cases, thus decreasing the rate of mortality and morbidity. Information available in our locality with regard to acute poisoning in adults is limited. Hence this present study was carried out with the aim to find out the pattern of acute poisoning in adults in our tertiary care hospital, to evaluate the mortality and morbidity burden of poisoning cases and to demonstrate the socio-demographic profile related to poison cases.

MATERIAL AND METHODS

This cross-sectional study was carried out on the victims/patients of poisoning cases brought to casualty and mortuary of Belgaum Institute of Medical Sciences (BIMS), Belagavi from November 2012 to April 2014. Data was analyzed prospectively. All the cases with history of poisons which were admitted and/or autopsied at BIMS Hospital, Belagavi were included in the study, whereas poisoning due to animal bites and idiosyncratic drug reactions were excluded. Data was analyzed prospectively in respect to the socio-demographic profile of poisoning cases in each age group, sex, socio economic status, type of the poison, mode, place of occurrence, history of first aid treatment, reference and final outcome of patient.

RESULTS AND OBSERVATIONS

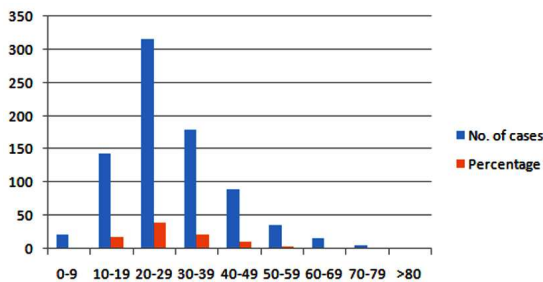
During the study period from November 2012 to April 2014, a total of 804 poisoning cases

were studied which came to the casualty of Belgaum Institute of Medical Sciences (BIMS) hospital. Among them 98 cases were declared brought dead and 706 were admitted. During the same period about 9068 patients were admitted in the medical ward which included the 706 patients of poisoning cases making the morbidity burden of poisoning to 7.78%.

In our study out of the total, maximum number of cases 516 (64.1%) were male and 288 (35.82%) cases were female. The ratio of male: female is 2:1.

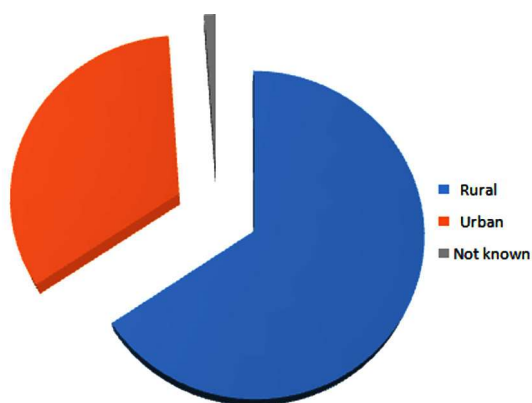
In the present study maximum number of victims 316 (39.30%) were in the age group of 20-29 years, followed by 179 (22.26%) who were in the age group of 30-39 years (Graph.1)

Graph 1: Distribution of poisoning cases according to age:



In the present study, the distribution of domicile pattern of the victims showed that 527 (65.54%) were from rural areas and 267 (33.20%) cases were from urban area (Graph no. 2)

Graph 2: Distribution of poisoning cases according to domicile pattern.



Maximum number of patients 746 (92.78%)

belonged to Hindu religion, with other religion constituting to a minimal of 7.21%. Maximum number of patients 77% were literates and 23% were illiterates. Manner of death in poisoning cases are depicted in Table 1.

Table 1: Distribution of poisoning cases according to manner of death.

Manner	Number of cases	Percentage
Suicidal	749	93.15%
Accidental	45	5.59%
Homicidal	10	1.24%
Total	804	100%

The distribution of the poisoning cases as per the socioeconomic status and seasonal variation is depicted in the Table 2 & 3.

Table 2: Distribution of poisoning cases according to Socio economic status.

Socio Economic status	Number of cases	Percentage
Upper Class - I	33	4.10%
Upper Middle Class- II	85	10.57%
Lower Middle Class-III	178	22.1%
Upper Lower Class - IV	323	40.1%
Lower Lower - V	185	23.0%
Total	804	100%

Table 3: Distribution of poisoning cases according to seasonal variation.

Season	Number of cases	Percentage
March- June	200	24.87%
July- Oct	45	5.59%
Nov- Feb	403	50.12%
Total	804	100%

MORTALITY RATE: Among the 804 cases in our study, 706 (87.81%) cases were admitted to the hospital and 98 (12.1%) cases were brought dead to casualty. Among the 706 admitted patients of poisoning, 568 (80.45%) patients recovered and were discharged, while 138 (19.54%) cases succumbed to the poisoning accounting to a mortality rate of 19.54% overall as shown in Table 4.

