Original Research Paper

Study of Poisoning Cases in an Indian Tertiary Care Teaching Hospital

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Abstract

Morbidity and mortality as a result of poisoning, is a raging problem worldwide. The poignant part of the problem is that these are mostly preventable, if a basic treatment infrastructure facility is available with immediate accessibility. The present study was conducted from August 2013 to January 2014 in IMS & SUM Hospital, a tertiary care teaching hospital at Bhubaneswar, Odisha, India. In this prospective study we analyze, the various factors that play a role in the poisoning cases and the treatment outcome along with attempts to find solutions to prevent such tragic deaths and morbidity, in this part of the country. In this study incidence of poisoning cases are 40% out of all medico-legal cases registered. Most of the poisoning cases are males, aged between 20 to 30 years and unmarried. Suicide is the most common manner of poisoning. Home is the most suitable site for poisoning, followed by work place and remote place. Insecticides are the most common poison encountered in this region, followed by snake bite. Majority of the patients presented to the hospital within four hours of poisoning and most of them were completely cured after the treatment.

Key Words: Morbidity, Mortality, Poisoning, Treatment outcome, Solutions

Introduction:

Poison is any substance which if introduced in the living body by any route could cause ill health or death. Poisoning both accidental and intentional is a significant contributor to morbidity and mortality throughout the world. According to WHO, three million acute poisoning cases with 2, 20, 000 deaths occur annually. Of these, 90% of fatal poisoning occurs in developing countries particularly among agricultural workers. [1] It is estimated that more than 50,000 people die every year from toxic exposure in India. [2]

Acute poisoning forms one of the common causes of emergency hospital admissions. Pattern of poisoning in a region depends on variety of factors, such as availability of the poisons, socio-economic status of the population, religious and cultural influences and availability of drugs. [1]

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The commonest agents of poisoning in India appear to be pesticides, sedatives, chemicals, alcohol, plant toxins, household poison and snake bite etc. Of late, Aluminium Phosphide has begun to emerge as a major player in the toxicological field, particularly in some northern Indian states.

Among children the commonest culprits include kerosene, household chemicals, drugs, pesticides and garden plants. [2, 3] Among the adults, females predominate in all age groups, with an evident preponderance in the second and third decades of life. Acute poisoning in children is almost entirely accidental, while in adults it is mainly suicidal. [1]

Mortality and morbidity of poisoning cases varies from country to country depending on the nature of poison and availability of facilities and treatment by qualified doctors. [1]

The treatments goals in poisoning and snake bite include support of vital signs, prevention of further poison absorption, enhancement of elimination, administration of antidote and prevention of re-exposure. Besides to achieve early treatment initiation which is utmost crucial, various first aid steps are quite significant in the treatment outcome. [4]

Clinical and toxicological diagnostic and treatment facilities are often inadequate due to lack of trained personnel thus requiring strengthening of national capabilities for prevention, diagnosis and treatment. Further the

lack of information on the ingredients of various products available make it difficult to plan and develop national poison policies and control program and to provide timely and reliable source of information to doctors and other medical personnel and first responders on the appropriate treatment. [2]

Aims and Objectives:

The huge burden of poisoning and snake bite cases demands comprehensive strategies for reducing the morbidity and mortality. Hence this prospective observational study was conducted with an aim to deduct the demographic profile of poisoning in this region, identify factors related to outcomes in such cases and to suggest strategies for reducing associated morbidity and mortality.

Material and Methods:

The study was conducted prospectively in the casualty, indoor, I.C.U. and medical record section of IMS & SUM Hospital Bhubaneswar, Odisha, India. All patients who presented with any type of acute poisoning including snake bite from August, 2013 to January, 2014 were included in this study. Cases excluded from the study are those with improper history of poisoning and brought dead patients.

Data obtained included demographic details such as age, sex, marital status, socio-economic status. The time and place of poisoning and snake bite and arrival at the hospital were noted.

Manner of poisoning noted from history. The details of the first aid given, outdoor and indoor treatment received along with the treatment outcome was included in the study.

All the data were presented as numbers and percentage and the observation and results deducted and discussed with similar studies. Chi-square test was used to predict the strength of association between different variables. A 'p' value of <0.01 was considered highly significant, 'p' value of <0.05 was considered significant and 'p' value of >0.05 was considered insignificant.

Finally conclusion of the study found out after the discussion.

Observation and Results:

The number of poisoning cases found was n=78 (40%) among all medico-legal cases (n=195) registered during the study period. Males (57.69%) dominated over females (42.31%) as per the number of poisoning cases registered. Most common age group found was 21-30 year (34.61%), which is also same for the males (n=18); but for females (n=12) the most common age of presentation was in between 31-

40 years. However this result is not statistically significant (p value=0.09903).

