Original Research Paper

Death due to Poisoning in District of Kamrup, Assam
A Medico-legal Study

*Mrinal Haloi, *Mamata Devi Haloi, **Amarjyoti Patowary

Abstract

Rapid development in science and technology and rapid growth in agriculture and industrial sector has led to increase in the incidence of poisoning, taking away a lot of precious human life. The chemical substances developed to protect the agriculture products from rodents and pests, to save the human beings from starvation, are themselves becoming a threat for the human life. Trends of poisoning had been constantly changing throughout the world with advent of new agents. This study aims to evaluate Incidence and pattern of poisoning in the district of Kamrup, Assam.

The study included all the cases of suspected poisoning brought to Gauhati Medical College and Hospital for autopsy during the period of one year i.e. from 1st July 2010 to 30th June 2011. A total of 96 cases of suspected poisoning death were analyzed. Male victims (62.50%) outnumbered females (37.50%) and maximum numbers of cases (33.33%) were in the age group 20-29 years. Economic status was found to be lower in 66.66% cases and maximum cases (73.95%) are from rural habitat. Organophosphorus compounds were the most common agent responsible for poisoning with 22.91% cases followed by organochlorine compounds with 19.79% cases.

Key Words: Poisoning, Suicide, Insecticide, Death, Organophosphorus

Introduction:

Poison is a substance (solid, liquid or gaseous), which if introduced to 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. [11] Poison is a substance (solid, liquid or gaseous), which if introduced to 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. [11]

Off different mode of suicide, poisoning is common and it has been known since antiquity. [7] The choice of poisoning agents depends on availability, cost, harmful effects of poison and regional consideration. [2] Suicidal and accidental poisoning is a significant contributor to morbidity and mortality throughout the world. As per WHO, about 3 million cases of poisoning with 2,20,000 death occur annually worldwide, of which 90% of the cases occur in developing countries particularly among agricultural workers. [8] The mortality rate of poisoning in developed countries is very less but in developing country like India it is quite high (15-30%). [5, 9]

Aims and Objectives:

The study was conducted to find out:
1. Incidence and pattern of poisoning in the district of Kamrup, Assam.
2. The different aspect of poisoning along with the demographic pattern, diurnal variation, distribution of cases in different climatic conditions and other related parameters.
3. The risk factors and group for control of incidents of death due to poisoning.
4. Modality to prevent loss of precious human life due to poisoning.

Material and Methods:

The present study is a retrospective study. All the cases of suspected fatal poisoning...
brought to Gauhati Medical College and Hospital for medico legal autopsy during the period of one year i.e. from 1\textsuperscript{st} July 2010 to 30\textsuperscript{th} June 2011. Details of suspected poisoning cases were collected from inquest reports, hospital records, autopsy reports and chemical examiner’s analysis report of viscera and body fluids. The various epidemiological data i.e. age, sex, religion, habitat, marital status, education, occupation, economic status, mental status, date and circumstances of ingestion of poison, place of treatment and most common agent responsible for fatal poisoning are studied. During the period of study 96 cases of suspected poisoning death were analyzed.

These are the cases having specific history and autopsy findings suggestive of poisoning. The skeletal remains, decomposed bodies and cases where the signs of poisoning were not present were excluded from this study. The investigation of the scene of incident was excluded from the purview of this study.

**Observation and Results:**

A total 2598 autopsies were performed during the study period, of which 96 cases were death due to suspected poisoning. Male victim outnumbered the female victim, the number being 60 (62.50%) in male and 36 (37.50%) in female. The male-female ratio is 1.66:1 in our study. (Table 1)

The present study shows that most of the victims were in the age group 20-29 years, with 32 (33.33%) cases, the lowest number of cases is reported in the age group of 0-9 years (1.04%). Most of the victims were married, 64 (66.66%) cases, of which 32.29% cases are male and 34.37% are female. (Table 1)

In our study Hindus outnumbered the Muslim with 48(50%) male and 26(27.08%) female cases, the overall cases being 74(77.08%). Maximum numbers of cases are educated up to high school level. Total 27(28.12%) cases are reported from this group. The lowest cases are reported from illiterate group with 11(11.45%) cases, of which 5(5.20%) were male and 6(6.25%) were female. (Table 2)

Regarding the occupation, maximum number of victim were students with 27(28.12%) cases followed by domestic worker and house wife from female community with 21(21.87%) cases. (Table 2)

In present study Lower class tops the list with 64(66.66%) cases followed by middle class with 31(32.29%) cases and rest 1 (1.04) case belongs to upper class. Victims with no specific habit outnumber the other categories with 39(40.62%) cases. In males, 24(25%) are smoker and in female 2(2.08%) cases had habit of tobacco. (Table 3)

Most of the victims mental statuses were normal numbering 88(91.66%). Depression was found in 8.33% cases in this study. Rural habitats were found in 71(73.95%) cases. (Table 4) Most ill-fated place was residence as it was recorded highest number of cases i.e. 78(81.25%) cases. 89(92.70%) cases of death due to poisoning were suicidal in nature and (7.29%) cases were accidental in nature. (Table 4)

Our study shows that most lethal hours in cases of poisoning was between 6 PM-12 Midnight, a total of 46(47.91%) cases died during this hour, of which 28(29.16%) were male and 18 females. Most of the patient 47(48.86%) were treated in Medical College Hospital while 41(42.70%) cases did not received any treatment. Majority of victims, 55(57.29%) died in the hospital. 22 (22.91%) cases died on the spot whereas 19(19.79%) cases died on the way to hospital. (Table 5) Maximum number of victims, 62(64.58%) died within 24 hours of ingestion of poison. Only 2(2.08%) cases survived beyond 7 days.

