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Original Research Article

A Hospital Based Retrospective Assessment of Socio-Epidemiological Aspects That Impact Poisoning

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Abstract

Aim: To determine the socio-epidemiological aspects that impact poisoning.

Material and Methods: This retrospective study was conducted in Department of FMT, Gouri Devi Institute of Medical Science and Hospital, Durgapur, West Bengal, India for one year. The subjects of the study were 433 poisoning victims whose autopsy was done, and various internal and external findings observed during the procedure noted and necessary specimen were sent for chemical analysis. The detailed history regarding the poisonous cases that were brought dead was obtained from the inquest from the relevant investigating officer, relative of the deceased and hospital records. The observations were analyzed and subjected to comparison with studies along the same line. Inclusion criteria: hose victims of poisoning whose body was autopsied in the mortuary of our tertiary care government hospital.

Results: The population was found to consists mostly of males (66.74%). The females made up remaining 33.26% of study population. On taking into account the educational qualification of the victim to the poison to the illiterates (62.59%) more often turned to poison than the literate people (36.26%). A 1.15% of population where the children who never went to school. It was noted that poisoning was more rampant among married individuals (64.90%). The unmarried persons (23.32%) were next prone to poisoning. The widow/widower (6.93%) married but separated individuals (4.39%) and divorcees (0.46%) were also among the population studied. The family pattern of individuals when observed as a whole revealed that the incidence of poisoning was more common in people living in nuclear family (95.38%). The number of poison cases in people living in joint family (4.62%) was far less in number. A vast majority of cases belonged to a low (81.29%) socio economic status.

Conclusion: Poisoning is more common through self-poisoning in male, married individuals, literate people and those with a poor socio-economic status. To reduce the incidence, proper counselling of the risky population is necessary. Sale of insecticides and pesticides to the public should be strictly controlled by law.

Keywords: Socio-epidemiological, Aspects, Poisoning.

Introduction

Poisoning remains a significant public health concern worldwide, with its impacts varying considerably across different regions and populations due to a range of socio-epidemiological factors. It encompasses a broad spectrum of substances, including pharmaceuticals, pesticides, household chemicals, and natural toxins, leading to a diverse array of clinical presentations and outcomes. [1] The World Health Organization (WHO) estimates that poisoning results in over 200,000 deaths annually, highlighting the urgency of addressing its underlying causes and contributing factors . Socio-epidemiological factors play a crucial role in the incidence and outcomes of poisoning. These factors include socio-economic status, education level, occupational exposure, geographical location, and cultural practices. Understanding the interplay of these factors is essential for developing effective prevention and intervention strategies. Socio-economic status is a significant determinant of poisoning risk. Populations with lower socio-economic status often have limited access to healthcare, education, and safer living conditions, making them more

vulnerable to poisoning incidents. [2] For instance, in low-income countries, the use of toxic pesticides and chemicals is more prevalent due to inadequate regulation and enforcement, leading to higher rates of unintentional and occupational poisoning. Additionally, economic constraints may force individuals to live in environments where exposure to hazardous substances is more likely, such as near industrial sites or in poorly constructed housing with inadequate ventilation. [3] Education level is another critical factor influencing poisoning risk. Higher levels of education are generally associated with better awareness and understanding of the risks associated with various substances and safer handling practices. Studies have shown that individuals with lower educational attainment are more likely to misuse medications and household chemicals, either intentionally or unintentionally, resulting in higher rates of poisoning. [4] Public health education campaigns aimed at improving knowledge and awareness about the risks of poisoning and safe handling of potentially hazardous substances can be effective in reducing poisoning incidents, particularly in low-literacy populations. Occupational exposure to toxic substances is a significant risk factor for poisoning, particularly in agricultural and industrial settings. Workers in these sectors are often exposed to pesticides, solvents, heavy metals, and other hazardous chemicals, leading to acute and chronic health effects. In many developing countries, the lack of proper safety regulations and protective equipment exacerbates this risk, resulting in higher rates of occupational poisoning. Implementing stringent occupational health and safety regulations, along with regular training and provision of protective equipment, can significantly reduce the incidence of work-related poisoning. Geographical location also influences the patterns and prevalence of poisoning. Rural areas often report higher rates of pesticide poisoning due to the predominant agricultural activities and widespread use of agrochemicals. In contrast, urban areas may see more cases of pharmaceutical and illicit drug poisoning due to the higher availability and misuse of these substances. [5,6] Geographical variations in poisoning patterns necessitate tailored public health interventions that address the specific risks and exposures prevalent in different settings. Cultural practices and traditional medicine use can also contribute to poisoning risk. In some cultures, the use of traditional remedies and herbal medicines is common, but these practices can lead to poisoning if the substances are not properly identified, dosed, or prepared. Additionally, cultural beliefs and practices around the storage and disposal of hazardous substances can influence the risk of unintentional poisoning, particularly among children. Public health initiatives that respect and integrate cultural practices while promoting safe use and handling of traditional medicines can help mitigate these risks.

