

ACUTE POISONING PRESENTED AT EMERGENCY DEPARTMENT OF A TERTIARY  
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Article Received on 14/04/2018

Article Revised on 04/05/2018

Article Accepted on 25/05/2018

## ABSTRACT

**Background: Objective:** The aim of our study is to evaluate the pattern, demographics, etiologies, survival and mortality of acute poisoning at a tertiary care center in Multan, Punjab. Periodic epidemiological studies are necessary to understand the pattern of poisoning in each region. **Methodology:** It is a descriptive, cross-sectional study. Duration of study was 6 months from August 2017 to January 2018. Non-probability random sampling technique was used to enroll cases for this study. The data was collected from patient case sheets using data collection forms. The variables e.g. Gender, age and outcome was presented as frequencies and percentage. **Results:** A total of 122 patients were included in the study and of those Patients were females 77 (63.1%) and 45 (36.8%). The male/female ratio was 1:1.7 and the mean age of the patients was 30.4±13.75 years. The most common age group presented with account poisoning was 15-30 years with 49/122 patients. The analyses showed that in 28 patients the cause of poisoning was paraphenylene diamine, organophosphates in 22 patients, Aluminum phosphide in 12 patients, in 16 patients drugs, opioids in 8 patients and in 18 patients the cause of poisoning remained unknown. Overall survival rate was 79.5% and mortality rate was 25%. This high mortality rate was mainly due to poor prognosis of Aluminum phosphide poisoning (100% mortality among 12 patients). Out of 122 cases, 50% were married. Level of education among 122 poisoning cases was very low, 41 were illiterate, 27 primary education and only 23 patients were graduated. According to mode of poisoning, 41 were accidental cases, 58 suicidal, 32 homicidal and 18 stupefying. Most of the patients were young female students and farmers. **Conclusion:** It has been clear that there is no doubt in increase in the incidence of the poisoning cases. According to the results of our study, the most common agents of suicide used in our region and those who were reported at our setup were paraphenylene diamine (kala pathar), pesticide, wheat pill and benzodiazepine. Most attempts were to cause deliberate harm to self, and most common in the younger patients. Female patients were more as compared to male. It is recommended that preventive measures and psychological counseling to be done of these patients.

**KEYWORDS:** Poisoning, etiology, kala pathar, wheat pill, pesticides, outcome, mortality.

## INTRODUCTION

Paracelsus said, "All things are poisons, for there is nothing without poisonous qualities. It is only the dose which make thing poison". Poison can also be defined as, any substance that can kill, injure and impair normal physiological function in human or producing general or local damage in our body [Hakim et, al., 2014]. Poisoning can be homicidal, suicidal and accidental. It is a common social and medical problem all over the world that has high morbidity and mortality rate. There are various chemical substances used for poisoning around the world e.g. pesticides, opioids, benzodiazepine, copper sulphate, methanol, petroleum products, rat pill, paraphenylene diamine over the counter drugs etc. Pattern of poisoning is different in different parts of

world and may changes with time.<sup>[1,2,3]</sup> Poisoning accounts for 875,000 deaths worldwide per year, low income countries have more mortality and morbidity rate. In developing countries leading cause for visit to hospital emergency among patients aged 2-30 years is the second most common cause after infectious disease. Among the various causes of poisoning, pesticides are the most common agent use as self-poisoning worldwide with the percentage ranging from 4% in European region to 50% in Western Pacific region.<sup>[5,6,7]</sup> Approximately 258,000 of pesticide self-poisoning reported globally each year [Gunnell et, al., 2007] most of them Asia. Organophosphate (pesticide) is the commonest chemical agent used in Pakistan.<sup>[8,9]</sup> Opioids and benzodiazepines and more common poisoning agents used in western