Most of the fatal poisoning cases occurred in the month of July, 16 (16.66%) cases whereas lowest number in the month of March, only 1 (1.04%) case. Incidence of poisoning were maximum during summer season 43(44.79%) cases. followed by winter with 28(29.16%), autumn with 13(13.54%) and spring with 12 (12.50%) cases. (Graph 1)

Maximum number of victims committed suicide due to family quarrel and unhappiness, 27 (30.33%).The lowest number reported to be due to illegitimate pregnancy, only 1(1.04%) case. (Graph 2)

**External Autopsy Findings:**

Out of 96 cases Cyanosis was present in 62(64.58%) cases, froth around mouth was found in 42(43.75%) cases. Petechial haemorrhage was detected in 26(27.08%) cases. 2 (2.08%) cases had injury over body.

**Internal Autopsy Findings:**

- **Specific smell of content of stomach and small intestine:** Kerosene like smell was most common in both stomach (49 i.e. 51.54%) and small intestine (23 i.e.23.95%)
- **Findings of visceral organs:** Highest number of cases showed congestion in kidney (87 i.e.90.62%) followed by liver (83 i.e.86.45%).

On toxicological analysis Organophosphorus compounds were the most common agents with 22(22.91%) cases,
followed by organochlorine 19(19.79%) cases, carbamate 11(11.45%) cases, alcohol 3(3.12%) cases and corrosive substance were detected only in 1(1.04%) case. (Graph 3)

Discussion:
In the present study, incidence of poisoning found to be 3.96%. Male victim (62.50%) outnumbered female (37.50%) as males lead a more stressful life than female due to family responsibilities. Maximum numbers of cases (33.33%) were in the age group 20-29 years due to the fact that at this period they are by nature more emotional, aggressive, intolerant and irrational. Married outnumbered single), because after marriage economic problem of family results in frequent quarrels and familial disharmony leading to increased stress. Most of the victims were Hindu (77.08%) because population of Hindu community is more in this study region. Majority of victims belong to the student community (28.12%), as this group is less exposed to life with worries of study, future unemployment and love affairs.

Maximum numbers (28.12%) of victims were educated up to high school level. Economic status was found to be lower in 66.66% cases, because poverty is a motive behind suicide and because of deficiency of funds they cannot afford the standard of treatment after exposure. Most of the victim (35.41%) had no specific personal habit, due to the fact that younger age group and females constitute significant number of cases and smoking, drinking alcohol are socially not accepted in this study population. 91.66% cases were mentally stable. Maximum cases (73.95%) are from rural habitat, due to bulk of present study population live in rural areas and agricultural activities are more prevalent.

Most of the incidents (81.25%) took place in the residence, because agricultural insecticides used for suicidal act were available at their residence. Most lethal period of poisoning found to be 6PM-12 Midnight (47.91%), due to emotional outburst resulting from tiredness, disappointments, and frustration reaching peak level at the end of days busy schedule. The place of treatment was Medical College Hospital in 48.95% cases, as most of the victims of poisoning referred and treated in medical college hospital for lack of facilities in the local hospitals. 57.29% cases died in hospital, 64.58% cases died within 24 hours.

Month of July accounted for maximum cases (16.66%), highest cases (44.79%) took place in summer, as this is the period of active agricultural activities when pesticide and insecticide are extensively used. 92.70% cases were suicidal in nature, family quarrel and unhappiness were the most common (30.33%) motive for suicide, as in nuclear families in which husband and wife is dependent on each other to a greater extent in all family matters are more prone to commit suicide. Externally cyanosis, petechial haemorrhage and froth were found in 64.58%, 27.08%, 43.75% of the cases respectively, kidney (90.62%) was the most common organ showing congestion. Organophosphorous compounds were the most common agent responsible for poisoning with 22.91% cases followed by organochlorine compounds with 19.79% cases.

The present study findings are similar with most of the studies done in this field like study of Dr. Khairul Hussain, Assam in 2001, GMCH Chandigarh study, G.G. Hospital Jamnagar etc. [4, 6] The study is in difference with the PGIMS, Rohtak study where the most common poison found to be used is the organochlorine insecticides where as in the present study the organophosphates are the most common poison used. [1]

Conclusion:
Measures to improve the socioeconomic conditions through reforms in the field of education, health, employment and more economic as well as scientific support to cultivators are expected to decrease the incidence of poisoning. Proper education of common people, cultivators about storage, handling, uses of pesticide and insecticide is expected to reduce incidence of poisoning. [3]

The existing laws in relation to toxic substances should be incorporated to erase the loopholes for their production, distribution, sale, storage and application. Public awareness about seriousness of poisoning is expected to reduce death due to poisoning. Government should provide toxicological diagnostic and therapeutic assistance to doctors. [2] Preventive measures for incidents of poisoning will be best. But once incidents occur, most modern treatment modality will reduce mortality. The problem of poisoning has been and is going to exist with human society. Hence further studies are necessary in the containment of this growing menace.

References:

Graph 1: Seasonal Variation of Cases

Graph 2: Motive behind Suicide

Graph 3: Agents detected by Chemical Analysis of Viscera and Body Fluids

Table 1: Sex and Marital Status of the Victims

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Table 2: Educational and Occupational Status of the Victims

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Table 3: Economical and Personal Habit of the Victims

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Table 4: Habitat, Mental Status and Nature of Death of the Victims

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Table 5: Time, Place of Poisoning and Death of the Cases

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