

Socio-demographic profile of pesticide poisoning cases admitted in a rural hospital of West Bengal

Dr Swapnodeep Sarkar¹, Dr Nirmalya Manna², Dr Seshadri Kole², Dr Amal Kumar Sinha Roy³, Dr Saikat Bhattacharya², Dr Manisha Sarkar¹, Dr Udit Pradhan¹

¹(PGT, Department Of Community Medicine, Medical College Kolkata),

²(Assistant Professor),

³(Associate Professor, Department Of Community Medicine, Medical College, Kolkata, India)

Abstract:

Background: In developing countries acute pesticide poisoning remains an important issue and according to WHO (1999) more than three million poisoning cases with 251,881 deaths occur worldwide annually, of which, 99% of fatal poisonings occur in developing countries, particularly among agricultural workers.

Objectives: The objectives were to study the socio-demographic profile of the pesticide poisoning cases, explore the circumstances and routes of poisoning and determine the time gap between the intake of poison and hospital admission.

Materials and methods: It was an institution based observational descriptive study with cross-sectional design. The study was conducted in Tarakeswar rural hospital of Hooghly district, West Bengal. The duration of study was 6 months (January – June 2015). All diagnosed and admitted pesticide poisoning cases in the IPD of Tarakeswar Rural Hospital during the study period constituted the study population. A predesigned, pretested semi structured schedule was used for collecting background information from the study population. Pre-testing was conducted to assess the feasibility, acceptability and reliability of the tool. Study sample was diagnosed pesticide poisoning cases admitted in the hospital during the days of survey. Admission register of the poisoning ward, Bed-Head Tickets (BHTs) and investigation reports were checked for collecting some necessary information. Circumstances of poisoning, routes of poisoning and presence of social problems were explored from the study population. Total 61 admitted cases participated in the study. Data were tabulated in Microsoft excel spread sheet. Appropriate statistical methods were used for analysis and interpretation.

Results: Median age was found 25 years and majority (65.6%) of the subjects was from 16-30 years of age group. Male (49.1%) and females (50.9%) were almost equally involved. Majority (83.4%) of the study population were from rural area. Regarding poisoning circumstances, majority were found to be suicidal (77%) followed by accidental (16.4%) and occupational (6.6%). Majority of the poisoning (65.6%) was found to be due to organophosphorus. Median time taken to admit the subjects in the study hospital after poisoning was calculated to be 6 hours. Significant associations ($p < 0.05$) are found between suicide attempt with social problems, addiction and family type.

Conclusion: There is a need of more detailed study to better elicit and understand the important factors related to pesticide poisoning. Some important facts revealed in the current study will be better understood if larger population can be involved in a more detailed study in order to help in more generalization of the results.

Key words: Pesticide poisoning, poisoning circumstances, routes of poisoning, suicidal.

I. Introduction

A pesticide is defined as a chemical substance, biological agent, antimicrobial or disinfectant used against pests including insects, plant pathogens, weeds, molluscs, birds, mammals, fish, nematodes (roundworms) and microbes that compete with humans for food, destroy property, have a propensity for spreading or are a vector for disease or simply a nuisance.¹ In the developed world the problem of acute pesticide poisoning has largely been controlled and the main concern is from long term exposure to low levels of pesticides. The situation is quite the reverse in the developing countries. Here the main health problems arising from pesticides is that due to acute poisoning.² It is a global health concern and the annual figures at a global level in 1985 were estimated at approximately 3 million cases hospitalized and approximately 220000 deaths.³ According to WHO (1999) more than three million poisoning cases with 251,881 deaths occur worldwide annually, of which, 99% of fatal poisonings occur in developing countries, particularly among agricultural workers.⁵ A survey undertaken in Asian countries examined the problem and found an average of 3% of agricultural workers in developing countries suffer an episode of pesticide poisoning per year.² A study in Sri

