

Study of Death Incidence by Insecticide Poisoning in Salem

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Abstract:

Introduction: Insecticide poisoning is a major public health problem in the world, particularly in developing nations, its usage has increased in recent and past thus increased even its misuse to commit suicide.

Methods: This retrospective study was carried out at department of Forensic Medicine & Toxicology, Govt. Mohan Kumaramangalam Medical College Hospital Salem, Tamil Nadu, India with the insecticide poisoning cases from the year of 2008 and 2009. Age from 6 months old foetus to 80 years. All collected data was analyzed in SPSS software.

Results: During this study period a total 2871 Medico legal autopsies were conducted, amongst them poisoning cases constitutes 372 (12.9%) cases, out of these 93 (25%) other poisoning cases, 279 (75%) cases were due to fatal insecticide poisoning.

Conclusion: During the period of 2008 & 2009 there are 260 number of cases were reported as suicidal poisoning by insecticides out of 279 cases. Males were outnumbered with 170 cases and females were 109 cases. More number of the cases were found in the age group of 21–30 years(82) followed by 31-40 years (68). Peak period of deaths by poisoning more in nos. in the month of May & June. Most victims were from rural area, married population outnumbering the married. There are 212 (74.98%) victims were from rural area while 67(24.01%) were from urban area and 223 (79.92%) were married, 56 (20.07%) were unmarried.

Key words: Insecticide poisoning; organophosphates; chemical report; Tik-20; follidol, suicide;

Introduction

Insecticides are compounds that are used to kill insects which may be pests, rodents, fungi, nematodes, mites, ticks, mollusks and unwanted weeds or herbs. They are used in most of the countries around the world to protect agriculture and horticulture crops against damage; they are also used as domestic pesticide¹. Acute poisoning by insecticides is becoming serious global problem. Insecticide poisoning account for

an estimated three million cases of severe poisoning worldwide in each year, with approximately 220,000 deaths. More than 90% of these cases are reported from developing countries, such as India^{2,3,17}.

Study from UK report 1% Insecticide poisoning deaths, South Africa reports 9.7%⁽³⁾, Morocco 4.2%⁽¹⁾, 66% in Iran³, which various studies from India show figures up to 70%^{4,5,6,7,8,9,10}. Although the poisoning death and deaths in Road Traffic Accidents are very nearly stands on the same line, great public concern

Table 1. Annual poisoning deaths and insecticide poisoning deaths in comparison with total medico legal autopsies.

Year	Total autopsies conducted	Total poisoning cases	Total Oleander & snake bite poisoning	%	Total insecticide poisoning	%
2008	1402	185	47	(25.4%)	138	(74.59)
2009	1469	187	46	(24.5%)	141	(75.40)
Total	2871	372	93	25%	279	(75%)

is given to road traffic accidents only, thus poisoning deaths being neglected. Therefore, an alarm for early diagnosis, treatment and preventions so also research needs to follow. Reporting of data is crucial in any country. As complete knowledge about the nature and magnitude of in particulars are essential for the physicians in hospital practice ¹⁰.

The aim of the study was to determine the epidemiological profile of fatal insecticide poisoning.

Methods

This retrospective study of all the poisoning, which were brought for post mortem examination to Govt. Hospital, Salem, Tamil Nadu. Examination and analysis done from all the available files of Accidents reports, diagnosis reports, inquest papers, post mortem reports and chemical analysis reports into the fatal insecticide poisoning cases from January 2008 to December 2009.

We used standard proforma to obtain data from the records to ensure consistency for the whole sample. Information collected sample includes Name, age, sex, height, weight, marital status, occupation and place of deceased, place of death, date and time of autopsy, date of chemical analysis, causes of death and manner of death. All the above data was

analyzed.

Statistical Analysis:

Types and manner of poisoning & other parameters were expressed as frequencies and percentages. Charts and Graphs were used in chi's square and bar & pie charts. P values smaller than .005 were considered statistically significant. The SPSS software 16.00 version was used for statistical analysis.

Results

The present study reveals that out of total 2871 medico legal autopsies conducted in 2008 and 2009, the total poisoning cases 372 (12.9%). Out of the above poisoning cases there are 279 (75%) cases due to insecticide poisoning and 93 (25 %) cases were oleander and snake bite poisoning. The percentage of insecticide poisoning deaths ranges (2008) 138 (74.59 %) to (2009) 141 (75.40 %).

Young adults belonging to the age group 21-30 constitutes the majority 82 (29.39 %) of victims followed by 31-40 (24.37 %), 11-20 (14.33%), 41-50 (12.18%), 51-60 (10.03%), 61-70 (04.30%), 0-10 (03.94%) and 71-80 (01.43%) was observed (Table-2).

Table 2. Age and gender wise distribution of insecticide poisoning.