A total of 1167 autopsies were conducted during 18 months of study period at BIMS mortuary, among which 236 were of poisoning cases accounting for 20.22% of total autopsied cases. Duration of survival period in admitted and autopsied cases are depicted in Table 5.

Table 4: Distribution of cases according to outcome as per mortality

Total no. of poisoning cases	Brought dead to casualty		Admitted			
			Recovered and discharged:		Expired	
804	98	12.1%	568	80.45%	138	19.54%

Table 5: Distribution of Survival Period in admitted and autopsied cases.

Survival period	Number of cases	Percentage
Less than 6 hrs	48	20.33%
6 hrs – 24hrs	07	2.96%
1 day- 3days	68	28.81%
3 – 5 days	04	1.69%
5- 7 days	07	2.69%
More than 7 days	04	1.69%
Total	138	100

Most common group of poison encountered in our study was Insecticide 57.96% Then death rate was higher (6.09%) in those who co-ingested alcohol with Organo phosphorous compound(OP). Among the insecticide group of poisoning 68.24% of cases were due to Organo phosphorous compound, followed by Lice powder (Diazinon) 9.65% and least was Imidaclopramide 2.14 % as shown in Table 6 & 7.

Table 6: Distribution of poisoning cases according to Poison Consumed.

Poison	No. of Cases	Percentage
Insecticide	466	57.96 %
Alcohol + OP	49	6.09 %
Rodenticides	34	4.22%
Corrosives	31	3.85%
Tablets (Phenobarbitone, analgesic,	-	-
Antihypertensive, sedative)	32	3.98%

Fuel & its product (kerosene, petrol, diesel)	26	3.23%
Undiagnosed	25	3.10%
Alcohol intoxication	28	3.48%
Herbicide	19	2.36%
Other tab	12	1.49%
Plant irritant	-	-
(Ricinuscommunis)	09	1.11%
Negative	56	6.96%
Awaited	23	2.86%
Total	804	100

Table 7: Patterns of Insecticides Poisoning.

Season	Number of cases	Percentage
Organo Phosphorous	318	68.24%
Lice powder (Diazinon)	45	9.65%
Chlorinated Hydrocarbon	32	6.86%
Cypermethrine	22	4.72%
Carbamates	05	1.07%
Chloropyrifos	14	3.00%
Pyrethroids	20	4.29
Imidaclopride	10	2.14
Total	466	100

With increasing work stress and life style changes, people are under constant pressure

DISCUSSION

and develop depression and suicidal tendencies. So it is not surprising that the incidence of self poisoning is on rise. Therefore it is important to know the socio-demographic trend and substances commonly used in that area.

SEX: In our present study males were the majority in overall comprising (64.1%) of the case load (35.82%) cases were of female. The ratio of male: female is 2:1. The high incidence may be because males are more exposed to stress, strain and occupational hazards compared to females. The reason for this can be attributed to the fact that males form a majority of the population going out for work, and since the burden of earning for a livelihood

are on them. Our findings are in accordance with the study conducted by Vinod Go vsavi et al¹⁰, Kanchan T et al,¹¹ Gurudut K S et al,¹² Sanjeev Kumar et al,¹³ SubashVijaya kumar,¹⁴ Shetty AK¹⁵ and Andrew H et al.¹⁶ Whereas the study conducted in Moodabidri and Nepal by SadanandaNaik et al¹⁷ and Amarnath Mishra et al¹⁸ showed female predominance.

AGE: In our study it was observed that majority of the case load was in the age group of 20-29yrs constituting to (39.30%) of the overall cases which is a major bulk of the population, followed by (22.26%) of the total cases in the age group of 30-39 years which is the major bulk of reproductive age group. Above 80 years of age there was hardly (0.12%) of cases. This can be explained by the fact that young age group of 21 to 29 yrs ie. adolescent and young adults are at more risk. The attributed factors like failure in facing the difficulties of academics, unemployment, romantic failure, family conflicts, and marital disharmony all play a part and improper judgment of the problem, dowry harassment are common in case of female in case of adolescence scolding by parents for very trivial issue and failure or less percentage in exams were the reasons being noticed. Study conducted by Gurudutt et al¹², Tejasprajapathi et al¹⁹, Shetty AK et al¹⁵ and Mahabaleshshettietal²⁰ showed increase in the case load in the age group of 21-29 years, whereas there was variation in the age group in the studies conducted by SadanandNaik et al (12-25 yrs)¹⁷, Amarnath Mishra et al (16-30 yrs)¹⁸ and Unnikrishnan et al (21-40 yrs).²¹

