

## Profile of Fatal Poisoning Cases in and Around Rajkot Region: A 3 Years Retrospective Study

K.N. Pipaliya\*, V.J. Aghera\*\*, M.N. Patel\*\*\*, R.D. Vaghela\*\*, R.K. Masharu\*\*\*

### Abstract

*Context:* Poisoning is the commonest method adopted in India to commit suicide. Pesticide poisoning is an important cause of morbidity and mortality in many countries in the world. *Aims:* Present study was undertaken to evaluate the pattern of poisoning deaths in Rajkot region of Gujarat. *Methods and Material:* Present Retrospective study was conducted from 1st January, 2012 to 31st December, 2014 at department of forensic medicine, PDU govt. medical college, Rajkot. During that period total 7434 autopsies were conducted, out of them 739 cases of fatal poisoning and animal envenomation were selected for study. *Statistical Analysis Used:* Microsoft excel. *Results:* Average incidence rate of death due to poisoning is around 10% in Rajkot region. Organophosphorus poisoning (35.99%) was most common followed by Aluminium phosphide poisoning (31.39%) and these findings were observed in individual age group and in male. Incidence rate is higher in male (61.7%) as compared to female (38.3%). Highest numbers of cases were found in age group of 21-30 years (29.63%). *Conclusions:* Organophosphorus insecticide was the prime culprit among all poisons. Trends of this region were revealed and result was comparable with previous studies done in same region.

**Keywords:** Poisoning; Organophosphorus; Fatal; Rajkot; Retrospective.

### Introduction

“All substances are poisons; there is no such thing as a non poison” - Paracelsus. The word poison is evolved from the Latin word *potion* i.e. to drink for health. But in the due course of time, the definition of poison has changed reversibly to its present form i.e. any substance, in any amount, by any route; if it produces harmful effects (3 Ds - disease, deleterious effect or death) over the body; it will be labeled as poison [1].

Poisoning is the commonest method adopted in India to commit suicide [2]. Pesticide poisoning is an important cause of morbidity and mortality in

many countries in the world. It has been estimated that 95% of fatal pesticide poisonings occur in developing countries, many of which are in the Asia-Pacific region.

Agriculture based economies, easy availability of pesticides, poverty related socioeconomic problems, lack of adequate protective clothing, and limited treatment facilities are some of the factors contributing to the high morbidity and mortality [3]. The incidence of insecticide poisoning has steadily increased in recent past and has reached a level where it can be called a social calamity [4].

This kind of study was done in the year 2007 in PDU Govt. medical college & hospital, Rajkot that shows Organophosphorus was the leading substance in all among cases. So in our Study, we tried to find out that any changes occurred or not.

### Material and Methods

Present Retrospective study was conducted from 1st January, 2012 to 31st December, 2014 at

**Authors Affiliation:** \*Assistant Professor, Department of Forensic Medicine, Pacific Medical College & Hospital, Udaipur 313001, Rajasthan, India. \*\*Tutor, \*\*\*Resident Doctor, Department of Forensic Medicine, P. D. U. Government Medical College, Rajkot-360001, Gujarat, India.

**Reprints Requests:** Krunal N. Pipaliya, Assistant Professor, Department of Forensic Medicine, Pacific Medical College & Hospital, Udaipur - 313001, Rajasthan, India.  
E-mail: [pipaliya@gmail.com](mailto:pipaliya@gmail.com)

department of forensic medicine, PDU govt. medical college, Rajkot. During that period 7434 autopsies were conducted, out of them 739 cases (Poisoning cases and animal envenomation cases) were selected for study. This study included all poisoning cases brought to PDU Govt. Medical college & Hospital for post mortem examination.

Cases were selected from suspected cases of poisoning based on relevant history and post-mortem examination, and afterwards confirmed by chemical analysis reports of viscera. Snake bite cases were confirmed by history of relative and post-mortem examination.

## Results

Out of total 7434 autopsies, 739 cases (9.94%) of death due to poisoning were selected for the present study. Average incidence rate of death due to poisoning is around 10% in Rajkot region (Table 1).

It is evident from Table 2 that death due to Organophosphorus poisoning (35.99%) was most common followed by Aluminium phosphide poisoning (31.39%) and these findings were observed in individual age group (Table 4) and in male (Table 5). In Female, death due to aluminium phosphide poisoning was most common followed by Organophosphorus poisoning (Table 5). In all 3 year, incidence rate of poisoning was almost same.

It is evident from Table 3 that highest numbers of cases were found in age group of 21-30 years (29.63%), followed by age group of 31-40 years

(26.16%). Incidence rate is higher in male (61.7%) as compared to female (38.3%). Highest numbers of male cases were found in age group of 31-40 years (26.1%) and female of cases were found in age group of 21-30 years (37.10%).