Lanka in 2010 shows agricultural pesticide poisoning is a major public health problem in the developing world, killing at least around 300,000 people each year.^{6, 7} The WHO now recognizes pesticide poisoning to be the single most important cause of suicide worldwide.⁸ Within the rural developing world, high levels of pesticide use with storage at home increases the risk of acute poisoning.⁹ The majority of the fatal exposure due to organophosphates, organochlorides and aluminium phosphide. Rodenticides include thallium, superwarfarins, barium carbonate and phosphides.^{10, 11} WHO defines an acute pesticide poisoning is any illness or health effect resulting from suspected or confirmed exposure to a pesticide within 48 hours.¹² So with such a prevailing international and Indian scenario it was felt imperative to know the background and circumstances of pesticide poisoning from the admitted patients in a rural hospital. The study had following objectives;

1. To study the socio-demographic profile of the pesticide poisoning cases.
2. To explore the circumstances and routes of poisoning.
3. To determine the time gap between the intake of poison and hospital admission.

II. Materials And Methods

It was an institution based observational descriptive study with cross-sectional design. The study was conducted in Tarakeswar rural hospital of Hooghly district, West Bengal, the field practice area of department of Community Medicine, Medical College Kolkata. The duration of study was 6 months (January – June 2015). All diagnosed and admitted pesticide poisoning cases in the IPD of Tarakeswar Rural Hospital during the study period constituted the study population. Patient, who gave consent and not critically ill, were included in the study. Poisoning cases other than pesticide induced (e.g. kerosene, acid, sleeping pills, alcohol etc.) were excluded from the study. Permission was obtained from the ethics committee of Medical College and Hospital and BMOH of Tarakeswar Rural Hospital. A predesigned, pretested semi structured schedule was used for collecting background information from the study population. Pre-testing was conducted to assess the feasibility, acceptability and reliability of the tool. Study sample was diagnosed pesticide poisoning cases admitted in the hospital during the days of survey. Informed verbal consent was obtained from each participant before collecting information. They were assured about the confidentiality and intimated that information collected, will be used only for academic purpose. Some background data (Age, sex, working status, occupation, educational status, marital status, type of family, number of family members, monthly family income, tobacco chewing, alcohol consumption etc.) was collected. Admission register of the poisoning ward, Bed-Head Tickets (BHTs) and investigation reports were checked for collecting information. Circumstances of poisoning, routes of poisoning and presence of social problems were explored from the study population. Thus 61 proforma with completed responses were considered for analysis. Data were tabulated in Microsoft excel spread sheet. Appropriate statistical methods were used for analysis and interpretation.

II. Results

Total 61 poisoning cases were studied and median age of the study population was 25 years and majority (65.6%) of them were from 16-30 years of age group. Male (49.1%) and females (50.9%) were almost equally involved with the later had slightly high percentage. Majority (83.4%) of the study population were from rural area. Most of them (80.3%) were Hindu and belonged to joint family (68.9%) background. Majority of the study population (67.2%) were married. Majority (23%) of the poisoning cases were found in homemakers. Most of the study population belonged to Class V or lower class (54.1%) according to modified B.G. Prasad Socioeconomic classification scale. Addiction was found to be present in 57.4% of the study population (Table 1). Regarding poisoning circumstances, majority of them were found to be suicidal (77%) followed by accidental (16.4%) and occupational (6.6%) (Table 2). Majority of the poisoning (65.6%) was found to be due to organophosphorus. Ingestion (82%) was the main route of poisoning followed by inhalation (13.1%) and cutaneous (4.9%) (Figure 1). Median time taken to admit the subjects in the study hospital after poisoning was calculated to be 6 hours and 62.3% of them were admitted in ≤ 6 hours. Association between social problems and poisoning circumstances were evaluated and suicide attempts were found to be significantly associated with presence of social problems ($p < 0.05$) (Table 3). Association between addiction and poisoning circumstances were evaluated and suicide attempts were found to be significantly associated with presence of addiction ($p < 0.05$) (Table 4). Association between type of family and poisoning circumstances were evaluated and suicide attempts were found to be significantly associated in study subjects belonging from joint family background ($p < 0.05$) (Table 5).

