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Original Research Article

Prospective study of spectrum, clinico-epidemiology, profile complication and outcome of pesticide poisoning in children

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ABSTRACT

Background: Konaseema region of Andhra Pradesh is a rural area having well irrigated lands and rice fields. Agriculture is the major some of income, and pesticide use is high. As per one report of deccan chronicle (a daily newspaper) Andhra Pradesh and Telangana accounts for 24% share of pesticide consumption in the country. Pediatric pesticide poisoning is under reported in India as well. In this background resent study has been designed to study clinic-epidemiology, profile, complication and treatment outcome of pesticide poisoning in Konaseema region of Andhra Pradesh.
Methods: In present study clinico-epidemiology, clinical profile, complication and outcome of the patient admitted in the Department of Emergency medicine and Paediatric were evaluated over a period of 12years.
Results: Most of the children were above 5years of age that is 74.0% (n=40), rest were below 5years of age. Male children out numbered female children and accounted for 77.78% (n=42). Accidental poisoning was more than suicidal poisoning that is 94.59% of the patients. 9.35% patient (n=5) developed respiratory failure and required ventilator support. Non-carcinogenic pulmonary edema was present in 8 (14.81%) patients. Four patients have atropine toxicity, electrolyte in balance was found in 7.4% (n=4) patients. Acute kidney injury was present in two patients, 5.5% (n=3) patients developed cardiac arrhythmia.
Conclusions: Chlorpyrifos was common agent which is responsible for poisoning most common complication in our patients were respiratory complications which required ventilatory support. Lack of information, improper disposal of container, non-existence of training and regulation is supported to the cause of accidental exposure of pesticide to paediatric patients.

Keywords: Children, Clinical profile, Complication, Pesticide poisoning

INTRODUCTION

Acute pesticide poisoning account for significant morbidity and mortality in developing countries, because of several reasons, there are no reliable estimates as to how many people every year suffers.[1,2] Pesticide poisoning disproportionately affects children and is a serious health problem.[3] As per the observation of food and agriculture organization of the united nations, the agricultural demand is going to boost by 50 % to fulfil the need of growing population by 2050. To achieve this the use of pesticide will also increase exponentially and generate a concern about environment and health risk.[4,5]

Konaseema region of Andhra Pradesh is a rural area having well irrigated lands and rice fields. Agriculture is the major some of income, and pesticide use is high. As per one report of deccan chronicle (a daily newspaper) Andhra Pradesh and Telangana accounts for 24% share of pesticide consumption in the country. As the chemical

substances are highly toxic, so incidence of accidental and suicidal poisoning is high. As per the study of Gautami S et al, Rao CHS et al, from undivided Andhra Pradesh pesticide poisoning is responsible for thousands of poisoning and hundreds of deaths every year, in few districts or where study has been conducted.[6,7]

But there is no study has been conducted on Clinico-epidemiology, profile and outcome of pesticide poisoning among children in our area. Pediatric pesticide poisoning is under reported in India as well. In this background resent study has been designed to study clinic-epidemiology, profile, complication and treatment outcome of pesticide poisoning in Konaseema region of Andhra Pradesh.

METHODS

This is a retrospective study carried out in the department of pediatrics Konaseema institute of medical science Amalapuram from October 2006 to October 2018. In present study clinico-epidemiology, clinical profile, complication and outcome of the patient admitted in the department of emergency medicine and pediatric were evaluated over a period of 12 years. This study was based on patient's case sheet data. Patient's case sheet was selected for information based on exclusion and inclusion criteria.

Inclusion criteria

- Both sex
- Age below 15years
- Confirm cases of pesticide
- Poisoning.

Exclusion criteria

- Doubtful poisons
- Pre-existing cardiological and neurological disorder
- LAMA.

