

Epidemiological Profile of Agriculture Pesticide Poisoning: An Experience at a Tertiary Care Hospital of Sindh

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ABSTRACT

Objective: To study the current trends of Epidemiological Profile of Pesticide Poisoning Cases reporting at a tertiary care hospital of Sindh.

Study Design: Prospective observational study

Place and Duration of Study: This study was conducted at the Chandka Medical College Hospital from January 2015 to May 2016.

Materials and Methods: A sample of 60 agriculture pesticide poisoning cases was studied in accordance to the inclusion and exclusion criteria. Biodata and physical examination were noted in the proforma. The patient data was kept confidential. Written informed consent was mandatory. SPSS 22.0 (IBM, Incorporation, USA) was available for the data analysis at 95% Confidence interval ($P \leq 0.05$).

Results: Mean \pm SD age noted was 43.5 ± 9.6 years; majority belonged to the 4th decade of life ($p=0.0001$). Of 60 subjects, 51 (85%) were male and 9 (15%) were female ($p=0.0001$). Male to female ratio was 5.6:1. Pinpoint pupil, hypotension, unconsciousness, sweating, cyanosis, and bradypnea were noted in the majority of study subjects. Medicolegal aspects of poisoning show 51.6% were accidental, 31.6 were suicidal and 16.6% were homicidal cases.

Conclusion: The findings of present study show accidental agricultural pesticide poisoning as most common followed by suicidal and homicidal poisoning. Legal restrictions of safe use of pesticides should be implemented urgently and strictly.

Key Words: Agriculture Pesticides, Accidental Poisoning, Villagers

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INTRODUCTION

A poison is a substance capable of causing the body damage, dysfunction or death of a living organism when administered or absorbed into body. A poison usually interferes with the functions of enzyme systems. Entry into body may produce local or general toxic effects. Poisons are known since ancient times. Pesticides are a class of compounds used to kill pests, which may be mites, ticks, rodents, insects, nematodes, herbs and weeds, etc. Agriculture pesticides are

commonly used substances for the protection of agriculture crops and horticulture. They are also used for domestic purpose.^{1,2} Agriculture pesticides are now easily available; hence the problem of intentional or accidental poisoning is on the rise particularly in the developing countries. Pesticide poisoning now accounts for 3 million cases yearly, with approximately 200,000 deaths. Now >90% of cases are reported from the developing countries, such as the Pakistan.^{3,4} In Developing countries, Agriculture pesticide poisoning has risen to serious level which may be called as a "Social calamity".^{4,5} Modern facilities of agriculture pesticides have revolutionized the agriculture crop production, but had appeared as easily available poisonous substances for suicidal and homicidal purpose. This led to an increased frequency of poisoning cases.^{6,7} Death toll has increased due to agriculture pesticide poisoning despite of advanced medical treatment and awareness. A number of agriculture pesticides are available, which are handy for misuse or accidental calamity. Some of persons use for the purpose of suicide as these poisons causes a peaceful death. The agriculture pesticide poisoning now equals to the deaths in road traffic accidents, however, this type of death is being neglected.⁶⁻⁸ Acute agriculture poisoning may be intentional or accidental;

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the former exceeds the later one.⁹ Agriculture poisoning is now a calamity because of easy availability by a particular class of society. Deaths by the agriculture pesticides now account more than road traffic accidents for the villagers. This is because of improper handling of lethal pesticides, although they are liable to be handled as per rules and regulations, but the implementation of laws is neglected seriously, leading to severe misuse often for the poisoning purpose. Agricultural Organophosphorus compounds are freely available poisonous substances. These have helped greatly in the green revolution as a boon but at the cost of risk of death due to poisoning.¹⁰ WHO estimates show approximately 1 million accidental poisoning cases and 2 million suicidal poisoning cases per annum throughout the World.¹¹ The agriculture pesticide poisoning have assumed an alarming situation in developing countries like Pakistan, because of lack of implementation of law handling these pesticides. This has been attributed to various causes but easy availability, indiscriminate handling, lack of rules and regulations implementation, lack of knowledge and handling by un- educated farmers.¹² In Pakistan, the surveillance of poisoning substance is lacking seriously, this has resulted in mishandling and misuse of agricultural pesticides for other purposes. Now days the agriculture pesticides are most suitable poisons for suicide and homicide because of their easy access. The present study is being reported on the current trends of Epidemiological Profile of Pesticide Poisoning Cases at a tertiary care hospital of Sindh.

