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Original Article

An Epidemiological study of Pesticide Poisoning Cases in West Bengal

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ABSTRACT

Background: *Pesticide poisoning is a major public health problem in developing countries like India. Its usage has increased in recent and thus increased even its misuse to commit suicide. The aim of this study was to determine the epidemiological profile of fatal pesticide poisoning cases in West Bengal.*

Methods: *This retrospective study was carried out at Department of Forensic Medicine, N.R.S. Medical College, Kolkata with the fatal pesticide poisoning cases from 2013 to 2014. All collected data was analyzed in all possible aspects, to identify risk factors, manner of death and other epidemiological factors etc.*

Results: *During the study period a total 1950 medico legal autopsies were conducted, amongst them poisoning were 250 (12.8%) cases. Out of these, 156 cases were due to fatal pesticide poisoning (62.4%). All collected data was analyzed in Microsoft office excels, after taking complete history and meticulous post mortem examination.*

Conclusion: *Agrochemical poisons, more so organophosphates are responsible for most of the poison related fatalities in the present study. Besides this, the establishment of specialized toxicological units for detection and management of poisoning cases at all hospitals and primary health care centers could considerably minimize the morbidity and mortality due to poisoning.*

Keywords: *Pesticide poisoning, Suicide, Rural area, Medico legal autopsy.*

INTRODUCTION

Pesticides are a group of chemical substances used mainly in agriculture. Pesticides have also been extensively used in vector control like malaria, filarial etc. It is an umbrella term used for all noxious chemicals that are used to kill pests. They are also used as domestic insecticides[(1)]. Pesticides poisoning a major public health problem in the developing world. Indian surgeon Sushruta is said to have defined the various stages of slow poisoning and the treatment of it. He also mentioned antidotes and the uses of traditional substances to counter the effects of poisoning [(2)]. Pesticide poisoning account for an estimated 250000-370000 people of severe poisoning worldwide in each year, with approximately 200,000 deaths. More than 90% of these cases are reported from developing countries, such as India

[3,4]. It is developing a level which can be called a "Social Calamity" [5]. Worldwide intentional poisoning is one of the important causes for mortality and morbidity. Exposure to agrochemicals, medicines and environmental agents are the major causes of poisoning. It is also seen that most of these pesticides poisoning and subsequent deaths happened in developing countries following a deliberate self ingestion of the poison and easy availability. An attempt has made to find out some epidemiological factors, pattern and other significant features of poisoning The aim of his study was to determine the epidemiological profile of fatal pesticide poisoning in and around South 24 Parganas district and Kolkata as this part of West Bengal has large agricultural area taking into account of demographic data, place of consumption and the manner of poisoning.

MATERIALS AND METHODS

We conducted Prospective, descriptive, cross sectional autopsy based study in association with the clinical records available from investigating agencies. The Hospital and mortuary based study was carried out taking 156 cases of pesticides poison in the department of Forensic and State Medicine, Nil Ratan Sircar Medical College, Kolkata from 1st April, 2013 to 31st March, 2014. All the dead bodies with history of pesticides poison brought to NRSMCH for medico legal autopsy were included in the present study. Decomposed bodies and subjects having preexisting pathology were excluded. Detailed history of circumstances of poisoning and treatment were noted. Tabulation, data and statistical analysis was done in the department of Forensic Medicine at Microsoft Excel (version 2016).

RESULTS

This study revealed that a total of 1950 medico legal autopsies were conducted from 1st August 2015 to 31st February 2017. Poisoning cases constituted 250 in number (12.8%). Out of these 250 cases, 156 cases were due to fatal pesticide poisoning (62.4%). It was found in the present study that pesticide poisoning constituted 8% of all unnatural deaths. Table1 shown that 82.7% were male and among them 86.5% were in the age group of 20-29 years. Maximum age observed was 59 years. Significant decrease in the higher age groups noted. Males outnumbered than females, the male female ratio being 4.7:1. Table 2 shown that agriculture is the main profession where male (93.4%) were more involved than female (6.6%). Table 3. shown that 144 cases (92.3%) victims were from rural area while 12 cases (7.7%) were from urban area. History recorded at the time of admission and police inquest revealed that 120 cases (77%) cases were of suicidal in nature. Table 4 shown that 30 cases (19.2%) had occupational exposure resulting in accidental manner. Only six cases (.038%) of homicidal pesticide poisoning were observed. Table 5 shown that 55 cases (35.2%) victims were died within 6-12 hours followed by broad death 52 cases (33.3%) following pesticides poisoning.