world and in urban areas. According to a study it is also observed that in advance countries poisoning cases are mainly due to consumption cleansing agents, detergents, paracetamol and cosmetics [Eddleston *et al.*, 2006]. In Pakistan although pesticide is most common cause but paraphenylene diamine commonly known as “kala pathar” in an emerging important cause of poisoning, especially in South Punjab.<sup>[10,11,12]</sup> It is used as a hair dye agent easily available and very cheap in price. The severity and outcome in poisoning cases are determined by a number of factors such as chemical and physical properties of poison, amount taken, mode of poisoning, age of person, co-morbidities, availability of antidote, and early diagnosis and appropriate management. There is a need to be constantly vigilant when it comes to the matter of poisoning. The knowledge of epidemiology of poisoning and its changes is important to both emergency physician and public health practitioner. Lack of specialized topological services in Pakistan has played an important role in high rates of morbidity and mortality. Pharmacokinetics and pharmacodynamics principle should be considered in the assessment and proper management of patients exposed to a poison [Khan *et al.*, 2013]. The purpose of this study was to define the common cause of poisoning presented at our tertiary care center. Knowledge of general pattern of poisoning in a particular area will help in early diagnosis and treatment. This will help in decreasing morbidity and mortality due to poisoning.

## METHODOLOGY

This study was conducted at a tertiary care unit. It is a descriptive, cross-sectional study. Duration of study was 6 months from August 2017 to January 2018. Non-probability random sampling technique was used to enroll cases for this study. Total 122 poisoning cases were enrolled in the study. Detailed history regarding age, gender, residence, educational qualification, occupation, monthly income, type of agent used for poisoning, marital status, time and date of poisoning, method utilized, time between intoxication and presentation to the emergency department, co-morbid illness, any previous history of poisoning mode of poisoning whether accidental/, suicidal or homicidal was evaluated. Complete general, physical examination and all baseline and specific to poisoning investigations were done. Patients were followed throughout their hospital admission in order to observe different surgical and medical intervention provided to different poisoning cases and to see the outcome. The data was collected from patient case sheets using data collection forms. The variables e.g. Gender, age and outcome was presented as frequencies and percentage. Data analysis was done through SPSS version 20.

## Exclusion Criteria

- The patients who were brought dead or died immediately upon arrival before receiving any indoor treatment.
- Pregnant women.

- Age below 15 years.
- Patients or their relative who were not willing to participate in the study.
- Food poisoning.
- Patients with allergic reactions to drug

## Inclusion Criteria

- All poisoning cases above 15 years.
- Patients gave consent.
- Snake bite were included.

## RESULTS

Total 122 cases of acute poisoning presented in medical emergency were enrolled in the study. Out of 122 patients, females were more than males 77 and 45 respectively. Mostly from younger age groups, 49 cases were lie in age group 15-30 years, 37 in 31-45 years, 26 in 46-60 years and only 12 patients were having age above 60 years. In our study the percentage poisoning cases decrease with increase in age. 34 patients were from agricultural background, 25 students, 21 laborers, 23 were having job in government and private sector and remaining 19 were female and housewives by profession. We found that most of the poisoning cases were illiterate or very less education. 41 patients were illiterate, 27 had got primary education, 31 studied upto secondary school, 19 were graduate and 4 were post-graduate. About 50% (61/122) patients were married, 32% (40/122) patient's relationship status was single and remaining were divorced/widow. When we investigated the mode of poisoning, we found 14 cases were accidental, 58 cases were suicidal attempt, 32 cases of homicidal attempt and 18 cases of stupefying poisoning. In our study we found that most commonly used agent in our region is Paraphenylene diamine (kala pathar) in 28 cases. Out of 28 kala pathar poisoning 24 survived and 4 died. Second common cause was pesticides (organophosphate) in 22 cases, out of which only 2 died due to late presentation to hospital and large amount of poison used. Better outcome in pesticides is due to its availability of antidote. Aluminum phosphide (wheat pill) has very poor prognosis with 100% mortality, these finding were same as in many other studies conducted regarding wheat pill poisoning. 16 cases presented with intake of over the counter available sleeping pills (benzodiazepine) e.g. alprazolam or lorezepam (commonly known as rape drug). All the patients survived, but 3 of them needed ventilator and ICU support. 18 patients presented with unknown poisoning, the sign and symptoms and investigation among these patients were very vague not pointing towards some specific poisoning agent. 4 patients presented with snake bite, one of them died. 5 cases of phenyl intake all survived. 8 patients presented with opioid poisoning, 4 cases of ethanol poisoning, 2 copper sulphate poisoning and 5 cases of kerosene oil intake. Out 122 different cases of poisoning 97 survived and 25 died. This high mortality rate is mainly due to aluminum phosphide, paraphenylene diamine and unknown poisoning cases.

