

ETIOLOGICAL AND CLINICAL PROFILE OF PATIENTS PRESENTING WITH ACUTE POISONING TO A TEACHING HOSPITAL

Riaz Muhammad¹, Muhammad Abdur Rahman Afridi², Zafar Ali³, Muhammad Asghar⁴, Ali Sebtain⁵, Khayyam Amer⁶, Abdul Rahim⁷, Noor Ullah⁸, Intekhab Alam⁹

¹⁻⁹ Department of Medicine, Lady Reading Hospital, Medical Teaching Institution, Peshawar - Pakistan.

Address for Correspondence:
Dr. Zafar Ali

Assistant Professor,
Department of Medicine,
Lady Reading Hospital,
Medical Teaching Institution,
Peshawar - Pakistan.

Email: ali_zafar1973@yahoo.com

Date Received:
December 12, 2017

Date Revised:
February 15, 2018

Date Accepted:
February 22, 2018

ABSTRACT

Objective: To determine the etiological and clinical profile of patients presenting to a teaching hospital with acute poisoning.

Methodology: This was a hospital based descriptive study of 103 patients presenting with acute poisoning from June 2015 to September 2016. Patients of more than 12 years age and of either gender were included by non-probability convenient sampling method. Demographics, etiological and clinical profile (intentionality of poisoning, nature of agents and clinical presentation) were studied. For data entry and analysis, SPSS version 21.0 was utilized.

Results: Out of 103 patients, there were 38 (36.9%) males and 65 (63.1%) females. Age of the patients ranged from 13 to 70 years with mean age of 24.56 ± 10.424 years. Majority [n=44, (42.7%)] of the cases were between the age group of 21-30 years. Unconsciousness was the most frequent [(n=27 (26.2%)] clinical presentation of patients with acute poisoning followed by vomiting 22 (21.4%). The commonest poison ingested was organophosphorus compounds 32 (31.1%), followed by benzodiazepines 13 (12.6%) and aluminium phosphide poisoning 09 (8.7%) cases. Suicidal intent was found in 82 (79.6%) cases.

Conclusion: Most of our patients were young individuals. Altered mental status was the most frequent clinical presentation of patients with acute poisoning. The commonest poison ingested was organophosphorus compounds followed by benzodiazepines and aluminium phosphide poisoning. Suicidal intention was the main reason for acute poisoning.

Key Words: Poisoning, Toxidromes, Organophosphorus compounds, Benzodiazepines, Aluminium phosphide, Suicide

This article may be cited as: Muhammad R, Afridi MAR, Ali Z, Asghar M, Sebtain A, Amer K, Rahim A, Ullah N, Alam I. Etiological and clinical profile of patients presenting with acute poisoning to a teaching hospital. *J Postgrad Med Inst* 2018; 32(1): 54-9.

INTRODUCTION

Acute poisoning is a significant health problem and is a leading cause of morbidity and mortality throughout the world¹. An estimated 84% deaths due to poisoning in the world are in the less affluent countries². Acute poisoning is also considered among the commonest reasons for frequent visits to emergency department in most of the hospitals³.

Clinical presentation of acute poisoning is related to a variety of factors. These include time interval since poisoning and arrival to a healthcare facility, the nature of toxic agent and its bio-chemical properties, the amount or dose ingested, victim's age and general health and the presence or absence of underlying medical illnesses^{4,5}. Moreover, the body system pre-

dominantly involved will also dictate the spectrum of clinical presentation. It can range from gastro-intestinal symptoms (nausea, vomiting, diarrhea), cholinergic symptoms (pupillary changes, lacrimation, salivation, sphincteric problems) to cardio-vascular symptoms (cardiac arrhythmias, hypotension, dyspnea, shock) and symptoms related to the nervous system (headache, ataxia, numbness, paraesthesia, tremors, diplopia, convulsions, confusion, coma)^{5,6}. Advertent or inadvertent exposure to a diverse group of substances can result in poisoning. The pattern of poisoning and agents used as poisons is different across the world and even regionally^{7,8}. Availability of toxic substance (whether through prescription or over-the-counter) and in the household is reported as one of the major reasons for deliberate poisoning. The extensive use of chemical substances for

agriculture, health, and domestic reasons pose a significant threat due to their poisonous potential.