MATERIALS AND METHODS

The present prospective observational study was conducted at the Chandka Medical College Hospital from January 2015 to May 2016. Our hospital is 500 bed tertiary care hospital which caters surrounding rural population comprising of farmers which are busy in the agriculture land and crop production. Adult villager subjects, diagnosed as cases of agriculture pesticide poisoning, was the inclusion criteria. Subjects of other poisoning, urban poisoning cases and subjects with severe co morbid systemic disease such as the Diabetes mellitus, chronic kidney disease (CKD) and heart failure, etc were excluded. The diagnosis of poisoning for pesticide poisoning was established by clinical history and physical examination. Conscious patients were interviewed, while attendants of unconscious patients were enquired about the type and cause of poisoning.

Approval was provided by the Institutional ethical committee. A sample of 60 agriculture pesticide poisoning cases was studied. Case selection was in accordance to the inclusion and exclusion criteria. A pre structured, pre-designed proforma was used for the collection of data. Patients presenting at the emergency department and admitted in the wards were approached

as per Helsinki's declaration of human research ethics. Biodata and physical examination was noted in the proforma. The patient data was kept confidential. Only authorized doctors engaged in the research project were allowed of access to the patient's data. Written informed consent for was signed by patients or legal guardians.

The data was typed on the Excel sheet. Compiled data once completed was ready for statistical analysis. SPSS 22.0 (IBM, Incorporation, USA) was available for the data analysis. The Continuous variables were presented as mean \pm S.D after analysis by Student t-test. Contrary to this, the categorical variables were analyzed by Chi-square test and results were presented as frequency and %. All data variables were analysed at 95% Confidence interval ($P \leq 0.05$).

RESULTS

Total sixty subjects presenting at the emergency department and admitted in the intensive care unit were studied. The demography of study subjects is summarized in the table 1. Mean \pm SD age noted was 43.5 \pm 9.6 years; majority belonged to the 4th decade of life ($p=0.0001$) although young age was also noted as shown in table 1.

Table No.1: Demography characteristics of study subjects (n=60)

	No	%	P-value
Age Groups			≤ 0.01
• 20-29.9 years	12	20.0	
• 30- 39.9 years	16	26.6	
• 40-49.9 years	21	35.0	
• >50 years	11	18.3	
Male	51	85.0	
Female	09	15.0	
Villagers	60	100	

Table No.2: Clinical findings of study subjects (n=60)

	No	%
Pinpoint pupil	51	85.0
Hypotension	50	83.3
Bradycardia	21	35.0
Conscious	11	18.3
Unconscious	51	85.0
Fasciculation	50	83.3
Salivation	41	68.3
Sweating	56	93.3
Cyanosis	39	65.0
Bradypnea	43	71.6
Total	60	100%

Male to female ratio was 5.6:1, this shows male dominancy. Of 60 subjects, 51 (85%) were male and 9 (15%) were female ($\chi^2= 45.8$, $p=0.0001$). All of 60 subjects were villagers. Clinical findings of study subjects of organophosphate poisoning are summarized

in the table 2. Pinpoint pupil, hypotension, unconsciousness, sweating, cyanosis, and bradypnea were noted in the majority of study subjects. Types of agriculture agents used are shown in table 3 and graph 1. In 11.6% cases, the nature of poison was not known. Medicolegal aspects of poisoning show 51.6% were accidental, 31.6 were suicidal and 16.6% were homicidal cases.