Material and Methods

This retrospective study was conducted in Department of FMT, Gouri Devi Institute of Medical Science and Hospital, Durgapur, West Bengal, India for one year. The subjects of the study were 433 poisoning victims whose autopsy was done and various internal and external findings observed during the procedure noted and necessary specimen were sent for chemical analysis.

Inclusion criteria: hose victims of poisoning whose body was autopsied in the mortuary of our tertiary care government hospital.

Exclusion criteria: among the deceased bodies examined postmortem the bodies pertaining to homicidal, unknown and decomposed bodies.

The detailed history regarding the poisonous cases that were brought dead was obtained from the inquest from the relevant investigating officer, relative of the deceased and hospital records. The observations were analyzed and subjected to comparison with studies along the same line

Materials used were inquest report and other relevant police documents, optic lens for magnification, metric tape for measurement, equipment for photography, a workstation for autopsy, autopsy certificate, records of hospitalization and treatments, if any and report of the chemical analysis from regional forensic science laboratory.

Results

The age of the victims spanned age groups such as 0 -10 to >70. Majority of the people who died of poisoning belonged to the age group 21 to 40(27.48%) and the least number of victims were found to belong the age group>70 years (1.15%). The second most number was observed in the age group 31-40. Children from the age 0- 10 accounted for 1.85% of the population while 11-20 years were 10.62%. This trend was noted to decline as the age increased 41-50 were 16.40% and 51-60 was 11.3% and 61-70 were 6% of the total subjects studied. When classified according to sex, the population was found to consists mostly of males (66.74%). The females made up remaining 33.26% of study population.

Table 1: Demographic and social factors in studied population

Factors	No. of subjects	%
Age (in years)		
0-10	08	1.85%
11-20	46	10.62%
21-30	119	27.48%
31-40	109	25.17%
41-50	71	16.4%
51-60	49	11.32%
61-70	26	6%
>70	05	1.15%
Sex		
Male	289	66.74%
Female	144	33.26%
Education		
Literate	157	36.26%
Illiterate	271	62.59%
Children	05	1.15%
Marital status		
Married	281	64.9%
Unmarried	101	23.32%
Divorcee	02	0.46%
Separated	19	4.39%
Widow/widower	30	6.93%
Family pattern		
Nuclear	413	95.38%
Joint	20	4.62%
Socio-economic status		
Low	352	81.3%
Medium	68	15.7%
High	13	3%

Table 2: Types of poison consumed

Type of poison	No. of subjects consumed	Percentage
Organo-phosphorous compounds	279	64.43%
Organo chlorine compounds	03	0.69%
carbonates	20	4.62%
Corrosive acid poison	22	5.08%
Super vasmol	09	2.08%
Aluminium phosphide	25	5.77%
Zinc phosphide	25	5.77%
Plant poison	15	3.46%
Others	35	8.08%

On taking into account the educational qualification of the victim to the poison to the illiterates (62.59%) more often turned to poison than the literate people(36.26%). A 1.15% of population where the children who never went to school. It was noted that poisoning was more rampant among married individuals (64.90%). The unmarried persons (23.32%) were next prone to poisoning. The widow/widower (6.93%), married but separated individuals (4.39%) and divorcees (0.46%) were also among the population studied. The family pattern of individuals when observed as a whole revealed that the incidence of poisoning was more common in people living in nuclear family (95.38%). The number of poison cases in people living in joint family (4.62%) was far less in number. A vast majority of cases belonged to a low (81.29%) socio economic status. There was also a declining trend observed when socio economic status of people increased. The number of poison cases among people of medium cadre (15.7%) and higher cadre (3%) were considerably lower. A comparison between type of poison ingested by various individuals revealed that organophosphorus compounds (64.43%) were the most common consumed. The last chosen one were organochlorine compounds (0.69%). Other poisons seen were plant poison (3.46%), carbonates (4.62%), corrosive