Medications are an important cause of poisoning and self-harm and is implicated in over half of the reported cases in the United States^{9,10}. For this purpose, benzodiazepines, barbiturates, antidepressants and antiepileptics are used most frequently. Occasionally there is ingestion of more than one drug which further complicates the issue¹¹. Organophosphates (OPs) are other major reasons for acute poisoning especially in developing countries¹². These comprised of a diverse group of chemicals but importantly insecticides and pesticides are used mostly for poisoning purposes. Aluminium phosphide or wheat pill is a grain preservative and used by a significant number of patients for self-poisoning. What is more concerning is the very high mortality associated with aluminium phosphide poisoning¹³.

Acute poisoning remains to be a significant problem in Pakistan. Regarding unintentional injuries, poisoning was responsible as the second commonest cause in a national health survey of Pakistan¹⁴. There is very limited data available on poisoning in our set up¹⁴⁻¹⁸. The present study was carried out to determine the etiological and clinical profile of patients presenting to a teaching hospital with acute poisoning. This will help physicians working in the emergency department as well as internists and general practitioners in the recognition and early diagnosis and prompt management of patients with acute poisoning. Poisoning is a predictable and preventable event. Recognizing its etiological agents and the associated clinical presentations will be beneficial in the management approach and help in devising prevention strategies. Increased awareness of health professionals and public will help in decreasing morbidity and mortality associated with acute poisoning.

METHODOLOGY

This was a hospital based descriptive study of 103 patients presenting with acute poisoning from June 2015 to September 2016, to the Emergency Department (ED) and Department of Medicine, Lady Reading Hospital, Peshawar. All patients with acute poisoning of more than 12 years age and of either gender were included in the study. The data was collected prospectively. Patients with insect and snake bites and those of food poisoning were excluded from the study. The sample was calculated by WHO sample size calculator. Considering 6% admissions of acute poisoning patients to ICU¹⁹, at 95% confidence interval and 4.6% margin of error, the calculated sample size was 103. Study approval was taken from Institutional review board of the hospital. The purpose of our research was clearly explained to the conscious patients or if patients were having altered mental status then to their relatives. Confidentiality of the information was assured. An informed written con-

sent in Urdu language was then obtained from patients or their relatives accordingly.

Acute poisoning was operationally defined as ingestion of a substance leading to self-harm. Intentional poisoning was considered as suicidal and un-intentional as accidental. Patients were selected by non-probability convenient sampling method. All patients who fulfilled the inclusion criteria were enrolled from the Emergency Department (ED) and then were admitted to the Department of Medicine, Lady Reading Hospital, Peshawar. A structured questionnaire was used covering demographics (age, sex, address, marital status, occupation, socioeconomic status) and clinical profile (symptomatology and clinical presentation, underlying reasons for poisoning, intention of poisoning, and nature of agents). A thorough history was obtained from patients or their attendants and focused examination was carried out. Relevant investigations including serum ALT, blood glucose level were carried out at Lady Reading Hospital, Peshawar. Toxicology screen was performed in selected cases. A predesigned proforma was used to enter the data.

Data were then entered into SPSS version 21.0 and analysis was carried out. For numerical variables (e.g. age), mean \pm SD was calculated; while for categorical variables (gender, type of poison, intentionality of poisoning and clinical presentation) frequencies and percentages were calculated. Type of poison was cross tabulated with gender and age groups using chi square test. Statistical significance was considered at p value <0.05 . All results were presented as tables.