Highest no. of OC, ALP,  $H_2SO_4$ , HCl and CO poisoning cases were observed in age group of 21-30 years. Highest no of OP poisoning cases were observed in age group of 31-40 years while highest no. of Snake Bite poisoning cases were observed in age group of 51-60 years (Table 4). Out of all poisoning cases, 87.55% cases were suicidal and rest 12.45% cases were accidental. Accidental poisoning cases include all CO poisoning, all snake bite poisoning, 12 OP poisoning and 6 Corrosive poisoning ( $HCl$  &  $H_2SO_4$ ). Most common route of administration for poisoning cases was ingestion (88.36%) followed by injection (7.44%)(All Snake Bite Cases) and inhalation (4.19%)(All CO poisoning and 12 OP poisoning).

Incidence rate were higher in married person (56.97%) as compared to unmarried person (32.34%) and separated/widow (10.69%). Death due to poisoning were more observed in lower socioeconomic class (68.2%) followed by middle class (30.58%) and upper class (1.22%). Out of 739 cases incidence was more in rural area i.e. 422 cases (57.10%) while 317 cases (42.90%) from urban area. Higher incidence of poisoning cases were found in Farmer & Worker - 277 cases (37.48%), student - 175 cases (23.68%). Followed by housewife- 152 cases (20.57%) followed by Businessman - 71 cases (9.61%) and serviceman - 64 cases (8.66%).

**Table 1:** Year wise distribution of poison cases

Year	Total Case	Poison Cases
2012	2391	225(9.41%)
2013	2513	266(10.58%)
2014	2530	248(9.80%)
TOTAL	7434	739(9.94%)

**Table 2:** Year and type of poison wise distribution of poison cases

Type of Poison	YEAR			Total
	2012	2013	2014	
OP	83(36.89%)	95(35.71%)	88(35.48%)	266(35.99%)
OC	30(13.33%)	37(13.91%)	35(14.11%)	102(13.80%)
ALP	67(29.78%)	85(31.95%)	80(32.26%)	232(31.39%)
$H_2SO_4$	6(2.67%)	7(2.63%)	8(3.23%)	21(2.84%)
HCL	12(5.33%)	15(5.64%)	17(6.85%)	44(5.95%)
CO	9(4%)	6(2.26%)	4(1.61%)	19(2.57%)
SB	18(8%)	21(7.89%)	16(6.45%)	55(7.44%)
TOTAL	225	266	248	739

**Table 3:** Age group and sex wise distribution of poison cases

Age Group	Male	Female	Total
<=10	13(2.85%)	8(2.83%)	21(2.84%)
11-20	90(19.74%)	50(17.67%)	140(18.94%)
21-30	114(25%)	105(37.10%)	219(29.63%)
31-40	119(26.1%)	30(10.60%)	149(20.16%)
41-50	58(12.72%)	43(15.19%)	101(13.67%)
51-60	43(9.43%)	34(12.01%)	77(10.42%)
61-70	15(3.29%)	10(3.53%)	25(3.38%)
>70	4(0.88%)	3(1.06%)	7(0.94%)
TOTAL	456(61.7%)	283(38.3%)	739

**Table 4:** Age group and type of poison wise distribution of poisoning cases

Age Group	OP	OC	ALP	H <sub>2</sub> SO <sub>4</sub>	HCL	CO	SB	TOTAL
<=10	8(3%)	10(9.8%)	0	0	0	0	3(5.45%)	21
11-20	67(25.19%)	20(19.61%)	35(15.09%)	0	8(18.18%)	0	10(18.18%)	140
21-30	50(18.8%)	37(36.27%)	84(36.21%)	11(52.38%)	17(38.64%)	8(42.11%)	12(21.82%)	219
31-40	69(25.94%)	15(14.71%)	52(22.41%)	5(23.81%)	2(4.55%)	6(31.58%)	0	149
41-50	47(17.67%)	5(4.9%)	24(10.34%)	0	15(34.09%)	0	10(18.18%)	101
51-60	22(8.27%)	10(9.8%)	25(10.78%)	0	0	5(26.32%)	15(27.27%)	77
61-70	0	5(4.9%)	10(4.31%)	5(23.81%)	0	0	5(9.09%)	25
>=70	3(1.13%)	0	2(0.86%)	0	2(4.55%)	0	0	7
	266	102	232	21	44	19	55	739