**Table: Distribution of patient among different age group and gender.**

Age groups (years)	Male	Female	Total
15-30	16 (13.1%)	33 (27%)	49 (40.1%)
31-45	10 (8.1%)	27 (22.1%)	37 (18.8%)
46-60	12 (9.8%)	14 (11.4%)	26 (21.3%)
61-75	6 (4.9%)	2 (1.6%)	8 (6.5%)
Above 75	1 (0.8%)	3 (2.4%)	4 (3.2%)
	45 (36.8%)	77 (63.1%)	

**Table: Relationship status among 122 cases.**

Single	40
Married	61
Divorced/widow	19

**Table: Qualification of 122 cases.**

Degree	No. of cases
Illiterate	41 (33.6%)
Primary	27 (22.13%)
Secondary	31 (25.4%)
Graduation	19 (15.5%)
Post-graduation	4 (3.2%)

**Table: Occupation of 122 patients.**

Occupation	No. of cases	% age
Housewife	19	15%
Student	25	20.5%
Job (govt. / private)	23	18.85%
Labor	21	17.21%
Farmer	34	27.86%

**Table: Outcome of 122 poisonous cases in tertiary care unit.**

Poisoning	Total	No. of case survived	No. of deaths occurred
Pesticides (organophosphate)	22 (18%)	20 (16.3%)	2 (1.2%)
Paraphenylene diamine (kala pathar)	28 (22%)	24 (19.6%)	4 (3.2%)
Phenyl	5(4%)	5 (4%)	0 (0%)
Kerosene oil	3 (2.4%)	3 (2.4%)	0 (0%)
Snake bite	4 (4.2%)	3 (2.4%)	1 (0.08%)
Aluminum phosphide (wheat pill)	12 (9.8%)	0 (0%)	12 (9.8%)
Opioids	8 (6.5%)	7 (5.7%)	1 (0.08%)
Benzodiazepines (sleeping pills)	16 (13.1%)	16 (13.1%)	0 (0%)
Ethanol	4 (3.2%)	4 (3.2%)	0 (0%)
Copper sulphate	2 (1.2%)	2 (1.2%)	0 (0%)
Unknown poisoning	18 (14.7%)	14 (11.4%)	4 (3.2%)
<b>Total</b>	<b>122</b>	<b>98 (80.3%)</b>	<b>24 (19.6%)</b>

**Table: Mode of poisoning.**

Mode	No. of cases	% age
Accidental	14	11.4%
Suicidal	58	47.5%
Homicidal	32	26.2%
Stupefying	18	14.7%

**DISCUSSION**

Poisoning is a universal public health problem that threatens the well-being of human population and is one

of the commonest cause of emergency department burden. Studies from United States and UK reported quite varied rate of poisoning cases from 1% to