RESULTS

There were 103 patients of acute poisoning in the present study. Among them, there were 38 (36.9%) males and 65 (63.1%) females. Male to female ratio was 1:1.7. Age of the patients ranged from 13 to 70 years with mean age of 24.56 ± 10.424 years. Majority of the cases were between the age group of 21-30 years [$n=44$, (42.7%)]. Gender and age wise distribution of patients is shown in Table 1. Most of the patients were received from district Peshawar ($n=69$; 67%), followed by Swabi 10 (9.7%), Mardan 6 (5.8%), Nowshera 4 (3.9%), Kohat 3 (2.9%) and other areas of the province 11 (10.7%).

Altered level of consciousness was the most frequent clinical presentation of patients with acute poisoning ($n=27$, 26.2%), followed by vomiting 22 (21.4%). Relative frequencies of other clinical presentations are shown in Table 2. The commonest poison ingested was OPs 32 (31.1%), followed by benzodiazepines 13 (12.6%) and aluminium phosphide poisoning 09 (8.7%). Type of ingested poisons is shown in Table 3. Suicidal intent was found in 82 (79.6%) cases whereas 21 cases (20.3%) were due to accidental ingestion.

Table 1: Gender and age distribution (n=103)

Gender	Age groups (in Years)				Total
	12-20	21-30	31-40	above 40	
Male	13 (12.6%)	16 (15.5%)	6 (5.8%)	3 (2.9%)	38 (36.9%)
Female	30 (29.1%)	28 (27.2%)	6 (5.8%)	1 (0.9%)	65 (63.1%)
Total	43 (41.7%)	44 (42.7%)	12 (11.7%)	4 (3.9%)	103 (100%)

Table 2: Clinical presentation of patients with acute poisoning (n=103)

Type of Poison	Frequency	Percentage
Unconsciousness	27	26.2
Vomiting	22	21.4
Drowsiness /Confusion	13	12.6
Pupillary changes/ Lacrimation	11	10.7
Dyspepsia	10	9.7
Shock/ Tachycardia	5	4.8
Headache	4	3.9
Others	11	10.7
Total	103	100

Table 3: Type of poison ingested (n=103)

Type of Poison	Frequency	Percentage
Organo-phosphorus Compounds	32	31.1
Benzodiazepines	13	12.6
Aluminium Phosphide Poisoning	09	8.7
Corrosives	4	3.9
Opioids	3	2.9
Paracetamol	3	2.9
Carbon Monoxide Poisoning	3	2.9
Copper Sulphate	2	1.9
Tricyclics	2	1.9
Alcohol	2	1.9
Diclofenac	2	1.9
Carbamazepine	2	1.9
Others	26	25.2

DISCUSSION

Increased magnitude of poisoning is related to the easy availability of over the counter medications and availability of medications and pesticides at home. Moreover, cases of poisoning are attributed to newer drugs with their unknown toxicities^{18,20}. In our study, there were 63.1% females. Desalew et al²¹ and Zhang et al²² reported more females in their studies. In the study by Saglam et al²³ 66.4% were women. This might be explained on the basis of fact that females in our region are more prone to negative cultural influences and domestic stress as compared to males. Other researchers

reported a higher proportion of males in other relatively developed countries^{24,25}. It may be related to the differences pertaining to gender and culture in different countries and societies.

Mean age of our study participants was 24.56 ± 10.424 years and majority of the cases were less than 30 years of age [n=87, (84.5%)]. This may be due to work related stress, financial stress, marital & relationship problems and increased impulsiveness in the young population. These findings were in accordance with the study by Sujatha et al²⁶ who observed mean age of 28.5 years and most patients were in the second or third decade of life.

Similarly, the peak age group for poisoning was found to be 15-29 years in the study by Khan et al¹⁵ and reported mean age was 29.24 ± 13.71 years by Saglam et al²³. Other studies also showed similar results^{21,27}. Moreover, in young patients, suicidal behavior was found with increased frequency in female gender²⁸. In most of the families in our set up, young adults are the bread earners and productive members of society²⁹. Higher frequency of poisoning in this age group is of alarming concern.