Age group	Male	%	Female	%	Total	%
0-10	05	01.79	6	02.15	11	03.94
11-20	15	05.37	25	08.96	40	14.33
21-30	43	15.41	39	13.97	82	29.39
31-40	42	15.05	26	09.31	68	24.37
41-50	26	09.31	08	02.86	34	12.18
51-60	25	08.96	03	01.07	28	10.03
61-70	11	03.94	01	00.35	12	04.30
71-80	03	01.07	01	00.35	04	01.43

Below ten years (0-10) of age 11 cases were observed, amongst 3 were the age of within three months, one week female infant was the minimum age of the study. Significant decrease in the high age groups observed. Male outnumbered female, the male and female ratio being 3 : 2.

We also observed that the maximum age was 80 in female and 75 years in male.

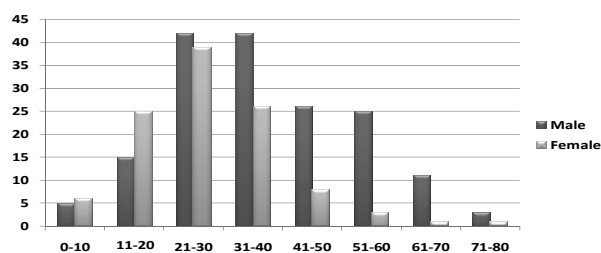


Chart- 1: Deaths by insecticide poisoning gender wise.

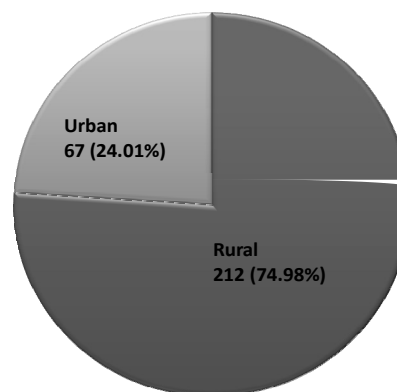


Chart-2: Insecticide poisoning deaths according to the place of occurrence

There are 212 (74.98%) victims were from rural area while 67 (24.01%) were from urban area.

Out of 279 total insecticide poisoning cases, 223 (79.92%) were married, 56 (20.07%) were unmarried

Relevant information recorded from accident register and inquest report, revealed that 260 (93.19%) cases were of suicidal in nature followed by homicidal 12 (04.30%) and 7 (02.50%) were in accidental nature.

This study also gives strong message as well as awareness to the dept. of health and public that brought death of insecticide poisoning cases stands high in numbers from rural area than urban and hospital admission deaths.

Different causes for deliberate consumption constitutes family quarrel, love failures and financial problems, disease like chronic illness, AIDS, mental illness, alcoholism and drug addiction.

Table 3. Insecticide poisoning deaths and marital status.

Year	Married		Total	%	Unmarried		Total	%
	Male	Female			Male	Female		
2008	66	45	111	80.1%	15	12	27	19.56%
2009	79	33	112	79.4%	13	16	29	20.56%
Total	145	78	223	79.92%	28	28	56	20.07%

Table 4. Total numbers of Brought dead cases and Hospitalized deaths.

Year	Brought dead		Total	%	Hospitalized death		Total	%
	Urban	Rural			Urban	Rural		
2008	17	78	95	68.84	16	27	43	31.15
2009	10	76	86	60.99	20	35	55	39.7
Total	27	154	181	64.87	36	62	98	35.12

Results of chemical analysis revealed that most of the reports were of Organophosphorous compounds and Organochlorinated compounds in general but in some of the chemical analysis report mentioned that such as Monochrotophos, Quinolphos, Endosulfan, Tik 20, Malathion and Parathion (follidol). All the chemical analysis have done in Regional Forensic Sciences Laboratory, Salem, Tamil Nadu.

Viscera of all the insecticide poisoning cases such as stomach and its contents, intestine, liver, kidney and blood have sent to Regional Forensic Sciences Laboratory(RFSL), Salem, for chemical analysis and reports have received. Out of 279 insecticide poisoning cases, 252 (90.32%) cases were found presence of poisoning in all the visceral organs including brought dead and hospitalized death within 36 -48 hours and 27 (09.67%) cases were admitted in the hospital if the person survived for more than 3 days, chances of detection of poison in viscera and blood reduced to almost 50%⁽¹²⁾. This may be because during the period of survival, the poison is excreted or is completely metabolized to a byproduct that is no longer, so poisoning found limited, decreased

level in liver and kidney and absent in stomach, its contents and intestine.

Table 5. Chemical analysis report.

Outcome of the report	No. of cases	Percentage (%)
Insecticide poisoning detected in all the viscera	252	90.32
Insecticide poisoning detected in Liver and Kidney	27	09.67
Total	279	100

Discussion :

Committing suicide is one of the ancient way of sacrificing their life by consuming different poisonous substances which are easily accessible to them compared to hanging or other methods. The morbidity and mortality in any case of acute poisoning depends upon number of factors such as nature of poison, age, sex of victims and rate of toxicity¹⁴, presence of medical facilities and time interval between intake of poison and medical attention⁷.

