Original Article

PATTERN AND FREQUENCY OF ACUTE POISONING IN CHILDREN

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ABSTRACT

Objectives: To determine different agents involved in acute poisoning in children, determine time interval between ingestion of agent and report at the hospital and document its hospital outcome.

Methodology: This was descriptive case series study conducted at the Department of Paediatrics (Emergency and General Wards), Khyber Teaching Hospital, Peshawar from Jan 2007 to July 2007. A total of hundred patients with history of acute poisoning were subjected to detailed history and examination regarding different aetiological agents, time interval between ingestion of agent and report at hospital and hospital outcome.

Results: Majority of patients were below six years of age, 69% were male while 31% were female. Pharmaceutical agents and kerosene oil poisoning were the leading cause constituting 29% each followed by opiate and organophosphorus constituting 17% and 15% respectively. Fifty three percent of cases belonged to urban while forty seven percent belonged to rural area. Forty percent of cases were brought to the hospital within first hour; followed by 38% and 22 % in 1-6 and more than 6 hours respectively. Ninety four percent of patients were discharged with almost complete recovery while six percent expired during hospital stay.

Conclusion: Acute poisoning is an important paediatric medical emergency and has got an important effect on morbidity and mortality in this age group. Toddlers are the most prone group in children to acute poisoning. Kerosene oil, drugs, organophosphorus and opiate are the common aetiological agents of poisoning in children. Hospital outcome is poor in patients with corrosives poisoning.

KEY WORDS: Acute Poisoning, Children, Kerosene oil, Tricyclic antidepressants, Organophosphorus, Opiates.

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INTRODUCTION

Poisoning is defined as exposure of an individual to a substance that can cause symptoms and signs of organ dysfunction leading to injury or death.[1] Poisoning has been identified as one of the major causes of the childhood and adolescence hospital emergency presentations and admissions in most developed countries including the United States, United Kingdom, and Australia.[2,3]

Poisoning may be acute or chronic. In acute poisoning symptoms suddenly appear soon

after the suspected food, medicine or fluid has been taken. The person, previously known to be in good health, is affected with a group of symptoms which do not confirm to ordinary illness. In chronic poisoning, symptoms develop insidiously and gradually. There is remission or even complete disappearance of symptoms on the removal of the patient from his usual surroundings.[4]

In developing countries, poisoning has also been recognized as a major health problem among children as adolescents.[4] Accidental poisoning is implicated in about 2% of all injury deaths in children in developing countries.[5]

Certain poison types of medicinal and non-medicinal substances have been identified as common agents in poisoning in children as adolescents.[6] Riordan et al reviewed the literature on childhood poisoning and identified several groups of medicinal substances as the most common.[7] These included analgesics, anti-inflammatory agents, psychotropic drugs such as antidepressants, and benzodiazepines related agents.[8] Non-medicinal substances chemicals such as organophosphates, pesticides, insecticides, organic solvents, and household such as bleach and caustics were also found to be common causes of poisoning among children.[9]

Acute childhood poisoning is important because it is an important cause of morbidity and mortality in children, which can be significantly and affectively controlled by preventive and educational measures.[10] The accidental exposure of a toxic substance by a child represents a complex interplay of host, agent and environmental factors.[1] Host factors associated with unintentional poisoning include young age (preschool), male sex and curious, impulsive personality,[11-13] whereas intentional poisoning is common in female sex and adolescent.[12]

It has also been suggested that there is a differential relationship between poison types and geographic locations where poisoning incidences occur.[3] Assumption on exposure, which is based on accessibility to poisonous substances, leads to the hypothesis that certain types of poisoning would be more prevalent in specific geographic locations. For example, children and adolescents in rural areas would have more chance of exposure to agricultural and other chemicals, hence poisoning due to these types of substances should be more prevalent in rural areas. Drugs, pesticides and kerosene oil are amongst the common etiological agents causing acute poisoning in children.[14-16] The main agents causing death are caustics.[17]

Poisoning in children is an important health problem, which has significant cost, both financial and emotional, as it is largely an accidental phenomenon. It is also a prime target for prevention and cost saving measures. Accidental poisoning constitutes a major cause of mortality and morbidity in children in developing countries. To characterize poisoning in children, a composite picture can be built from a number of the surveys of Accident and Emergency (A&E) department and hospital admissions. The purpose of this study was to determine the pattern and frequency of various agents involved in acute poisoning in children, time interval between ingestion and arrival at hospital and hospital outcome.

METHODOLOGY

This descriptive case series study was conducted at the Department of Paediatrics (Emergency and General Paediatric wards), Khyber Teaching Hospital Peshawar from January 2007 to July 2007. A total number of hundred children, age one month to 15 years presenting with definite history of exposure to toxic substances or clinical features suggestive of possible poisoning were included in the study. Children with insect bite and chronic poisoning were excluded.

All children were subjected to detailed history regarding demographic data (age, sex and region), aetiological agents (like kerosene oil, organophosphorus and drugs etc), time of poison ingestion, time of arrival at hospital and hospital outcome. All the information was documented on proforma. Complete general

physical examination and thorough systemic examination was performed in all cases. Investigations like complete blood count, X-Ray chest, blood glucose, blood urea and creatinine, arterial blood gases and toxicological screening of (gastric lavage, urine and blood) were carried out, where needed. Specific management measures like gastric lavage, decontamination, antidote, alkalization or diuresis were taken accordingly. Outcome was measured in term of complete recovery and expiry. Informed consent was taken from parent's relatives and advantages/risks in study and significance of the study were explained to the parents/relatives.