Spectrum of clinical presentation varies with type of agent ingested^{4,17,30}. In this study, altered mental status was the most frequent clinical presentation of patients with acute poisoning (unconsciousness in 26.2% & drowsiness or confusion in 12.6% cases). Vomiting was present in 21.4% cases. Shock and tachycardia were present in 4.8% cases. Sujatha et al²⁶ reported hypotension in 10.8% cases. In the study by Verma¹³, nausea, vomiting, retrosternal burning and pain epigastrium were present in majority of patients; however 53% of patients showed restlessness without alteration in consciousness. Panchal et al³¹ reported nausea and vomiting as the commonest symptoms (86%) of cases followed by pain in abdomen (34%) and altered sensorium in 32% of cases. Increased salivation was observed in 97% cases, 96% had constricted pupils, increased gut sounds were heard in 94% cases in the study by Ather et al³². Panchal et al³² reported miosis in 42% of cases and disturbed consciousness in 52% of cases. Shock was present in 4.8% of our patients. In a study by Ku et al³³ shock was found to be a significant risk factor for mortality after carbon monoxide (CO) poisoning.

The pattern of poisoning depends on various factors such as availability, access to the poison, socio-economic status, gender, literacy and cultural influences. In our study, the commonest poison ingested was organophosphorus compounds 32 (31.1%). Ather et al³² showed 41% patients of organophosphate poisoning. In the study by Khan et al¹⁵, pesticides were found involved in 15.3% and hydrocarbons in 10% cases. Organophosphorus (OP) was the most frequently occurring poisoning as reported by studies from areas with agriculture as the major occupation of people^{34,35}. Pesticides are considered as the most common agents for poisoning and having increased morbidity and mortality particularly in less affluent countries^{17,36,38}. In Pakistan, the increased access to pesticides and its easy availability at home, illiteracy and lack of adequate regulations regarding its purchase and use are the principal reasons for higher number of cases due to OP poisoning³². It points towards significant implications for society and health care now and in the future. Therefore strict legislature regarding pesticides and other OP compounds and restrictions on their sale is of paramount importance in handling and controlling this problem. Even advanced

countries face similar problems regarding legislature and purchase restrictions³⁸.

Benzodiazepines were ingested in 12.6% cases and paracetamol in 2.9% cases in the present study. Singh et al⁵ reported that the most common agents were benzodiazepines, 29.7%, followed by alcohol (24.63%) and opioids (7.2%). Clark et al³⁹ showed that among drug overdose, tricyclic antidepressants were 28%, benzodiazepines 21%, recreational drugs 23%, opioids 14% and paracetamol 19%. Vallersnes et al⁴⁰ observed that benzodiazepines were taken by 18% of patients. Sujatha et al²⁶ showed 19.6% of the drug overdose was benzodiazepines and 5.2% patients were with paracetamol over dose. Wakushie et al⁴¹ reported that 11.5% of poisonings were due to drugs. The situation in urban areas may resemble western countries⁵. Khan et al¹⁵ reported medications as the most common reason for poisoning and they observed an increasing trend for household toxins and pesticides, alcohol and drugs of abuse. It necessitates a great work in ensuring the rational use of drugs and dispensing only with valid prescriptions to prevent their harmful use and to reduce cases due to poisoning⁴¹.

Wheat pill or aluminium phosphide is widely used as an insecticide and as grain preservative. When it is ingested for self-poisoning, its constituents (phosphides) come into contact with gut fluids with liberation of phosphine leading to toxicity⁴². Wheat pill poisoning was present in 8.7% cases in our study. These were provided ICU care as well. In a study by Bhatti et al⁴³ wheat pill poisoning was reported in 10% cases, which is similar to our findings. Carbon monoxide poisoning was present in 2.9% cases in our study. It was reported as 8.7% in the study by Saglam et al²³. It occurs when there is incomplete combustion of organic material leading to formation of an odorless gas called carbon monoxide. The most common sources of unintentional CO poisoning are faulty or inadequately ventilated gas heating appliances and automobile exhaust fumes fires. In Taiwan, over a 06 years period, a significantly increased mortality was observed due to CO poisoning⁴⁴.

