

Current Trends and Medicolegal Patterns of Acute Poisoning: An Audit From a Tertiary Care Hospital of Sindh

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ABSTRACT

Objective: To study the current trends and medicolegal patterns of acute poisoning presenting at a tertiary care hospital of Sindh.

Methods: This was an observational study conducted in the department of Forensic Medicine and Toxicology LUMHS Jamshoro, Hyderabad and Medico-legal section of Liaquat University Hospital Hyderabad from January 2013 to May 2017, 493 cases of acute poisoning were analyzed according to the inclusion and exclusion criteria. Diagnosis of acute poisoning was established after clinical history, clinical examination, history of poisonous substance and clinical findings. Consent was taken from the patients or the family attendants. Data was analyzed on SPSS 22.0 (IBM, Incorporation, USA) by Student's t-test and Chi-square test at 95% Confidence interval ($P \leq 0.05$).

Results: Mean \pm SD age noted was 47.5 ± 11.7 years. Of 493 cases, 351 (71.19%) were male and 142 (28.8%) were female ($\chi^2 = 59.7$, $p = 0.0001$). Organophosphate, alcohol and benzodiazepine were most common poisons noted in 77 (15.61%), 42 (8.51%) and 40 (8.11%). Accidental poisoning was common compared to the suicidal and homicidal poisoning ($\chi^2 = 56.78$, $p = 0.0001$).

Conclusion: Organophosphate, alcohol and benzodiazepine were most common poisons noted in 77 (15.61%), 42 (8.51%) and 40 (8.11%) respectively. Accidental poisoning exceeded the suicidal and homicidal poisoning.

Key Words: Acute Poisoning, Accidental Poisoning, Homicidal Poisoning, Suicidal Poisoning

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INTRODUCTION:

A poison is a substance that alters the biological functions of living body through interaction with cell and its enzyme in different organs systems resulting in serious damage¹. Inhibition of cellular enzymes is the most common site of majority of poisons. A poison

may disturb biological function locally or generalized through the body. The mode of intake of a poison is important. Some poisons are capable of penetrating skin and producing systemic symptoms, whilst other poisons are absorbed through gut, get into blood streams and produce the toxic effects¹. Story of poisoning is as old as human being since time immemorial. Many poisons are known anciently, but modern poisonous agents are the latest one introduced for therapeutic purpose, crop production and storage. Agriculture pesticides have emerged as a new class of poisons that are commonly used for poisoning purpose². Pesticides are used to increase the crop production through killing of pests that damage the crops. Various zoological agents such as the herbs, weeds, rodents, mites, flies, rodents are known to damage the crops and

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are killed by pesticides, herbicides, insecticides and rodenticides, etc. All of these chemical agents kill the concerned crop damaging pest, herb, insect and rodent, etc; however they are present in the biological ecosystem. The half-lives of pesticide poisons are different hence they contaminate the water pools and grains for long durations. Pesticides are commonly used in horticulture and agriculture. Insecticides, anti-lice shampoos, etc are used for domestic purpose^{3,4}. Agriculture pesticides are notorious amongst the available herbicides and poisoning is common because of easy access. Accidental or intentional poisoning with these easily available agents is a public dilemma. Menace of poisoning is on rise these days due to social conditions and economic constraints. Annual estimates of pesticide related causalities accounts for 3 million and 200,000 deaths. More alarming issue is that more than 90% of poisoning cases are being reported from the third world developing countries^{1,2}. In developing countries, illiteracy and easy access to pesticides has put the masses at danger^{2,3}. Modern agriculture pesticides have revolutionized the crop production but at the cost of increased poisoning. The easily available poisons are commonly used for suicidal and homicidal poisoning. Accidental poisoning is also very common, hence total poisoning toll has multiplied⁵. Based on the previous reports⁶, it is estimated that the pesticide poisoning has multiplied and equals to the mortalities of road traffic accidents (RTAs). This type of mortality is seriously neglected in developing countries due to improper handling, illegal use, illiteracy and political issues^{5,6}. Acute poisoning is most often intentional and exceeds the accidental poisoning cases⁷. Implementation of handling laws of pesticide poisons is seriously neglected particularly for the villagers who are illiterate. They take these poisons very easy and loose lives.¹⁰ WHO estimates shows accidental and suicidal pesticide poisoning accounts for 1 and 2 million of cases respectively⁸⁻¹⁰. Easy access and poor surveillance of poisonous substances is a threat to the public health. The present study was planned to report on the current trends and patterns of acute poisoning cases reporting at a tertiary care hospital of Sindh.