In present study out of 2871 medico legal autopsies 372 cases were of fatal poisoning in which 279 cases were due to insecticide poisoning. History and police inquest revealed that 260 (93.19%) cases were of suicidal in nature followed by homicidal 12 (04.30%) and accidental 07 (02.50%) nature,

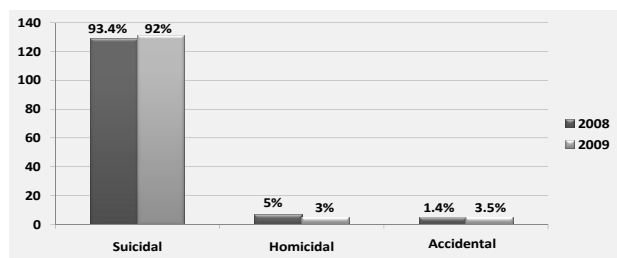


Chart-3: Manner of death of insecticide poisoning.

this correlate with Vishal Garg, & S.K. Verma¹⁶ suicidal 62 and accidental 33 cases out of 95 cases. Insecticide poisoning is significant in number as they are preferred in most of the suicides because of this rapid action, ready availability and knowledge of lethal potency. Sometimes homicidal deaths occurs when insecticide poisoning mixed with liquors and accidental deaths occur in children.

Maximum number of cases were found in the young adults of age group 21-30 followed by 31-40 years is consistent with other studies Mina Ait El Cadi,et.al.,¹; Manish Nigam,et.al.,⁴; Vinay B Shetty, et.al.,⁸; Vishal Garg¹⁶; SK Verma and Dhaval et.al.,¹⁷ & S.M.Kar,et. al.,¹⁸ have observed 21-30 years and followed by 11-20 years. The reasons for this trend may be that young adults are more susceptible to frustrations caused by highly competitive society, failures in exams, love affairs, scolding by parents etc.

The sex incidence affected with fatal insecticide poisoning was more with male which outnumbered females the ratio being 3:2 and tallies with other studies^{1,3,5,6,7,8,9,10,11,12,13,15} males outnumbered the female as male are often exposed to stress and strain of day to day life, occupational hazards and easy availability of insecticides. Female cases were due to dowry demands, family quarrels for illicit affairs and failures in love and examn. results. Out of 279 cases, 223 cases were married and 56 cases were unmarried.

It was observed in the present study 121 (74.98%) cases were from rural area and 67 (24.01%) cases were from urban area. The maximum insecticide poisoning in rural area because of large family size, ignorance, easily availability of agricultural poisoning, lack of education and awareness^{7,16,17}. Early marriages in rural community, social customs, limited resources, poverty may lead to married male to consume insecticides than unmarried population.

This findings were also similar with findings of previous studies^{5,6,7,8,9,10,11,12,15}.

Chemical analysis report revealed Parathion (Follidol), Monochrotophos, Endosulfan, Diazinon (Tik20) and Quinolphos are outnumbering offending agents. This trend however varies with the area concerned and easy availability. These studies have been carried out in Chennai, Pune and Mumbai showed Parathion(Follidol) and Tik20(Diazinon), study in Aurangabad revealed Monocil, Thimate, and Endosulfan, in decreasing frequency. In 27 (09.67%) cases were chemical analysis reports were shown that presence of poisoning in certain viscera are very limited. It was observed that generally after 3-4 days of hospitalization chemical analysis was found that the poisoning in the viscera narrowing about 50%¹². This may be due to the poison being completely metabolized to by products that is no longer demonstratable during analysis when the person survives more than 4 days period¹².

In the present study 181 (64.87%) cases were brought dead and 98 (35.12%) hospitalized death and death rate is high in numbers particularly in rural area 154 (85.08%). This finding is consistent with BD Gupta, PC Vaghela, Manoj Kumar etal., Vaibhav Sonar. Most of the victims found dead at their farm houses and unnoticed for long time. This may be due to distance between place of incidence and hospitals, strong desire to commit suicide, improper referral from Primary Health Centres without treatment giving reason of inadequate antidotes and other facilities and lack of awareness.

Conclusions :

Out of total 2871 medico legal autopsies conducted, poisoning cases constitutes 372 (12.9%) cases, out of these 279 (75%) cases were due to fatal insecticide poisoning.

Insecticides were used maximum to commit suicide, consisting 260 (93.19%) victims.

Male outnumbered female with male, female ratio being 3:2, the highest incidence being in the age group of 21-30 years.

Peak period of deaths by poisoning more in nos. in the month of May & June, reason behind that examinations results have declared during these period .

Most victims were from rural area, married population outnumbering the married.

Considering the chemical analysis most common offending agents were, Parathion (Follidol), Monochrotophos, Endosulfan, Diazenon (Tik20) and Quinolphos.

Insecticide poisoning is a major public health problem in developing countries; its usage has increased in recent and past thus increase misuse to commit suicide.

Recommendations:

In view of the above observations, this study recommends the following to prevent and manage the poisoning cases:

Strengthen the preventive measures by educating farmer/common people through education programme & camps.

Sale of deadly chemicals to anyone from open market should be constrained by prior approval for the use of such chemicals from authorized centers and keeping proper records of their sale by the retailers.

Poison Information centers may be promoted in each Primary Health Centers (PHCs).

Separate toxicological units in the district hospitals.

Set up separate departmental toxicological laboratory in the casualty of district and teaching hospital.

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