III. Tables And Figures

Table 1: Socio-demographic variables of the study population (n = 61)

Socio-demographic variables	Number	Percentage
Gender		
Male	30	49.1
Female	31	50.9

Age groups (in years)		
≤ 15	5	8.2
16-30	40	65.6
31-45	9	14.8
46-60	5	8.2
Above 60	2	3.2
Place of residence		
Rural	51	83.4
Urban	10	16.6
Religion		
Hinduism	49	80.3
Islam	12	19.7
Type of family		
Nuclear	19	31.1
Joint	42	68.9
Marital status		
Married	41	67.2
Unmarried	17	27.9
Widow	2	3.3
Divorced/ Separated	1	1.6
Occupation		
Farmer	11	18.0
Home maker	14	23.0
Students	10	16.3
Service	8	13.1
Retired	2	3.3
Unemployed	2	3.3
Others	14	23.0
Socio-economic class		
Class I	0	0.0
Class II	3	4.8
Class III	5	8.3
Class IV	20	32.8
Class V	33	54.1
Addiction		
Present	26	42.6
Absent	35	57.4

Table 2: Distribution of study population according to poisoning circumstances (n = 61)

Poisoning Circumstances	Frequency	Percentage
Suicidal	47	77
Occupational	10	16.4
Accidental	4	6.6
Total	61	100

Figure 1: Pie chart showing distribution of study population according to different routes of poisoning

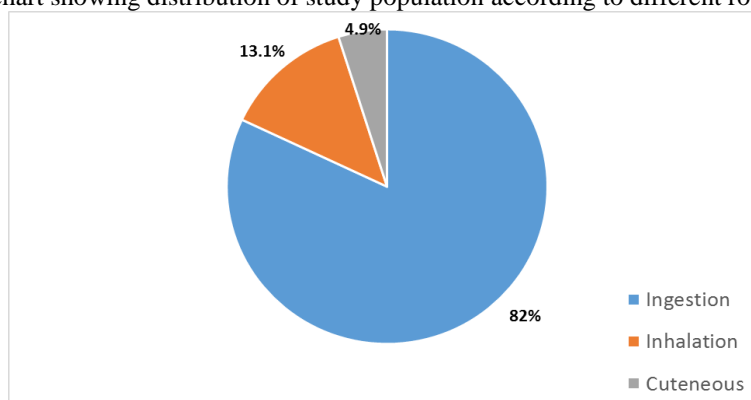


Table 3: Relationship between presence of social problems and poisoning circumstances

Social problems	Poisoning circumstances Number (%)		Total Number (%)
	Suicide	Others	
Present	23 (95.8)	1 (4.2)	24 (100)
Absent	24 (64.9)	13 (35.1)	37 (100)
Total	47	14	61

$\chi^2 = 6.241$; $p < 0.05$ (Yate's corrected)

Table 4: Relationship between presence of addiction and poisoning circumstances

Addiction	Poisoning circumstances Number (%)		Total Number (%)
	Suicide	Others	
Present	24 (92.3)	2 (7.7)	26 (100)
Absent	23 (65.7)	12 (34.3)	35 (100)
Total	47	14	61

$\chi^2 = 4.557$; $p < 0.05$ (Yate's corrected)

Table 5: Relationship between family type and poisoning circumstances

Family type	Poisoning circumstances Number (%)		Total Number (%)
	Suicide	Others	
Nuclear	11 (57.9)	8 (42.1)	19 (100)
Joint	36 (85.7)	6 (14.3)	42 (100)
Total	47	14	61

$\chi^2 = 4.26$; $p < 0.05$ (Yate's corrected)