acids(5.08%), aluminum phosphide(5.77%), zinc phosphide(5.77%). An 8.08% of individuals consumed other poisons also. When the manner of death of the individuals were assessed, it was noted that most of the cases were suicidal (94.46%). A minor 5.56% of the deaths were due to accidental poisoning.

Discussion

Of the total 3275 cases of postmortem, poisoning constituted 433 cases amounting to 13.22% during the study period. Least incidence of poisoning was observed in 71-80 yrs(1.15%) and most incidence of poisoning was seen in 21-30 yrs(27.48%). The reason for most people consuming poison at the age of 21-30 can be sited varying from academic pressure, unemployment, love failure, conflict with parents, improper judgement etc. Kumar S also found the age distribution for males and females appeared to be in the age range of 20–63 years, which is the age of youth for work and, in females, the age of reproduction. [4] The 37.8% of suicides in India are carried out by those below the age of 30 years, and 71% of suicides in India are among people who are below the age of 44 years as mentioned by other authors. [5] This imposes a huge social, emotional and economic burden on the society. Khosya S et al study also found the incidence of poisoning cases were maximum in age group 21-40 years. [6] Similar observations were made by Mutalik et al, [7] Gupta et al [8] and study by Vanishree et al. [9] The suicide rate decreases as age increases, which can be explained by the increase in the level of responsibility of males and females toward their families. In this study, males were more affected (66.74%) than the females (33.27%). The reason for this can be male being the sole breadwinner in majority of the families are under more duress emotionally and economically. Similar observations were made by Dalal et al. [10] males consisting 63% of cases of poisoning and still higher incidence was observed by Agarwal et al. [11] i.e. 72% cases of poisoning in males. Singh et al. [12]also reported that poisoning cases were more in males than in females. Least incidence of poisoning was seen illiterates (36.26%) and most incidence of illiterates in (62.59%). The reason for this may be attributed to unemployment or underemployment and financial crisis. In this study, most incidence of poisoning was in married (64.90%) while least incidence of poisoning was seen in divorcee(0.46%).The married males usually consume poison due to marital disharmony, financial problems, unemployment, etc. Khosya S et al found that out of the 483 cases 267 (55.27%) were married and 216 (44.72%) were single. [6] Most incidence of poisoning was seen in nuclear family (95.38%) than joint family (4.62%). The reason for this being nuclear family, they do not have any support from family elders and lack of proper guidance. This study found least incidence of poisoning in high status (3.00%) and high incidence in low status (81.29%). The reason mainly being a deficit in finances, deprivation of even basic amenities and lack of proper education. The study by Khosya S et al shows that highest number of poisoning cases in lower socioeconomic status 592 cases (74.09%), followed by middle class-171 cases (21.4%) and then the upper class which constituted 47 cases (5.88%).[6] Our findings are similar to other study findings. [13,14] In our study, organophosphorus compounds (64.43%) were the most common consumed. The last chosen one were organochlorine compounds (0.69%). Poisoning irrespective of its manner is associated with considerable mortality and morbidity worldwide. The causes and means of poisonings vary from country to country, in different setups, regions, and between sexes and age groups. [3,15,16] Agrochemical pesticides have been reported as the most common cause of acute poisonings in the region, while most of the fatalities are associated with organophosphate compounds. [17] Studies suggest that phosphides and organophosphates are commonly implicated in fatal poisonings in northern and southern part of India, respectively. [3,18] In Khosya S et al study suicidal poisoning was leading 79.82%, and leading poisoning was Organo phosphorous group of compounds 30.65%. Next common poisoning by aluminum phosphates (13.14%). [6]

Conclusion

Poisoning is more common through self-poisoning in male, married individuals, literate people and those with a poor socio-economic status. To reduce the incidence, proper counselling of the risky population is necessary. Sale of insecticides and pesticides to the public should be strictly controlled by law.

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