Suicidal intent was found in 79.6% cases whereas 20.3% cases were due to accidental ingestion. In the study by Lee et al⁴⁵, suicidal attempt was the predominant etiology (66.1%). It was deliberate in 73.5% in the study by Saglam et al²³. In the study by Sujatha et al²⁶ poisoning with suicidal intent constituted 95.2% of study subjects, whereas accidental poisoning occurred in 4.8% patients. Similar results were noted in other studies as well^{24,46}. An underlying psychiatric illness is usually present in a significant number of patients with acute poisoning. It is further aggravated or made more complicated by environmental stressors. Therefore it is important that all patients admitted with poisoning should be subjected to detailed psychiatric evaluation

and suicidal risk assessment⁴⁷. Interventions focused on mental health will help in decreasing further attempts of self-harm or poisoning.

LIMITATIONS

This study was conducted in a single center. It is essential for better policy making to observe the data from multiple centers with larger samples and for a longer time period.

CONCLUSION

Most of our patients were young individuals. Altered mental status was the most frequent clinical presentation of patients with acute poisoning. The commonest poison ingested was organophosphorus compounds followed by benzodiazepines and aluminium phosphide poisoning. Suicidal intention was the main reason for acute poisoning.

RECOMMENDATIONS

Different age groups need consideration of different poisoning-prevention strategies. Strict legislature regarding medications, pesticides and other OP compounds and restrictions on their sale is of paramount importance in minimizing incidences of poisoning. Aluminium phosphide being a highly lethal poison needs to be replaced with a safer option. A regional poison information center should be established to assist in the diagnosis, predict clinical consequences and to guide management.

REFERENCES

- Chen F, Wen JP, Wang XP, Lin QM, Lin CJ. Epidemiology and characteristics of acute poisoning treated at an emergency center. *World J Emerg Med* 2010; 1:154-6.
- World Health Organization. Poisoning Prevention and Management. WHO; 2012. Available from: URL: <http://www.who.int/ipcs/poisons/en/>.
- Akkose S, Fedakar R, Bulut M, Armagan E, Cebicci H. Acute poisoning in adults in the years 1996-2001 treated in the Uludag University Hospital, Marmara Region, Turkey. *Clin Toxicol (Phila)* 2005; 43:105-9.
- Hu YH, Chou HL, Lu WH, Huang HH, Yang CC, Yen DH et al. Features and prognostic factors for elderly with acute poisoning in the emergency department. *J Chin Med Assoc* 2010; 73:78-87.
- Singh O, Javeri Y, Juneja D, Gupta M, Singh G, Dang R. Profile and outcome of patients with acute toxicity admitted in intensive care unit: Experiences from a major corporate hospital in urban India. *Indian J Anaesth* 2011; 55:370-4.
- Khlifi M, Zun L, Johnson G, Harbison R. Etiological characterization of acute poisonings in the emergency department. *J Emerg Trauma Shock* 2009; 2:159-63.
- Cook R, Allcock R, Johnston M. Self-poisoning: current trends and practice in a UK teaching hospital. *Clin Med* 2008; 8:37-40.
- Fathelrahman AI, Ab Rahman AF, Mohd Zain Z. Self-poisoning by drugs and chemicals: variations in demographics, associated factors and final outcomes. *Gen Hosp Psychiatry* 2008; 30:467-70.
- Bronstein AC, Spyker DA, Cantilena LR Jr, Green J, Rumack BH, Heard SE. 2006 annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS). *Clin Toxicol (Phila)* 2007; 45:815-917.
- Harriss L, Hawton K. Deliberate self-harm in rural and urban regions: a comparative study of prevalence and patient characteristics. *Soc Sci Med* 2011; 73:274-81.
- Jones JD, Mogali S, Comer SD. Polydrug abuse: a review of opioid and benzodiazepine combination use. *Drug Alcohol Depend* 2012; 125:8-18.
- Aardema H, Meertens JH, Ligtenberg JJ, Peters-Polman OM, Tulleken JE, Zijlstra JG. Organophosphorus pesticide poisoning: cases and developments. *Neth J Med* 2008; 66:149-53.
- Verma R. Profile of patients with acute aluminium phosphide poisoning in a tertiary care institute of Haryana India. *Int J Interdis Stud* 2016; 03:24-30.
- Fatmi Z, Hadden WC, Razzak JA, Qureshi HI, Hyder AA, Pappas G. Incidence, patterns and severity of reported unintentional injuries in Pakistan for persons five years and older: results of the National Health Survey of Pakistan 1990-94. *BMC Public Health* 2007; 7:152.
- Khan NU, Khan UR, Feroze A, Khan SA, Ali N, Ejaz K et al. Trends of acute poisoning: 22 years' experience from a tertiary care hospital in Karachi, Pakistan. *J Pak Med Assoc* 2016; 66:1237-42.
- Hussain AM, Sultan ST. Organophosphorus insecticide poisoning: management in surgical intensive care unit. *J Coll Physicians Surg Pak* 2005; 15:100-2.
- Khurram M, Mahmood N. Deliberate self-poisoning: Experience at a Medical Unit. *J Pak Med Assoc* 2008; 58:455-7.
- Ahmad R, Ahad K, Iqbal R, Muhammad A. Acute poisoning due to commercial pesticides in Multan. *Pak J Med Sci* 2002; 18:227-31.
- Cretikos MA, Parr MJ. Drug related admissions to intensive care: the role of illicit drugs and self-poisoning. *Crit Care Resusc* 2003; 5:253-7.
- Sandhu SS, Dalal JS. Trends of Poisoning in Faridkot region of Punjab-A retrospective study of one year. *J Indian Acad Forensic Med* 2010; 32:8-10.
- Desalew M, Aklilu A, Amanuel A, AddisuM, Ethiopia T. Pattern of acute adult poisoning at TikurAnbessa specialized