**Table 5:** Sex and type of poison wise distribution of poisoning cases

Type of Poison	Male	Female	Total
OP	186(40.79%)	80(28.27%)	266(35.99%)
OC	58(12.72%)	44(15.55%)	102(13.80%)
ALP	144(31.57%)	88(31.1%)	232(31.39%)
H <sub>2</sub> SO <sub>4</sub>	10(2.19%)	11(3.89%)	21(2.84%)
HCL	10(2.19%)	34(12.01%)	44(5.95%)
CO	19(4.17%)	00	19(2.57%)
SB	29(6.36%)	26(9.19%)	55(7.44%)
TOTAL	456	283	739

## Discussion

The incidence of poisoning of fatal poisoning in present study was 9.94%, which is comparable with other studies [5-10]. In present study, death due to Organophosphorus poisoning (35.99%) was most common followed by Aluminium phosphide poisoning which is same as previous studies.<sup>5,6</sup> It occur due to easy availability of agriculture poison in market. According to the manner of death, majority of death were suicidal (87.55%) followed by accidental (12.45%) [5,9,10].

In the present study, poisoning death cases were higher as (61.7%) in males than females deaths (38.3%) which is comparable with previous studies [5,7-10]. Though all studies were conducted in different parts of India, male predominance was a common and constant feature. In present study, highest numbers of cases were found in age group of 21-30 years (29.63%), which was also observed in previous studies [5-10]. Incidence rate were higher in married person (56.97%) as compared to unmarried

person (32.34%) and separated/widow (10.69%) which was also observed in other studies [5,8,10]. It occur because of stress of the modern life style, failure or less percentage in the exams, scolding from parents or teachers, failure in love, family problems etc.

Maximum numbers of poisoning cases were observed in rural area as compare to urban area due to illiteracy or less education, less awareness about poison, less availability of immediate treatment [6,8-10]. Death due to poisoning were more observed in lower socioeconomic class (68.2%) [6,9,10]. In the present study, the incidence of poisoning was higher in agriculture labourer [8,10]. Majority of Indian population is living in rural area and are farmer by occupation. Farmer are mainly depend upon monsoon for growing crops and failure of monsoon leads to failure to grow crops and less income leads to financial crisis which leads to suicide of farmer.

## Conclusion

This is concluded from above study that death due

to fatal poisoning responsible for 9.94% cases among total autopsy conducted. Deaths due to OP poisoning (35.99% cases) were most commonly encountered among all fatal poisoning. Males (61.7% cases) were more affected as compared to female. 21-30 years (29.63%) was most affected age group. Among all fatal poisoning case 87.55% cases were suicidal. Most common route of administration for poison was ingestion (88.36% cases). Farmer and workers (37.48% cases) were commonly affected. Trends of this region were revealed and result was comparable with previous studies done.

#### Abbreviations

OP = Organophosphorus

OC = Organochlorine

ALP = Aluminium Phosphide

H<sub>2</sub>SO<sub>4</sub> = Hydrosulphuric Acid

HCL = Hydrochloric Acid

SB = Snake Bite

CO = Carbon Monoxide

#### References

1. Kumar A, Vij K. Trends of poisoning in Chandigarh-

- A six year autopsy study. *Journal of Forensic Medicine and Toxicology*. 2001 Jan-June; 18(1): 8-10.
2. Aggarwal P, Handa R, Wali JP. Common poisonings in India. *JFMT*. 1998 Jan-June; 15(1): 73-74.
3. Fernando R. Pesticide poisoning in the Asia-Pacific region and the role of the regional information network. *Clinical toxicology*. 1995 Nov; 33(6): 677-682.
4. Nigam M, Jain AK, Dubey BP, Sharma VK. Trends of organophosphorus poisoning in Bhopal region- An autopsy based study. *JIAFM*. 2004; 26(2): 62-65.
5. S. Chaudhary, Prospective study of Fatal poisoning cases in Rajkot Region.
6. AK Kapoor. An epidemiological study of Aluminium Phosphide poisoning at Allahabad. *IJFMT*. 2006; 4(1).
7. JS Dalal et al. Trends - a post mortem study. *JIAFM*. 1998; 20(2): 27-31.
8. BD Gupta and PC Vaghela. Profile of fatal poisoning in and around Jamnagar. *JIAFM*. 2005; 27(3): 145-148.
9. Rajani V. Bhagora. Profile Study of Fatal Poisoning Cases Brought for Postmortem Examination at Mortuary of Sir Takhtsinhji General Hospital, Bhavnagar (Gujarat). *Int J Res Med*. 2015; 4(3): 59-63.
10. Navinkumar M. Varma Study of Profile of Deaths due to Poisoning in Bhavnagar Region *JIAFM*. 2011; 33(4): 313-318.