

Current Trends of Poisoning In Bikaner Region

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ABSTRACT:

Background & Objective: Poisoning is seldom induced as a priority for the health research in India, even though poisoning is an important public health problem, causing significant morbidity and mortality throughout the world and thousands of people are losing their lives prematurely from pesticide poisoning. The aim of a study to determine the various parameters of poisoning, such as type of poison involved, incidence in a pattern of poisoning, to detect the risk factor and prone groups and outcome of poison. **Method:** This prospective and observational study was carried out in the Department of Forensic Medicine and Toxicology, in association with Biochemistry and Medicine Department, S.P. Medical College, Bikaner (Rajasthan) in which poison consumed by a victim was confirmed by High performance liquid chromatography (HPLC) method by using samples of gastric lavage and blood. **Result:** The present study shows the incidence of poisoning decreases with increases of age above 40 years. Maximum number of cases belonging to Male of low socioeconomic status during September month of the year and the manner of poisoning was suicide. **Conclusion:** A detailed knowledge about the nature and magnitude of the poisoning cases in a particular area is not only important for early diagnosis and prompt treatment, but also it may help to form policies to curb the access of the population to certain very toxic substances.

Key-words: Poison, HPLC, Organophosphorus, Suicide.

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INTRODUCTION:

Poisoning is as old as our society. Of late, the incidence of poisoning cases has increased steadily with each passing year. The total numbers of suicide in the year 2012 in India were 135445 (11.2/Lakh). The poisoning is the 2nd most common mode of suicide after hanging (37.0%) and the incidence of suicide by poison in the year 2012 were 29.1% of the total number of suicides.¹ Poison is a substance (solid, liquid or gaseous), which, if introduced into the living body, or brought into contact with any part thereof, will produce ill-health or death, by its constitutional or local effect or both. Thus, almost anything is a poison.²

Poisoning both intentional and accidental, significantly contributes to mortality and morbidity throughout the world. According to WHO, three million acute poisoning cases with 2,20,000 deaths occur annually.³ Of these, 90% of fatal poisoning occur in developing countries, particularly amongst the agricultural workers.⁴ Acute poisoning forms one of the commonest causes of emergency hospital admissions. Pattern of poisoning in a region depends on a variety of factors, such as availability of poisons, socioeconomic status of the population, religious and cultural influence and availability of drugs. The exact incidence of poisoning in India is uncertain due to lack of data at the central level as most

cases are not reported, and as mortality data is a poor indicator of the incidence of poisoning. It has been estimated that about 5-6 persons per Lakh of the population die due to poisoning every year.⁴ Developing countries such as India and Sri Lanka have reported alarming rates of toxicity and deaths due to poisoning. In the United States, deaths due to poisoning number more than 775 per year.⁵ Most of the people who die from poisoning are an adult and deaths often results from intentional rather than accidental exposure.⁵

As early as 331 BC, poisonings executed on the dinner table or in drinks were reported, and the practice became a common occurrence. The use of fatal substances was seen among every social class; even the nobility would often use it to dispose of unwanted political or economic opponents. The Arabs developed a form of arsenic that is odorless and transparent, making the poison difficult to detect. This "poison epidemic" was also prevalent in parts of Asia at that time, as well.⁶ Self-poisoning causes a large majority of deaths and immense strain of pesticide poisoning is put on hospital services particularly in Asia. At 1990, Jayaratnam estimated that self-harm resulted in 2 million cases each year with 2 lakh deaths.⁷ This study has been aimed to determine the various parameters of poisoning, such as types of poison involved, incidence in a pattern of poisoning, to detect the risk factor and prone groups and outcome of poison in Bikaner region.

MATERIAL & METHODS:

This prospective and observational study was carried out by using information regarding age, gender, marital status, demography, manner, time of occurrence, stay in hospital and patient outcome from the hospital records, victim's relatives and accompanying police records in the Department of Forensic Medicine and Toxicology, in association with

Biochemistry and Medicine Department, S.P. Medical College, Bikaner (Rajasthan), during the study period (01 April 2014 to 31 March 2015). The poison consumed by a victim will be confirmed by High performance liquid chromatography (HPLC) method by using samples of gastric lavage and blood.

Inclusion Criteria

1. Cases admitted in P.B.M. & Associated Group of Hospitals, Bikaner (Rajasthan) in one year duration were taken for study.

Exclusion Criteria:

1. Poisoning by animal and insects bite.
2. Patients who have absconded and LAMA from hospital.

RESULTS:

The present study shows the incidence of poisoning decreases with increases of age above 40 years. Out of 902 cases maximum 588 cases (65.19%) were male and 314 cases (34.81%) were female (Table-1) and the highest number of poisoning cases was in September -111 cases (12.36%), followed by July- 86 cases (9.53%) and then August which constituted 85 cases (9.42%). The incidence of poisoning cases was highest in September (Table-2). Table-3 shows the highest number of poisoning cases was in lower socioeconomic status 530 cases out of 902 cases (58.76%) and Table-4 shows the manner of poisoning highest is suicidal 459 cases (50.89%) followed accidental 402 cases (44.57%), undetermined in 38 cases (04.21%) and lowest in homicidal cases 3 cases (00.33%).