IV. Discussion

A cross-sectional study was done among the pesticide poisoning cases admitted in a rural hospital of West Bengal to elicit their socio-demographic profile, poisoning circumstances and time gap between poisoning and hospital admission. Median age of the study subjects was found to be 25 years and 65.6% of them were from age group of 16-30 years. A H Dawson et al¹⁶ found the median age to be 28 years in a similar type of study. S K Dash et al¹³ the major age group to be 21-30 years (40.5%) in a similar type of study. In similar studies by A P Sarkar et al¹⁴ and Kora S A et al¹⁵ found the major age group to be 21-30 years (46.8% & 46.62% respectively). The difference in the findings of the present study from the discussed studies may be due to different study settings. In the present study the male (49.1%) and female (50.9%) participants were almost equal in number. But similar study done by Karki P et al¹⁷ found female majority (54%) among the study subjects. Similar studies done by S K Dash et al,¹³ A H Dawson et al¹⁶ and A K Bartra et al¹⁸ and all of them found male majority among the study subjects. These findings are consistent with the findings of present study. Regarding marital status, majority of the study subjects were found to be married in the present study. In a similar study done by Karki P et al¹⁷ found majority of the study subjects unmarried (62%). In another similar study done by A P Sarkar et al¹⁴ found majority of the study subjects married (70.7%). Similar findings were revealed by Kora S A et al,¹⁵ A K Bartra et al¹⁸ and S K Dash et al.¹³ These findings are consistent with the findings of the present study. In the present study, majority of the poisoning cases were found to be suicidal attempt (77%). Similar study by Karki P et al¹⁷ found majority of the cases were suicidal poisoning (86.5%). Similar findings of suicidal poisoning (63.4%) was reported by a study done by A K Bartra et al.¹⁸ The findings are consistent with the findings of present study. Present study found 16.3% of the study subjects were students. Karki P et al¹⁷ found 46% of the study subjects were students.

The finding here is inconsistent with the present study and this may be due to different study population and different study settings. Majority of the study subjects found to be belonged from rural area (83.4%) in the present study. A P Sarkar et al¹⁴ reported similar findings with majority of the study subjects (89.6%) from rural area. Study done by A K Bartra et al¹⁸ also found majority of subjects (83%) from rural area. S K Dash et al¹³ reported similarly with rural majority (58.2%) among the study subjects. These findings are very much consistent with the present study findings. Present study found majority of the study subjects belonged from class V in socio-economic class by following modified B.G. Prasad socio-economic scale. Similar study done by S K Dash et al¹³ found majority of the study subjects (72.5%) belonged from class V in socio-economic class. This finding is consistent with the present study. Majority of the subjects were found to be homemaker (23%) followed by farmer (18%). Study done by A P Sarkar et al¹⁴ reported 37.4% of the subjects were homemakers followed by agricultural workers (23%). Another similar study done by Kora S A et al¹⁵ found 37.76% of the subjects were homemakers followed by farmers (18.24%). Median time gap between poisoning and hospitalization was calculated to be 6 hours in the present study and 62.3% of the subjects were found to be admitted in ≤ 6 hours. Study done by A H Dawson et al¹⁶ reported the median time gap of 4 hours between poisoning and hospitalization. Another similar study by Kora S A et al¹⁵ found 81.74% of the subjects were hospitalised in ≤ 6 hours. These findings are inconsistent with the present study and may be due to different study settings and different study population. Majority of the poisoning cases in the present study were found to be due to organophosphorus (65.6%). Study done by Kora S A et al¹⁵ found similar result with majority of organophosphorus poisoning (63.8%). Another similar study done by A P Sarkar et al¹⁴ also reported similar findings with majority of the poisoning due to organophosphorus (59%). These findings are

consistent with the findings of the present study. Association between social problems and poisoning circumstances were evaluated in the present study and suicide attempts were found to be significantly associated with presence of social problems ($p < 0.05$). Association between addiction and poisoning circumstances were evaluated and suicide attempts were found to be significantly associated with presence of addiction ($p < 0.05$) in the present study. Association between type of family and poisoning circumstances were evaluated in the present study and suicide attempts were found to be significantly associated in study subjects belonging from joint family background ($p < 0.05$).

V. Conclusion

An observational cross-sectional study was done in a rural hospital among the pesticide poisoning cases admitted in the poisoning ward. The study results highlights that females are slightly more affected (50.9%) and the highest cases of poisoning being in the age group of 16-30yrs (65.6%). Most of the victims are from lower socio-economic class (54.1%) and chiefly belonging to the rural areas (83.4%). Most of the study populations are from joint family (68.9%) background. Most of the victims were home makers (23%) and farmers (18%). Significant associations are found between suicide attempt with social problems, addiction and family type. The limitations of the present study was low sample size and cross-sectional observational design. The problem of pesticide poisoning is important and more detailed study involving large amount of participants with more suitable study design will be needed for better understanding of the facts.

VI. Acknowledgement

All the pesticide poisoning patients participated in the study.

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