29%.<sup>[13,14,15]</sup> According to results of our study the majority of the patients were in young age, these results are similar to other studies.<sup>[16,17,18]</sup> Male to female ratio is 1:1.7 which is approximately similar to other studies,<sup>[19,20]</sup> but different from some studies conducted in developed countries in which the ratio is 1:1.<sup>[21,22]</sup> In a study done by Mittal *et al.*, (2013) found that male cases were 70% and female were only 30%. The predominance of female and young patients was also reported in studies done in Turkey, India, Sri Lanka and Nepal.<sup>[23,24,25,26]</sup> Female predominance in this study accounted to the facts that female are often exposed to stress in our society. Many domestic and foreign studies also revealed that most of the poisoning cases were from young age groups.<sup>[27,28,29]</sup> In this study we found that suicidal cases were more as compared to accidental and homicidal and it is also observed that mostly married and young people tried poisoning for suicidal purpose. Accidental cases were more common in farmers and children, usually they encounter small amount of poisoning accidentally in fields and corrosive at home respectively. Survival rate was 95% in accidental cases in our study. In our study we found that in our area most commonly used agent/chemical as a poison is paraphenylene diamine commonly known as "kala pathar" then is pesticides, benzodiazepine (sleeping pills), wheat pill and unknown poisoning. Use of poisoning agents vary worldwide depends upon availability of substance, demography etc. In developed countries pharmaceutical agents like benzodiazepine, acetaminophen alcohol and opioids are more common and in agricultural countries pesticides and aluminum phosphide are mostly used for this purpose. Our country is counted as agricultural and developing country, here organophosphate is commonly used poison among people from rural areas because of easy availability and use of benzodiazepine and other pharmaceutical agents is also very popular due to no strictness on selling and purchasing of such medicine. There are almost 50 different brands of benzodiazepine available in market, it is mostly used for para-suicide purpose.<sup>30</sup> In Pakistan alcohol is not easily available, some people manufacture their own alcohol which is fatal. Low alcohol consumption is due to tradition and religious belief. Alcohol poisoning ratio ranges from 18% to 30% in western countries. A study was conducted in our hospital in 1986 in which 75% cases were due to pesticides, 13% with narcotics and tranquilizers, remaining 12% were due to other unknown causes. The mortality rate of wheat pill poisoning is very high in our study, its toxicity attributed to the liberation of phosphine gas, the major lethal consequence of aluminum phosphide is circulatory collapse due to super oxides and peroxides. Organophosphate poisoning is the major cause of morbidity and mortality in third world countries like Pakistan.<sup>[31]</sup> In a review from Pakistan on 1900 emergency cases there were 40% of cases of acute poisoning and in this 40% organophosphate and wheat pill were most commonly used agents. According to a review of 76 articles by Eddleston they found that organophosphate was responsible for majority of deaths

in cases of poisoning. Thomas *et al.* reported that paracetamol is the most commonly used agent in England.<sup>[32]</sup> This study showed different results regarding gender, poison agent and outcome from many studies done in Pakistan. We found that paraphenylene diamine (kala pathar) as a most commonly used agent and organophosphate (which most commonly used poisoning agent in Pakistan is as discussed) as a second most common in our study. We found that farmers and illiterate people is prone to poisoning may be due to illiteracy itself and easy availability of pesticides and kala pathar in rural areas. Limitation in history, lack of skills by physician to identify exposures bases on toxicity, ambiguity of substances taken by patients, lack of forensic experts and lack of laboratory capacity to facilitate the diagnosis all contributes to poor outcome those agents that no antidote has poor outcome. The mortality rate is very high as compared to several other studies done in Pakistan. This is mainly due to wheat pill, kala pathar and unknown poisoning cases. There is no antidote available for these toxic agents and are managed symptomatically. It is concluded that public awareness workshops should be organized to educate people especially farmers, medical store keeper and pesticides keeper regarding use and misuse of these agents and psychological counseling. We recommend that strict measure should be taken to stop easy availability of drugs, pesticides and toxic agents like kala pathar (paraphenylene diamine). We also recommend psychological counseling of patients in order to prevent repeated attempts by them. Poisoning cases vary by region and we believe that conducting multi center studies in order to develop national policies regarding poisoning will be useful to combat poisoning.

## CONCLUSION

We concluded that paraphenylene diamine is most common among poisoning case that present in over in hospital. There is no antidote for it, patients are managed symptomatically. Pesticides are the second most common agent used for poisoning and it has good prognosis in our center due to intensive management and antidote (pralidoxime) availability. Wheat pill poisoning has very poor prognosis and 100% mortality rate in our set up. Easy availability of benzodiazepine from medical stores, its misuse as a poisoning is increasing day by day. In our study poisoning is more common among female and young people. We also found that suicidal poisoning cases are more as compared to homicidal and accidental. Mortality rate of acute poisoning cases is very high mainly due to poor prognosis of wheat pill poisoning, lack of toxicological experts and limited resources. Due to easy availability, illiteracy, lack of knowledge and strict policies regarding selling of these substances the ratio of acute poisoning cases has increased from past.

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