The present study shows the outcome of poisoning, highest number of cases was cured and discharged 465 cases (51.55%) followed by the patients who left against medical advice (LAMA) or absconded, 300 cases (33.26%) and death was seen in 137 cases (15.19%) (Table-5). The study shows the highest number of poisoning cases were agricultural worker

Table: 1
Age & Sex Wise Incidences of Poisoning Cases

Age Groups	Male	Female	Total
0-10 yrs	104	36	140
11-20 yrs	110	94	204
21-30 yrs	199	112	311
31-40 yrs	103	55	158
41-50 yrs	48	13	61
51-60 yrs	18	03	21
Above 60 yrs	06	01	07
Total Cases	588 (65.19%)	314 (34.81%)	902 (100%)

373 cases (41.35%) and lowest no of cases only 13 (1.44%) in the service class (Table-6). In our study poison was detected in 61.67% cases (177 cases out of 287 cases) while poison was not detected in 38.33% cases (110 cases out of 287 cases). Out of total 177 cases Organophosphorus poison found in 99 cases (53.93%) followed by Aluminium Phosphide poisoning (18.07%), Rodenticides (9.05%), Organochlorines (5.65%), Carbamates (5.08%), Alcohol (4.53%) and Drug overdose (1.69%) (Table-7).

Failure to detect poison:

Sometimes, despite obvious poisoning, lab analysis of poison is unsuccessful. Reasons are:

1. Poison already eliminated:
 - I. Through vomiting and diarrhea (e.g. In irritant poisons)
 - II. Through lungs by exhalation, evaporation etc.
 - III. Through complete metabolism (detoxification, conjugation and elimination) especially in delayed deaths.
2. The poison may be inherently undetectable by routine methods (e.g. Some vegetable poisons,

3. Extraction of poisons may be difficult. Biological venoms and toxins (being proteinaceous in nature)
4. Decomposition setting in – some persons may be destroyed
5. Poison present in body in exceedingly small amount.
6. Human errors:
 - I. Faulty preservation
 - II. Wrong material sent for examination
 - III. Insufficient material.

Table: 2
Shows The Month Wise Incidences of Poisoning Cases

Month	Male (%)	Female (%)	Total (%)
April 14	44 (4.88)	26 (2.88)	70 (7.76)
May 14	40 (4.43)	29 (3.22)	69 (7.64)
June 14	37 (4.10)	27 (2.99)	64 (7.10)
July 14	48 (5.32)	38 (4.21)	86 (9.53)
August 14	63 (6.98)	22 (2.44)	85 (9.42)
September 14	76 (8.43)	35 (3.88)	111 (12.36)
October 14	56 (6.21)	28 (3.10)	84 (9.31)
November 14	42 (4.66)	21 (2.33)	63 (6.98)
December 14	43 (4.76)	22 (2.44)	65 (7.21)
January 15	39 (4.32)	19 (2.11)	58 (6.43)
February 15	50 (5.54)	28 (3.10)	78 (8.65)
March 15	50 (5.54)	19 (2.11)	69 (7.64)
Total	588 (65.19)	314 (34.81)	902 (100)

DISCUSSION:

In the present study, highest incidence of poisoning was observed in age group 21-30 years accounted 34.48% which is similar with observations of other

workers,⁸⁻¹² which can be explained by the fact that the persons of this young age group are suffering from stress of the modern life style, failure or less percentage in the exams, scolding from parents or teachers, failure in love, family problems etc.

Table: 3
Socio-Economic Status and Area Wise Incidences of Poisoning

Socioeconomic Status	Rural (%)	Urban (%)	Total (%)
Upper Class	007 (00.77)	013 (01.44)	020 (02.22)
Middle Class	249 (27.61)	103 (11.42)	352 (39.02)
Lower Class	359 (39.80)	171 (18.96)	530 (58.76)
Total	615 (68.18)	287 (31.82)	902 (100)

Table: 4
Incidences of Poisoning Cases According To Manner Of Poisoning

Manner	No. of Cases (%)
Suicidal	459 (50.89)
Accidental	402 (44.57)
Homicidal	03 (00.33)
Undetermined	38 (04.21)
Total	902 (100)

Table: 5
Incidences of Outcome of Poisoning Cases

Outcome	No. of Cases (%)
Discharge	465 (51.55)
Death	137 (15.19)
Lama & Absconded	300 (33.26)
Total	902 (100)

Change over from the concept of joint family to nuclear family has forced modern youth to face the problem of day to day living, both at home and outside, on