Table 1: Age wise distribution of poisoning cases

Age in years	Sex	Total
	Male Female	
20-29 years	116(86.5%) 18(13.4%)	134
30-39 years	3(37.5%) 5(62.5%)	8
40-49 years	10(71.4%) 3(21.4%)	13
>50 years	0(0.00%) 1(100%)	1
Total	129(82.7%) 27(13.3%)	156

Table 2: Sex and Occupation wise distribution of cases

Sex	Occupation	Total
	Agriculture non agriculture	
Male	129(93.4%) 0(0.00%)	129(82.7%)
Female	9(6.6%) 18(100%)	27(17.3)
Total	138(100%) 18(100%)	156(100%)

Table 3: Sex and Locality wise distribution of cases

Sex	Locality Rural Urban	Total
Male	120(83%) 9(75%)	129(82.7%)
Female	24(17%) 3(25%)	27(17.3%)
Total	144(92.3%) 12(7.7%)	156(100%)

Table 4: Manner of deaths

Suicidal	Accidental	Homicidal	Total
120(77%)	30(19.2%)	6(.038%)	156(100%)

Table 5: Distribution of cases according to period of survival

Duration of survival	No. of cases (%)
Brought dead	52(33.3%)
6 – 12 hours	55(35.2%)
12 – 24 hours	26(16.67%)
1 – 3 days	16(10.2%)
3 – 7 days	7(4.48%)

Discussion

It was found in the present study that pesticides poisoning constituted 8% of all unnatural deaths which was consistent with A.K.Kapoor, Dalal JS. et al and Vaghela PC et al 2005[6,7,8]. Dhattarwal SK et al established higher incidence of death due to poisoning (23.42%)[9]. In the present study death due to pesticides poisoning were higher as 82.7% in male than female deaths 13.3% which was supported by Dalal J. S. et al and Vaghela PC et al [7,8]. Death due to poisoning was found in young age group (20-29 years) followed by 30-39 years which was observed by Gupta S et al 2007 [11], Nigam M et al 2004 [12] and Singha Dalbir et al 1999 [13]. It could be explained by the fact that young age group are suffering from stress, family problem, modern life style, social and financial problem. Maximum number of poisoning cases were observed in rural areas 92.3% as compared to urban areas 7.7% because of increase farming area and activity like spraying of pesticides, illiteracy and less availability of immediate and proper treatment which was consistent with previous study like Vaghela PC et al [8] and Dhattarwal SK et al [9] where Chaudhary S et al [10] showed 64.9% cases were observed in urban as compared to rural area (35.10%). Regarding manner of death suicidal deaths were highest among all deaths may be due to various stress factors coming from financial, social, family problems, low level of education, immaturity and many more aspects of life. Easy availability of poisons made them easy victims also [14]. Spot deaths were more in present study, which might be due to lack of awareness to go for the treatment, lack of proper treatment, distance between hospital and scene of incident, a firm commitment in the mind of suicides to die which did not allow them to go for the treatment.. 55% of the victims survived for 6-12 hours after consuming the poison. This emphasizes the fact that the initial 12-24 hour period is the most crucial period dictating the final outcome and stresses the early and energetic management of these cases

Conclusion

Agrochemical poisons are responsible for most of the poison related fatalities in the present study. In developing countries like India, loss of crops due to pests cannot be ignored. Hence, instead of banning a particular pesticide, some measures could be adopted such as proper labeling of all pesticide products, imparting awareness to the lay public about the hazards of pesticides and highlighting the safe practices of storage and use. Besides this, the establishment of specialized toxicological units for detection and management of poisoning cases at all hospitals and primary health care centers could considerably minimize the morbidity and mortality due to poisoning.

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