- teaching hospital, a retrospective study, Ethiopia. *Hum Exp Toxicol* 2011; 30:523–7.
22. Zhang J, Xiang P, Zhuo X, Shen M. Acute poisoning types and prevalence in Shanghai, China, from January 2010 to August 2011. *J Forensic Sci* 2014; 59: 441–6.
 23. Saglam ZA, Demir B, Ataoglu EH, Yenigun M, Temiz LU, Saler T. Causes of acute poisoning in adults: a retrospective study, in a hospital in Istanbul, Turkey. *J Pub Health* 2012; 20:59–63.
 24. Jang HS, Kim JY, Choi SH, Yoon YH, Moon SW, Hong YS et al. Comparative analysis of acute toxic poisoning in 2003 and 2011: Analysis of 3 academic hospitals. *J Korean Med Sci* 2013; 28:1424–30.
 25. Vallersnes OM, Jacobsen D, Ekeberg Ø, Brekke M. Patients presenting with acute poisoning to an outpatient emergency clinic: A one-year observational study in Oslo, Norway. *BMC Emerg Med* 2015; 15:18.
 26. Sujatha KJ, Thyagaraj V. A Clinical and Demographic Profile of Acute Poisoning in Adults: A Two Year Experience from a Tertiary Care Centre in Bangalore, India. *Br J Med Medic Res* 2017; 21:1-10.
 27. Khudair IF, Jassim Z, Hanssens Y, Alsaad WA. Characteristics and determinants of adult patients with acute poisoning attending the accident and emergency department of a teaching hospital in Qatar. *Hum Exp Toxicol* 2013; 32:921–9.
 28. Radhakrishnan R, Andrade C. Suicide: An Indian perspective. *Indian J Psychiatry* 2012; 54:304–19.
 29. Khan NU, Pérez-Núñez R, Shamim N, Khan UR, Naseer N, Feroze A et al. Intentional and unintentional poisoning in Pakistan: a pilot study using the Emergency Departments surveillance project. *BMC Emerg Med* 2015; 15:S2.
 30. Ramesha KN, Rao KB, Kumar GS. Pattern and outcome of acute poisoning cases in a tertiary care hospital in Karnataka, India. *Indian J Crit Care Med* 2009; 13:152–5.
 31. Panchal M, Trivedi D. Clinical Profile in Patients of Organophosphorous Poisoning. *Int J Sci Res* 2016; 5:97-9.
 32. Ather NA, Ara J, Khan EA, Sattar RA, Durrani R. Acute organophosphate insecticide poisoning. *J Surg Pak* 2008; 13:71-4.
 33. Ku CH, Hung HM, Leong WC, Chen HH, Lin JL, Huang WH et al. Outcome of Patients with Carbon Monoxide Poisoning at a Far- East Poison Center. *PLoS One* 2015; 10:e0118995.
 34. Ahuja H, Mathai AS, Pannu A, Arora R. Acute poisonings admitted to a Tertiary Level Intensive Care Unit in Northern India: Patient Profile and Outcomes. *J Clin Diagn Res* 2015; 9:UC01-4.
 35. Indu TH, Raja D, Ponnusankar S. Toxicoepidemiology of acute poisoning cases in a secondary care hospital in rural South India: A five-year analysis. *J Postgrad Med* 2015; 61:159–62.
