

# Study of socio-epidemiological factors influencing poisoning

Karthick Ramasamy<sup>1</sup>, Gokularamanan Kandasamy<sup>2\*</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor Department of Forensic Medicine, Government Mohan Kumaramangalam Medical College Salem -636001, Tamil Nadu, INDIA.

Email: [gokul.fm@gmail.com](mailto:gokul.fm@gmail.com)

## Abstract

**Background:** The incidence of poisoning is increasing day by day because of its low cost, easy availability without any check on their sales and irregularity in distribution. Patients' socio-economic status and generally their life-style also seem to be an important factor. **Aim:** To evaluate the socio-epidemiological factors influencing the poisoning. **Material and Methods:** In this retrospective study of 433 poisoning victims whose autopsy was done were evaluated for factors predisposing to poisoning. The detailed history regarding the poisonous cases was obtained from the inquest from the relevant investigating officer, relative of the deceased and hospital records. **Results:** Majority of the people who died of poisoning belonged to the age group 21 to 40 (27.48%), mostly males (66.74%). Poisoning was more rampant among married individuals (64.90%). A vast majority of cases belonged to a low (81.29%) socioeconomic status. Most of the cases were suicidal (94.46%) with organophosphorus agents. **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.

**Key Word:** Poisoning, suicide, low socioeconomic status, organophosphorus poisoning

## \*Address for Correspondence:

Dr. Gokularamanan Kandasamy, Associate Professor, Department of Forensic Medicine, Government Mohan Kumaramangalam Medical College, Salem -636001, Tamil, Nadu, INDIA.

Email: [gokul.fm@gmail.com](mailto:gokul.fm@gmail.com)

Received Date: 26/01/2019 Revised Date: 12/02/2019 Accepted Date: 07/03/2019

DOI: <https://doi.org/10.26611/1018925>

## Access this article online

Quick Response Code:	Website: <a href="http://www.medpulse.in">www.medpulse.in</a>
	Accessed Date: 16 March 2019

## INTRODUCTION

Poison is and likely to remain one of the commonest causes of unnatural death. We are surrounded by more than 9 million natural and synthetic chemicals, and the list keeps going inexorably and is estimated that about one to two thousand new chemicals appear in the market every year and most of these chemicals, be it pesticide, cosmetics or food preservatives pose great risk to health if inhaled, ingested or otherwise administered in excess. Poisoning being invariably medicolegal in nature among

fatal cases, post-mortem examination is done to establish the exact cause and manner of death. Manner of death in these cases is predominately suicidal because of the general belief that it terminates life in minimal sufferings or accidental but however homicidal cases are also reported. There is a list of leading factors to suicide. Patients' socio-economic status and generally their life-style also seem to be an important factor. Familial transmission, genetic predisposition and traumatic child experiences are other examples of risk factors for suicide behaviors.<sup>1</sup> Over the last few decades, agricultural pesticides have become a common household item in rural areas of the developing world. Due to their easy availability, pesticides have also become commonly used for intentional self-poisoning.<sup>2,3</sup> The incidence of poisoning is increasing day by day because of its low cost, easy availability without any check on their sales and irregularity in distribution. The present study was conducted to evaluate the socio-epidemiological factors influencing the poisoning.

**MATERIAL AND METHODS**

This retrospective study was conducted for a period of 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:** those 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. 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%

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 organophosphorous 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%), corrosiveacids(5.08%), aluminiumphosphide(5.77%), zincphosphide(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.

**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%

## 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.<sup>4</sup> 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.<sup>5</sup> 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.<sup>6</sup> Similar observations were made by Mutalik *et al*,<sup>7</sup> Gupta *et al*<sup>8</sup> and study by Vanishree *et al*.<sup>9</sup> 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*.<sup>10</sup> males consisting 63% of cases of poisoning and still higher incidence was observed by Agarwal *et al*.<sup>11</sup> i.e. 72% cases of poisoning in males. Singh *et al*.<sup>12</sup> also reported that poisoning cases

were more in males than in females. Least incidence of poisoning was seen in illiterates (36.26%) and most incidence of illiteratesin (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.<sup>6</sup> 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%).<sup>6</sup> Our findings are similar to other study findings.<sup>13,14</sup> In our study, organophosphorous 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.<sup>3,15,16</sup> 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.<sup>17</sup> Studies suggest that phosphides and organophosphates are commonly implicated in fatal poisonings in northern and southern part of India, respectively.<sup>3,18</sup> 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 aluminium phosphates (13.14%).<sup>6</sup>

## 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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Source of Support: None Declared  
Conflict of Interest: None Declared