Most of the poisoning victims belonged to middle class (61.53%), followed by lower (34.63%) and least was from the high socio-economic class (3.84%). Most of the victims found were unmarried (53.86%). However it was found that unmarried males (n=33) and married females (n=24) were more prone for poisoning. This result is statistically highly significant (p value<0.01).

Suicide was the most common manner of poisoning (65.39%), followed by accidental pattern (34.61%). No homicidal poisoning cases were detected during the study period. However accidental pattern was more common in males (n=21) (mostly unmarried, n=18) and suicidal pattern was more common in females (n=27) (mostly married, n=18) and this finding is highly significant statistically (p value=0.008988).

'Home' (46.15%) was the most suitable site for poisoning, followed by 'work place' (23.07%) and 'remote place' (15.39%). While for males, 'work place' (n=13) was the most common place for poisoning, in females 'home' (n=27) was the dominant place and it has high statistical significance (p value=0.002119).

Insecticides (26.92%) were the most common poison encountered in this region irrespective of sex, followed by snake bite (19.23%). Snake bite (n=12) and alcohol poisoning (n=9) were dominant in males while rat poison (n=6) and sedatives (n=6) were dominant in females.

These results are statistically significant (p value=0.0196). More than two third of the patients were presented to the hospital within four hours of incident. Most of the patients had been completely cured (76.92%) after the treatment. Least number of patients had been referred (3.85%). Case fatality rate was also low (only 3.84%). However there is a relation between the lag period of incident and hospital presentation to the outcome of the treatment.

Maximum patients were completely cured when the lag period was within four hours. With the increase in lag period there was increase in the number of complicated and fatal cases. The lag period when compared with the treatment outcome the results are statistically significant (p value=0.01631).

Discussion:

Incidence of poisoning cases found in the study was 40% of all the medico-legal cases, which is similar to the study of another author. [5] Poisoning cases are one of the major burdens of all the medico-legal cases in a

casualty probably due to easy availability of a wide range of domestic/household poisons to a range of agriculture and plant poisons and ignorance of general people regarding its handling. Male to female ratio in this study is equivalent to the study by others. [3, 6, 7]

This may be due to high male to female ratio and high male exposure to poisons in this part of country. However the study of two foreign authors showed female dominancy in poisoning cases. [8, 9] Age group 21-30 years was found most vulnerable in this study and is similar to studies of many others. [6, 7, 10-13] Active and productive life style makes the age group most vulnerable. Most poisoned patients belonged to middle class family in this study and it is supported by other studies [4, 7] as well.

Another group of authors found that most of the patients were of low socio-economic class [11, 12,14] These variation depend on the locality, the affordability of the tertiary care hospital etc. In contrast to the present study the studies of many authors' showed that most of the poisoned victims are married. [4, 7, 14]

Local factors, unemployment and stress in unmarried persons may have caused such result in this region. Suicide was the most common manner than accidental than homicidal pattern in this study and this data is supported by authors. [11-14]

Unemployment, stress and family dispute may lead to such finding. Suicide was more common in females found in this study and also in other. [10] More emotional instability in females added with gender bias in our Country may be the cause. The data, accidental pattern was more commonly found among unmarried persons and suicide pattern among married person is supported by author. [10]

Love disputes, reckless behavior and fickle nature of unmarried may lead to such situation. Place of occurrence in most cases was 'home' in this study and it is similar to other study. [8] Availability of plenty of household poisons and secluded environment in home made it the ideal choice of place for poisoning.

Insecticides followed by snake bite were the prevalent form of poisoning found in this study and is supported by authors. [6, 7, 11]

This study group being largely agriculture based where the farmer applies pesticides to the crops, good crop attracts rodents, which inadvertently attracts snakes into the picture. Easy availability of pesticides, agricultural and outdoor habit probably makes this most common type of poisoning in this region. However, in some studies 'household

agent' dominates [3, 10] while in others medicinal drugs. [8, 9]

Lag period between incident and presentation to hospital is same as in other studies. [4, 6, 10] Most of the patients in this study had been completely cured and it is supported by other authors. [9, 10, 12]

Case fatality in this study was 3.84% and this is quite similar to other study where it is 3.4% [12] and lower as compared to others where they are 8.3% [6], 10% [13], 15.4% [11] and 18.6%. [4] It shows better efficiency of the hospital towards management of various poisoning cases. Mortality is still low in the other studies approaching nil [10] and <1%. [8]

Early presentation to the hospital resulted in better treatment outcome was concluded from this study and the result is supported by many other authors. [4, 6, 10, 11] Ideally the cases are better managed when the patient presented to the hospital early.

Conclusion:

The huge burden of poisoning cases encountered in emergency department in this part of the country may be attributed due to easy availability of insecticides and other household poisons and these resulted usually from self-inflicted action. Measures observed in this study include early presentation to hospital, awareness to handle the toxic materials and counseling.