 36. Z'gambo J, Siulapwa Y, Michelo C. Pattern of acute poisoning at two urban referral hospitals in Lusaka, Zambia. *BMC Emerg Med* 2016;16:2.
 37. Rajapakse T, Griffiths KM, Christensen H, Cotton S. A comparison of non-fatal self-poisoning among males and females, in Sri Lanka. *BMC Psychiatry* 2014; 14:221.
 38. Wesseling C, Corriols M, Bravo V. Acute pesticide poisoning and pesticide registration in Central America. *Toxicol Appl Pharmacol* 2005; 207:697–705.
 39. Clark D, Murray DB, Ray D. Epidemiology and outcomes of patients admitted to critical care after self-poisoning. *Intens Care Soc* 2011; 12:268-73.
 40. Vallersnes OM, Jacobsen D, Ekeberg Ø, Brekke M. Patients presenting with acute poisoning to an outpatient emergency clinic: a one-year observational study in Oslo, Norway. *BMC Emerg Med* 2015; 15:18.
 41. Wakushie J, Daba FB. Pattern of acute poisoning and management outcome among patients presented to adama referral hospital, Ethiopia. *Med Data* 2016; 8:185-9.
 42. Anand R, Binukumar BK, Gill KD. Aluminum phosphide poisoning: An unsolved riddle. *J Appl Toxicol* 2011; 31:499–505.
 43. Bhatti N, Khan DA, Saleem S, Ijaz A, Aamir M. Frequency of drug poisoning in adults at tertiary care hospital, Wah Cantt. *Pak J Pathol* 2015; 26(1): 27-34.
 44. Shie HG, Li CY. Population-based case-control study of risk factors for unintentional mortality from carbon monoxide poisoning in Taiwan. *Inhal Toxicol* 2007; 19:905–12.
 45. Lee HL, Lin HJ, Yeh SY, Chi CH, Guo HR. Etiology and outcome of patients presenting for poisoning to the emergency department in Taiwan: a prospective study. *Hum Exp Toxicol* 2008; 27:373–9.
 46. Avsarogullari L, Senol V, Akdur O, Akin A, Durukan P, Ozkan S. Characteristics of acute adult poisonings in a university hospital emergency department in central Turkey: a three-year analysis. *J Pak Med Assoc* 2012; 62:129–33.
 47. Bjornaas MA, Hovda KE, Heyerdahl F, Skog K, Drottning P, Opdahl A et al. Suicidal intention, psychosocial factors and referral to further treatment: a one-year cross-sectional study of self-poisoning. *BMC Psychiatry* 2010; 10:58.

CONTRIBUTORS

RM conceived the idea, planned the study and drafted the manuscript. MARA and ZA helped acquisition of data and did statistical analysis. MA, AS, KA, AR and NU helped acquisition of data. IA critically revised the manuscript and supervised the study. All authors contributed significantly to the submitted manuscript.