Table No.3: Agriculture Pesticide (n=60)

	No	%
Chlorpyrifos	11	18.3
Methyl Parathion	09	15.0
Propanophos	12	20.0
Trichlorophos	17	28.8
Acephate	04	6.60
Not known	07	11.6
Total	60	100%

Table No.4: Medicolegal Aspects of Agriculture Pesticide Poisoning (n=60)

	No	%
Accidental	31	51.6
Suicidal	19	31.6
Homicidal	10	16.6
Total	60	100%

DISCUSSION

The present study is a first prospective study reporting on the agriculture pesticides poisoning in villagers of Sindh population. Agriculture pesticide poisoning is becoming a public health problem in the rural society, this is because of illiteracy, lack of training of spreading agriculture agents on the crops and lack of public awareness about the agriculture pesticides that how much dangerous substances they are handling with. More than this is the misuse of agriculture pesticides for the suicidal and homicidal purpose by the villagers. The situation has now reached to an alarming level where the mortality and morbidity are proposed to increase at the most. Agriculture pesticides have already taken lives of bread earners of village families due to accidental poisoning. Accidental poisoning was most common encountered type noted in the present small scale study. Mean \pm SD age noted was 43.5 ± 9.6 years; majority belonged to the 4th decade of life ($p=0.0001$) although young age was also noted (table 1). The findings are in agreement with previous studies.¹³⁻¹⁵ Male to female ratio was 5.6:1, this shows male dominance. Of 60 subjects, 51 (85%) were male and 9 (15%) were female ($\chi^2= 45.8$, $p=0.0001$). The male dominance is in agreement with previous studies.^{9, 13-15} This is a fact because the male partners of village families are the workers engaged most of the time in the agriculture lands. Pinpoint pupil, hypotension, unconsciousness, sweating, cyanosis, and bradypnea were noted in the majority of study subjects.

Our clinical findings are in agreement with previous studies.^{16,17} Types of agriculture agents used are shown in table 3. In 11.6% cases, the nature of poison was not known; this is due to the illiteracy of villagers which is highly prevalent. Medicolegal aspects of poisoning show 51.6% were accidental, 31.6 were suicidal and 16.6% were homicidal cases. Our findings are in keeping with previous studies.¹⁸⁻²⁰

Most common poisoning cases were due to the agriculture organophosphates, the finding is discordant to a previous study by Gargi et al.²¹ The Gargi et al.²¹ reported that aluminum phosphide as most common followed by organophosphates. The findings are inconsistent to present and previous studies.^{16,17} A previous study⁹ has reported 75.4% male were suffering from poisoning compared to only 24.6% in female; this finding is in agreement with the 85% male observed in the present study (table 1). The World Health Organization²² has warned on the restricted use of agriculture pesticide sale, but implementation of these regulations is a dream in developing countries like Pakistan. If the sale of agriculture pesticides is restricted according as per rules, then the suicidal and homicidal deaths may be prevented to some extent, this is in agreement with previous studies.^{23,24} Legislation of pesticide sale and purchase has been effective in some countries and they reported a decrease in the suicidal and homicidal deaths.²³⁻²⁵

Training the farmers on the use of agriculture pesticides may reduce the accidental poisoning too. Public education programs should be planned in order to reduce the menace of the agricultural poisoning. Public health poisoning centers should also be established at the rural health center for early initiation of preventive and therapeutic measure to prevent the mortality.²⁵ Establishing Poisoning emergency centers at the Public health dispensaries will be a good step in changing the current scenario of agriculture pesticide poisoning. Primary health care centers should be provided with facilities of handling the poisoning cases as has been in the China,¹⁴ similar facilities should be provided in the Pakistan.

As our primary economy depends on agriculture, hence establishing poisoning centers at the rural areas will be contribute greatly towards managing the agriculture pesticides poisoning at the door step of villagers. Periodic training and refreshal courses for the young doctors will also be a useful who are working at the basic health units. This will strengthen the public health sector and will benefit the rural community.

CONCLUSION

The findings of present study show accidental agricultural pesticide poisoning as most common followed by suicidal and homicidal poisoning. The accidental poisoning may be prevented if the farmers are trained by the public health authorities. Suicidal and homicidal poisoning cases may be decreased by

implementation of legislation for agriculture pesticide sale and purchase in the country. Legal restrictions of safe use of pesticides should be implemented urgently and strictly.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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