Patient included in this study were treated as per standard treatment guideline of pesticide poisoning. Various parameter demography, types of poison consumed, clinical profile, complication and treatment were collected. Assuming the prevalence of mortality due to poisoning in children to be 1.5% from available literature Dayasiri et al.[8] The sample size collected to be 35 as desired confidence level of 95% and an absolute precision of 4% using nMasters version 2.0 Software. So, based on present exclusion and inclusion criteria 54 patients were enrolled for this study.[9]

Statistical analysis

The sample size collected to be 35 as desired confidence level of 95% and an absolute precision of 4% using and master version 2.0 Software. All data were analyzed using SPSS version19.0

RESULTS

In present study 54 pediatric patients presented with acute pesticide poisoning were enrolled for this study, over a period of twelve years.

Table1: Demography of the patients.

Variables		Number (n=54)	Percentage
Age	0-5years	14	25.92
	5-15years	40	74.0
Sex	Male	42	77.78
	Female	12	22.23
Type of poisoning	Accidental	50	92.59
	Suicidal	4	7.4
Season	Winter	18	33.33
	Summer	12	22.22
	Rainy	26	48.14
Place	Rural	32	59.25
	Urban	22	40.74

Most of the children were above 5years of age that is 74.0% (n=40), rest were below 5years of age. Male children out numbered female children and accounted for 77.78% (n=42).

Accidental poisoning was more than suicidal poisoning that is 94.59 % of the patients. Most of the poisoning cases were reported during rainy season that is 48.14% (n=26), 18 cases were in winter and 12 cases were reported during summer season. Among all the patients 59.25% (n=32) were from rural area and 40.74%(n=22) were from urban background.

Table 2: Type of pesticide poison consumed.

Variables	Number	Percentage
Chlorpyrifos	16	29.62
Monochrotophos	11	20.30
Methyl parathion	6	11.1
Parathion	6	11.1
Phorate	4	7.4
Deltamethrine +Triazophos	5	9.2
Prophenophos	6	11.1

In present study authors were able to identify the compound, which were used for poisoning 16 patients have consumed chlorpyrifos (29.62%), monochrotophos was consumed by (20.62%), 11 patients, methyl parathion was consumed by 6 patients, phorate was consumed by 4 patients five patients have consumed Deltamethine +Triazophos. Prophenophos was consumed by six patients.

As per Table 3, clinical profile of the patient was variable, salivation was present 48 (88.89%) patients. 40 patients have nausea, 22 patients presented with vomiting urine/stool continence was found in 32 patients.

Table 3: Clinical profile of patients.

Symptoms			
Variable		**Number**	**Percentage**
Muscarinic	Salivation	48	88.89
	Nausea	40	74.07
	Vomiting	22	44.70
	Stool/urine incontinence	32	59.25
	Respiratory difficulty	10	18.51
	Altered sensorium	18	33.33
	convulsion	2	3.70
	Fasciculation's	20	37.00
	Weakness/cramps	28	51.85
Signs			
Bradycardia	28		33.35
Tachycardia	10		18.51
Hypotension	4		7.4
Miosis	41		75.92

18.51% (n=10) patients presented with respiratory difficulty. Altered sensorium was found in 33.35% (N=18) and two patients prevented with convulsion. Fasciculation was present in 20 patients (37.0%) weakness and cramps were present in 28 (51.85%) patients. Authors have found that Bradycardia was found in 18 patients (33.33%) and tachycardia was present in 18.51% (n=10) patients. 7.4% (n=4) patient presented with hypotension. Miosis was present in 75.92% patients (n=41).

Table 4: Complications of poisoning.

Variables	Number	Percentage
Respiratory failure.	5	9.25
Non-cardiac pulmonary edema	8	14.81
Atropine toxicity	4	7.4
Aspiration pneumonia	3	5.5
Electrolyte imbalance	4	7.4
Acute kidney injury	2	3.70
Cardiac arrhythmia	3	5.5
Inter mediate syndrome	1	1.85
Seizures	2	3.70

Regarding complication of poisoning 9.35% patient (n=5) developed respiratory failure and required ventilator support. Non-carcinogenic pulmonary edema was present in 8 (14.81%) patients.