Table: 6
Incidences of Occupational Wise Poisoning Cases

Occupation	No. of Cases (%)
Agricultural	373 (41.35)
Labourer	288 (31.93)
Serviceman	13 (1.44)
Shopkeeper	20 (2.22)
Students	57 (6.32)
Unemployed	33 (3.66)
Not Applicable To Children < 5 Yrs of Age	118 (13.08)
Total	902 (100)

Table: 7
Shows the Poisoning Due To Different Type of Substances on HPLC Machine

Name Of Poison	No. of Cases (%)
Organophosphorus	99 (55.93)
Aluminium Phosphide	32 (18.07)
Carbamates	09 (05.08)
Organochlorine	10 (05.65)
Rodenticide	16 (09.05)
Drug Overdose	03 (01.69)
Alcohol	08 (04.53)
Total	177 (100)

their own without the much needed advice from the elders. When these problems and tensions become unbearable, ending one's life seems to be the only solution of them. Sharma et al¹³ stated that people in the extremes of the age groups, i.e. below 15 years and above 60 years, were least prone to poisoning and the higher incidence of poisoning is found in the age group of 15-30 years. Singh et al¹⁴ have also studied that younger age group is more susceptible to the lure of riches, the modern society's

hard stick of success and frustrations caused by the inability to cope with the highly competitive, indifferent and materialistic society have resulted in increased poisoning in younger generations.

In the present study, males (65.19%) showed higher incidence of poisoning than the females (34.18%). These findings are also similar to findings of other studies conducted by Reddy and Gannar at Gulbarga shows that 65.65% of cases were male.¹⁵ Our findings are also similar to the study of Shetty in which 51.5% of cases were males.¹⁶ The results of the present study showed that the peaks of poisoning admission were during spring months (September to November), followed by summer months (March to May), and lowest in the winter. These findings are consistent with Batra et. al;¹⁷ who found maximum cases being admitted during the mid-monsoon months of August and September and the lowest numbers of cases were being admitted were in the month of January. This is probably due to socioeconomic reasons like monsoon dependent cultivation practice, agricultural based economy, loss of crops, exorbitant rates of interest and indebtedness to privacy usury, inability to meet the increased financial burden due to marriages of children, failure in examination etc.¹⁸

The present study shows the highest numbers of poisoning cases are in the lower socioeconomic class (58.76%) followed by middle class (39.02%), and lowest in upper class (2.22%). In a study carried out by Chaudhary et. al,¹⁹ it was observed that socioeconomic status has different effects on the basis of area of residence. In rural deaths low socioeconomic status confers higher odds of suicide whereas in urban areas medium socioeconomic status is having higher odds of suicide. This can be explained by the fact that individuals of lower and middle socioeconomic class having less education, unemployment, more family

responsibilities, financial crisis, comparison of their lifestyle of modern lifestyle, poverty, large family size, etc.

The present study shows the manner of poisoning highest is suicidal (50.89%) followed by accidental (44.57%), undetermined (04.21%) and lowest in homicidal cases (00.33%). This may be because of the reasons like economic crisis, examination failure, love failure, quarrels, unemployment, and chronic illness. Our findings are in accordance with a study of various authors.²⁰⁻²⁴ In the present study the highest numbers of poisoning cases were reported among agricultural worker (41.35%) and the lowest number in the service class (1.44%). Agricultural workers solely depend on agricultural income for their livelihood. Due to some reason (i.e either lack of water or flood) if they are not able to generate the required income for their day to day living and commitments, they may get frustrated and resort to suicide by these agricultural insecticides, pesticides or weed killers, which are available to them.²⁵

The commonest poison observed was Organophosphorus compounds (34.92%) in this study. Our observations are consistent with studies of Purnan and Nagappa,²⁶ Ramesha²⁷ who observed that majority of poisoning cases (36%) was due to organophosphorus compounds. It is clearly evident from the above figures that the agriculture and related profession that plays pivotal role in these cases of poisoning. So it is the duty of general public, N.G.O's, Government and Doctors to educate this venerable portion of society. Organochlorines, Aluminium Phosphide and other spray poisonings can be restricted by having a control on their sale and distribution. The preventive and educational measures can be more effectively designed and implemented if epidemiological data derived from the poison information centers are utilized. Young adults can be checked by psychological counselling by talking their

problems sympathetically and on humanitarian grounds.

CONCLUSION:

India is a developing country of South Asia. The rural population of this country is mostly dependant on agriculture for a living and 70% population of our country is rural. There is very little information available on the access of the population to different types of poisons. Major occupation in Bikaner region is farming with the majority of the population living in rural areas. Agricultural practice is monsoon dependent and the farmers usually belong to lower socioeconomic strata. A detailed knowledge about the nature and magnitude of the poisoning cases in a particular area is not only important for early diagnosis and prompt treatment, but also it may help to form policies to curb the access of the population to certain very toxic substances.

Conflict of interest:

The authors have no conflict of interest.

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