DOMICILE PATTERN: Our study witnessed more number of cases (65.54%) from rural background around Belgaum. This may be due to the fact that as BIMS hospital is a tertiary referral center where the patients are referred from surrounding Belgaum for further treatment and management. Urban constituting 33.20% of the case load and 1.11% remains not known in unidentified deceased. Few studies show urban predominance, the reason being due to rapid urbanization leading to stiff competition, lack of employment opportunities, economic instability, work load, mental stress, mechanical life and high cost of living in urban setup.

RELIGION: Majority of the poisoning cases 746 (92.78%) in our study belonged to Hindu religion. This can be explained as the majority of population in India are Hindus. No significant correlation could be drawn and there is no comparative data available from others' studies.

Education: In our study 23% of populations are illiterates and 77% are literates. Even though maximum population in our study are literates, poisoning are common and may be due to financial crisis, personal disharmony, heavy competition, unemployment, unable to take judgement, psychological stress etc.

MANNER OF POISONING: The present study shows 93.15% cases suicidal in nature, accidental poisoning constituted 5.59 % and 1% of homicidal cases. Suicide by poisoning is the most popular form of death because poisons are easily available commercially from any stores or may be taken even at home like house hold poisons, which can be mixed with food, sometimes causes presumably painless death. Modern techniques of sample analysis and established means of detecting poison are thought to be responsible for the fall in homicidal poisoning mortalities throughout India.¹¹

SOCIO ECONOMIC STATUS: In the present study it was found that 40% were from upper lower class and least in upper class 4.10%. The suicides in upper lower class may be due to various stress factors coming from financial, social, family problems, low level of education, immaturity, Easy availability of poisons, lack of knowledge about the deleterious effects of the pesticides make them easy victims also.

SEASONAL VARIATION: Our study showed that the maximum number of cases were seen in the month of November to February with 50% of incidence followed by 25% in July to October and 24.87% in March to June. The reason for the increase in the case load during the month of November to February could not be reasoned out.

MORTALITY RATE: Among the 706 admitted patients of poisoning, 568 (80.45%) patients recovered and were discharged, while 138

(19.54%) patients expired accounting to a mortality rate of 19.54% overall. Our study showed high mortality rate when compared to study conducted at Mangalore²¹, Belgum¹², Bagalkot²², Moodabidri¹⁷ and Dharwad.²⁰ In this present study probably higher mortality rate may be due to the fact that the patients might have reached/ referred in their end stage, lack of poison detection center, lack of proper history, diagnosis, investigation, initiation of treatment in acute poisoning cases.

Common type of Poison consumed: In this present study most common poison encountered was insecticide (57.96%) followed by of alcohol with Organo Phosphorous substances (OP) (6.09%). Among insecticides, Organophosphorous compound constitutes 68.24%. The reason behind is as Belgaum being developing district, agriculture remains a main occupation in some parts of it. Insecticides and other agrochemical fertilizers such as Organophosphorous compounds are used to a greater extent and the poisoning with such products are more common. Insecticides are easily available in any stores and of relatively low cost and which are commonly and irrational used without knowledge about the toxicity and side effects of OP which makes the victim easily succumb.

Organophosphates were implicated in majority (68.24%) of the mortalities This attributes to the fact that organophosphates continue to be the most commonly used agrochemicals in Southern India. Our findings are similar to other studies in the table except some studies

in Northern India like Punjab, Aligarh etc as North India is a predominantly agricultural region and therefore, Aluminium phosphide was found to be the most common used and cause for acute poisoning with high mortality, due to its high fatality rates especially because of the non-availability of specific anti-dote and easy procurement.

CONCLUSION

Out of total 804 cases, 706 cases was admitted which constituted 7.78% of the morbidity rate when calculated among the cases which came to our tertiary care centre. The Mortality rate was 19.5%. Mortality rate is high in our study when compared to other studies, to reduce this, early diagnosis and better timely treatment should be initiated. Morbidity of the poison in our area can be cut down by the prevention of suicides in the society. The common group of poison was insecticides, in that commonest was Organo phosphorous compounds. The morbidity and mortality can be reduced by developing and implementing effective prevention strategies. Our study suggests that there is need for more strict legislations and implementation of rules, regulations, and safety measures.

Conflict of Interest:

The author has made no acknowledgment in this article.

Ethical Clearance

Obtained from BIMS, Belagavi

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