METHODS:

An observational study was planned at the Department of Forensic Medicine and Toxicology LUMHS Jamhoro, Hyderabad and Medico-legal section of Liaquat University Hospital Hyderabad, from January 2013 to May 2017. Emergency Department is the busiest ward of hospital where hundreds of emergencies are attended on monthly basis. We examined 493 cases of acute poisoning over this duration. An acute poisoning case, adult, both gender and rural and urban areas populations were included. Children, and adult subjects suffering from chronic systemic diseases were excluded. Diagnosis of acute poisoning was established after clinical history, clinical examination, history of poisonous substance and clinical findings. Conscious patients were enquired about the details of poisons and quantity. For unconscious patients, the attendants were the source of clinical information. All the cases were managed as per standard protocol. Serious moribund cases of acute poisoning were managed in the intensive care units. A proforma was designed in advance for the data collection. Type and quantity of poisons were enquired to reach to a proper poisonous substances consumed by the patients. Consent was taken from the patients or the family attendants. Biodata, type of poison, duration and mode of poisoning were noted in the proforma. Patient's data was kept confidential. Only concerned researcher was allowed to see the patient's data. Data sheets were saved. Details of information were typed in an Excel sheet of the personal laptop computers which were locked for maintaining the confidentiality of patient's personal data. Excel sheet was copied on to the SPSS 22.0 (IBM, Incorporation, USA) and data was analyzed statistically. Student's t-test analyzed the continuous variables and results presented as mean \pm S.D. Chi-square test analyzed the categorical data variables and results were presented as frequency and %. Statistical analysis was performed at 95% Confidence interval ($P \leq 0.05$).

RESULTS:

Total 493 cases presenting in the

Emergency Department and Intensive Care Units proved to be suffering from acute poisoning. Mean \pm SD age noted was 47.5 ± 11.7 years. Most of the subjects belonged to the 5th decade of life ($p=0.0001$). Of 493 cases, 351 (71.19%) were male and 142 (28.8%) were female ($\chi^2=59.7$, $p=0.0001$). Male was dominated showing male to female ratio of 2.47:1. Frequency of acute poisonous substances is shown in table I and Line graph I. Organophosphate, alcohol and benzodiazepine were most common poisons noted in 77 (15.61%), 42 (8.51%) and 40 (8.11%) as shown in table. Medicolegal aspects and yearly distribution of suicidal, homicidal and accidental case are shown in table II, ($\chi^2=56.78$, $p=0.0001$).

Table I. Frequencies of Acute Poisoning Cases (n=493)

Poisonous Substances	No	%
Organophosphates	77	15.61
Benzodiazepines	40	8.11
Barbiturate	33	4.16
Chlorpyrifos	28	5.67
Trichlorophos	27	5.47
Arsenic	21	4.25
Carbon monoxide	27	5.47
Chlorylhydrate	35	7.09
Morphine	24	4.86
Methamphetamine	18	3.65
Organochlorophosphates	15	3.04
Alcohol	42	8.51
Anti lice	33	6.69
Acephate	26	5.27
Methyl Parathion	27	5.47
Mixed/Unknown	20	4.05

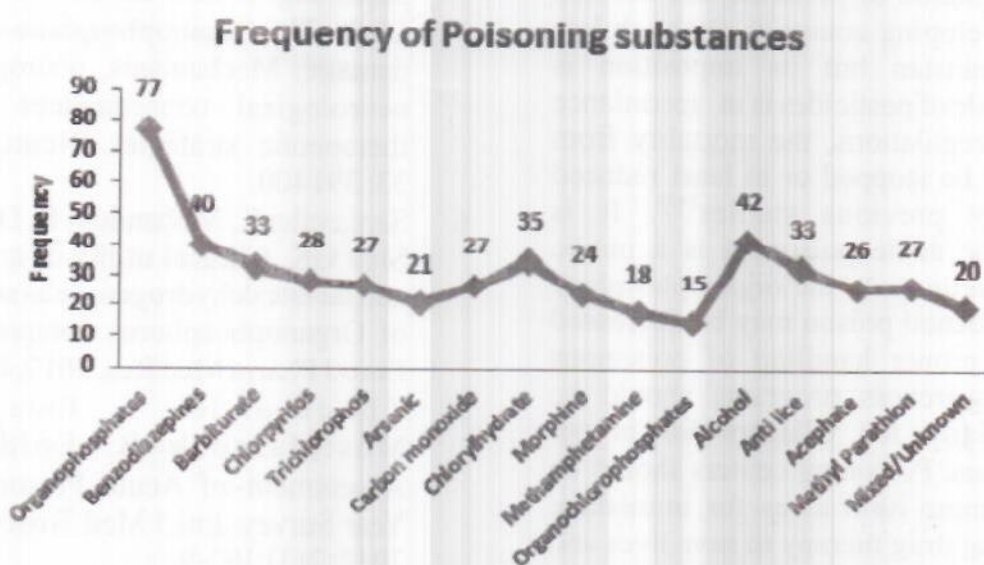
DISCUSSION:

The present study is an observational study of current trends of acute poisoning substances used by our public for intentional or unintentional purpose. We studied a sample of total 493 cases presenting in the Emergency Department and Intensive Care Units proved to be suffering from acute poisoning. The present study reports the agricultural pesticide as most common

poisonous substance used. In the present study, organophosphate, alcohol and benzodiazepine were most common poisons were noted in 77 (15.61%), 42 (8.51%) and 40 (8.11%) ($\chi^2=56.78$, $p=0.0001$). This shows the agriculture pesticides-organophosphates are the most common poisons used for suicidal and homicidal purpose, although accidental poisoning is also noted. The observation of organophosphate poisoning is consistent with previous studies.¹¹⁻¹³ The observation of present study point to the alarming situation of agriculture pesticide poisoning that has been reported by previous studies.¹⁴⁻¹⁶ The agriculture pesticide poisoning has arisen as a commonest public health problem among the villagers. Reasons could be easy availability, social problem, illiteracy, economical decline and mishandling. The economical devaluation has led to the social worries and anxieties that are making the persons for a compulsion to commit suicide and easily available poison is the agriculture poisons. In present study, the accidental organophosphate poisoning is noted that might have been because of lack of technical training of spreading agriculture pesticides on the crops. And also the villagers don't know how deadly the organophosphates are that should be realized. Villagers are never taught and trained how to handle the organophosphate pesticides. Hence the use of agriculture is on rise for the both suicidal and homicidal purpose by the villagers and accidental cases also do occur. This has created alarming level of mortality and morbidity for the villagers. Accidental poisoning has taken lives of only bread earners of many villager families. The condition is worse at the moment because the young age group of villagers is been affected. In present study the mean \pm SD age noted was 47.5 ± 11.7 years. Most of the subjects belonged to the family supporting age group of forties and fifties. The age finding of present study is similar to the previous studies¹⁷⁻¹⁹. Of 493 cases, 351 (71.19%) were male and 142 (28.8%) were female ($\chi^2=59.7$, $p=0.0001$). Male was dominated showing male to female ratio of 2.47:1. The male dominance is in agreement with previous studies^{7,17-19}. The reason is the villagers are usually male dominant in working places like agriculture. The findings are supported by previous reports^{20,21}.

Table II. Yearly Frequency of Poisoning cases (n=493)

Year	Suicidal	Homicidal	Accidental	Total	X ² -value	P-value
2013	23	31	25	79	56.78	0.0001
2014	33	39	37	109		
2015	13	16	27	56		
2016	56	39	47	142		
2017	21	19	67	107		
Total	146	144	203	493		



Graph I. Frequency of Different Poisonous Substances



Graph II. Yearly frequency of Poisonous Cases

In present study, the organophosphate, alcohol and benzodiazepine were most common poisons noted in 77 (15.61%), 42 (8.51%) and 40 (8.11%) respectively. In present study, the accidental poisoning exceeded the suicidal and homicidal poisoning. Our findings of organophosphate poison and accidental poisoning are in accordance to the previous studies^{20,21}. However, a previous study²² reported aluminum phosphide poison as most common that is inconsistent with present and previous studies^{20,21}. WHO²³ issued warning of strict implementation of pesticide sale but this is a dream in developing countries although law is present in Pakistan but its imposition is neglected. If the sale of pesticides is in accordance to the rules and regulations, the mortality from these agents may be stopped or at least reduced as suggested by previous studies²⁴⁻²⁶. It is concluded that the acute poisoning is a public health problem particularly the organophosphate poisons. The accidental poison may be decreased and stopped by proper handling of poisonous agents. Public awareness programs should be arranged particularly for villagers for proper handling of poisons. Poisoning centers should be established in remote rural areas for immediate implementation of drug therapy to save lives and prevent the mortality.

CONCLUSION:

The present study reports organophosphate, alcohol and benzodiazepine were most common poisons in accidental poisoning cases noted in 77 (15.61%), 42 (8.51%) and 40 (8.11%) respectively. In present study, the accidental poisoning exceeded the suicidal and homicidal poisoning. Training of villagers, legal sale restrictions and training of proper handling of poisonous is the need of the day.

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