Also, there is need to improve techniques for early and accurate diagnosis and treatment in poisoning cases with the help of various toxidromes, analytical tests and use of antidotes if available.

Further it clarifies the need to establish a poison information center in this region and manage a Clinical Toxicology Unit for the better management and prevention of such morbidity and mortality in poisoning cases. The study is more focused on acute poisoning and presentation, while chronic poisoning could have even worse effects are yet to be studied.

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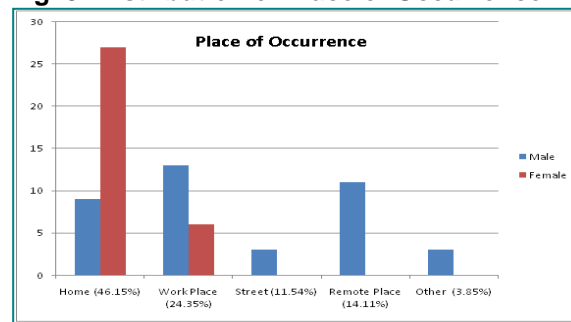
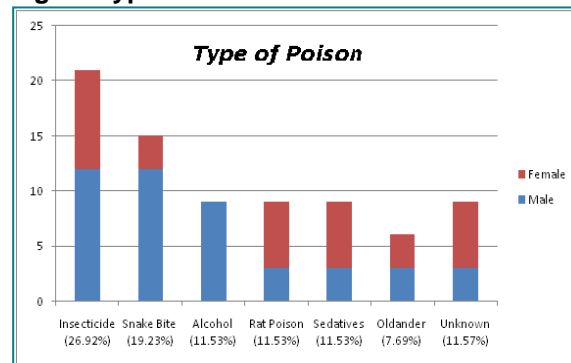## Fig. 1: Incidence of Poisoning Cases among all Medico-legal Cases
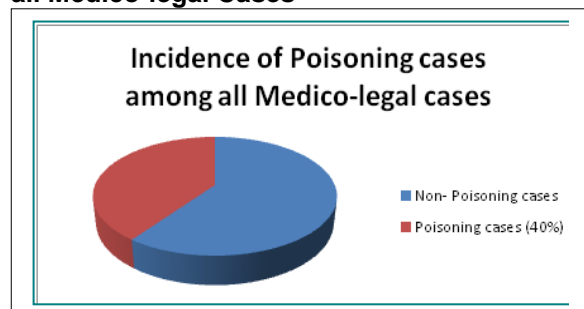
Fig. 2: Socioeconomic Status
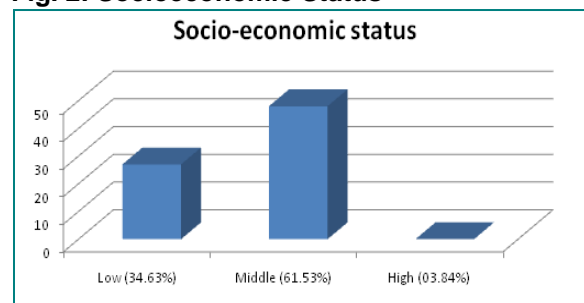
Fig. 3: Distribution of Place of Occurrence

Fig. 4: Type of Poison

Table 1: Age and Sex wise Distribution

Age grps (Yrs)	Male	Female	Total
< 10	00	00	00 (0%)
11 – 20	12	06	18(23.07%)
21 – 30	18	09	27(34.61%)
31-40	09	12	21(26.92%)
41- 50	06	03	09(11.53%)
51-60	00	00	00(0%)
>60	00	03	03(3.84%)
Total	**45(57.69%)**	**33(42.31%)**	**78(100%)**

Table 2: Sex wise Distribution of Marital Status and Manner

Manner	Male			Female			Total
	Married	Unmarried	Total	Married	Unmarried	Total	
Accidental	03	18	21	06	00	06	27(34.61%)
Suicidal	09	15	24	18	09	27	51(65.39%)
Homicidal	00	00	00	00	00	00	00(0%)
Total	12(15.38%)	33(42.3%)	45	24(30.76%)	09(11.56%)	33	78(100%)

Table 3
Lag Period between Incident and Hospital presentation compared with the Treatment Outcome

Lag period	Complete cure	Complication Develop	Referred	Death	Total
< 1 hour	06	00	00	00	06(7.69%)
1-2 hours	12	06	03	00	21(26.92%)
2- 4 hours	24	00	00	03	27(34.63%)
4-6 hours	09	03	00	00	12(15.38%)
6-12 hours	09	03	00	00	12(15.38%)
Total	60(76.92%)	12(15.38%)	03(3.85%)	03(3.85%)	78(100%)