Four patients have atropine toxicity, electrolyte in balance was found in 7.4% (n=4) patients. Acute kidney injury was present in two patients, 5.5% (n=3) patients developed cardiac arrhythmia. 3.7% (n=2) patients developed seizure and one patient developed intermediate syndrome. Out of 54 patients 53 were cured and discharged but one patient died (1.8%) because of respiratory failure.

Table 5: Outcome of the treatment.

Variables	Number	Percentage
Discharged	53	98.14
Death	1	1.8

DISCUSSION

In present study 54 cases of pediatric pesticide poisoning were included as per inclusion and exclusion criteria. Authors have observed that pesticide poisoning is common between 5-15years of age and among male children. Which is supported by the observation of Robert JR et al and Lu C et al.[10,11] But Dayasiri KC et al, has found that pesticide poison is more common in below 5years age group.[8] Most of cases of poisoning were accidental only 7.4% cases were having suicidal intent, which is supported by the work of Elikana lekei et al.[12] Incidence of poisoning was more in rainy season and most of the patient were from rural area then urban this finding corroborates with the finding of Dayasiri et al and Rao CSH et al.[7,8]

In present study most, common pesticide consumed was chlorpyrifos, (29.36%) followed by monochrotofos. Methyl parathione, parathione, and prophenophase were equally common. As per the study of Rao CSH et al, Monochrotophos was more common, but study of Dayasiri et al, supports our finding.[7,8]

Regarding clinical profile of the patients, muscarinic symptoms like salivation, nausea vomiting and urinary/stool incontinence was more common than CNS and respiratory symptom which is supported by the finding of Robert J. zwiener et al, Abd E1-Rahman et al.[13,14]

Regarding nicotinic symptoms weakness and cramps were present in 51.85% patients and fasciculation was present in 37.00% patients. Zwie RJ et al, found that 35% presented with weakness and 22% patient presented with fasciculation but Abd E1-Rahman et al, found fasciculation presumption 55.3% patients, which support our finding.[13,14] Bradycardia was common cardiovascular sign followed by tachycardia and hypotension, which is supported by the work of Shan MN et al, Peter JV et al.[15,16] In present study miosis was present in 75.92% patient Shah M et al, reformed 70% Abd e1-Rahman et al,14 reported 89%.[14,15]

Regarding complication of poisoning 9.25% developed respiratory failure. Incidence of respiratory failure was 14% in the study of George JE et al, from centrol, Kerala, and Chintale NK et al, reported respiratory failure to be 8.08% from central and southern India, which support present study.[17,18] Non cardiac pulmonary edema was present in 14.81% patients which supported by the finding of Dayasiri et al and Nehal M shah et al.[7,15] Total Incidence of respiratory involvement was 24% in present study. Eddleston M et al, of Srilanka, reported respiratory

complication incidence to 24% which supports present study.[19]

Atropine toxicity was present in 7.4% patients, which corroborates with the finding of shah N et al.[15] In present study authors have found that cardiac arrhythmia was present in 5.5% which corroborates with the finding of Zueiener RJ et al.[13] Electrolyte imbalance was present in 7.4% patients, which is supported by the finding of Abd E1-Rehman and Dayasiri et al.[7,14] Authors have observed that 3.75% patient presented with acute kidney injury, which is supported by the work of Fiaz MS et al.[20] In present study cardiac arrhythmia was present in 5.5% patient, which is supported by the work of Saadeh Am et al and Landari s et al.[21,22] Inter media syndromes were present in one patients and 3.70% patient developed seizure which is supported by the work of Detweiler MB et al.[23] Out of 54 patients admitted with pesticide poisoning 53 patient recorded and 1 patient died (1.8%).

CONCLUSION

Based on present study conclude that authors would like common in school going children with male predominance, Chlorpyrifos was common agent which is responsible for poisoning. The most common complication in our patients was respiratory complications which required ventilatory support. Lack of information, improper disposal of container, non-existence of training and regulation is supported to the cause of accidental exposure of pesticide to paediatric patients.

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