The data collected was analyzed using SPSS version 10 software. The age distribution of the patients was done by making different age groups, like 1st, 2nd, 3rd and 4th and putting patients into these age groups.

Descriptive Statistics was used to calculate Mean and Standard Deviation of age. Frequency (%) was calculated for gender, rural / urban distribution, type of poisoning and outcome. The data was presented as tables and figures.

RESULTS

A total number of hundred patients with history of acute poisoning were included in the study. Out of these hundred patients majority were male constituting 69% patients of the study (n =69), while the remaining 31% were female (n =31), with an overall male to female ratio of 2.2: 1.0.

Maximum number of patients presented in the first five years of life i.e. 87% (n= 87). Out of these majority were in the age group of 1 to 5 years of (n=64, 64%), followed by less than one year age group (n =23, 23%). While the rest of the patients 11% (n=11) and 2% (n=2) of cases presented in 5 -10 years and 10-15 years of age groups respectively. The data for age distribution is given in Table-I.

The age range was one month to 12 years, with a mean value of 3.0292 and standard deviation of ± 2.5687. The region distribution of the study showed that patients from urban area outnumbered that of rural area. Patients from urban area constituted 53% (n= 53) while rural area constituted 47% (n=47) of cases.

Table-I: Age distribution of acute poisoning in children (n =100)

Age (in years)	*No of Patents (%)*
1month-1yr	23 (23)
1-5	64 (64)
5-10	11 (11)
10-15	2 (2)

Regarding the pattern and frequency of various poisons Kerosene Oil and Drug category were the most common constituting 29% (n=29) each. The common agents included in the drug category were tricyclic antidepressants and analgesics. The rest of the agents were Opiate, organophosphorus, corrosives and dhatura constituting 17, 15, 6 and 4% respectively. The details regarding the pattern and frequency are given in Table-II.

Seventy eight percent (n= 78) of cases were brought to the hospital within the first six hour of poison ingestion, while the rest 22 percent (n= 22) arrived after six hour of ingestion as given in Table-III. Ninety four percent of cases (n= 94) recovered completely during the hospital stay while the rest six percent (n= 6) expired. P value for time and outcome was 0.025.

DISCUSSION

Acute poisoning is a common problem in pediatric age group. Majority of the children (87%) in our study were less than five years of

Table-II: Substances used in acute poisoning in children (n =100)

Poison Type	*No of Patients (%)*
Drug	29 (29)
Kerosene Oil	29 (29)
Opiate	17 (17)
Organophosphorus	15 (15)
Corrosives	6 (6)
Dhatura	4 (4)
Total	100 (100)

Table-III: Time between ingestion and arrival at hospital in children with acute poisoning (n =100)

Time (in hrs)	*No of Patents (%)*
< 1	40 (40)
1-6	38 (38)
6-24	22 (22)
Total	100 (100)

age. This has been observed in other studies.[10,18,19] Mean age was three years in our study as compared to 2.48 by Hamid et al study conducted at Children's Hospital, Lahore.[10] Male patients outnumbered female patients in our study; the same was the case in studies conducted at National Poison Information Centre, All India Institute of Medical Sciences, New Delhi and Kuwait.[20,21]

The urban to rural patient ratio in our study was not much different. About 53 percent of our population was from urban area while the rest 47 percent from rural area. This was different from other studies conducted at Lahore, India.[10,21] This may be due to the situation of the teaching hospital which is draining both rural and city area almost at the same ratio, because almost all patients included under the heading of rural area were from the surrounding peripheries of the Khyber Teaching Hospital.

We have observed that pharmaceutical products as a group is the most common cause of the childhood poisoning constituting 29 percent of the patients. This is not different from other national and international studies.[6,11,19] A report from India showed very high incidence 66.6 percent of drug poisoning. Other studies have also shown drugs to be very important cause of poisoning but not the leading one.

As far as individual pharmaceutical agents are concerned, tricyclic antidepressants were the leading cause of poisoning in our study. This reflects the magnitude of indiscriminate use of antidepressant agents in our setup. Studies from United Kingdom in 1960 and 1970 showed antidiarrheal drugs like lomoil and diphenoxylate as one of the leading causes of accidental poisoning in children a trend which since then has shown significant decline.[22]

The frequency of Kerosene oil poisoning was the same as pharmaceutical agents constituting 29 percent of the patients with acute poisoning in children. Many other local and regional studies show almost similar results.[6,18,20,21] This is largely due to widespread use of kerosene oil as household fuel in this part of world. It is found to be improperly stored in the kitchen especially in soft drink bottles. Some studies show decline in Kerosene oil poisoning because of increasing availability of other fuels.[23]

The frequency of opiate and organophosphorus poisoning was 17 and 15 percent in our study. A study conducted at Children's Hospital and the Institute of Child Health, Lahore showed frequency of 09 and 06 percent in opiate and organophosphorus poisoning respectively.[10]

Most of the patients 78 percent arrived in the first six hour after ingestion of the poisonous agents. The patients reach at time to our hospital probably because of its easy approach to its catchment's areas. Delay in the rest of almost one fifth cases is due to the ignorance of the attendants.

Poisoning related mortality in paediatric population has been reported from as low as 0.8% to as high as 12.5% in different studies.[9,21,22] In our study the mortality was 6% which is even lower than other local studies which showed the mortality of 8% and 11% respectively.[6,10] The reason for this low mortality may be situation of our hospital which is easily approachable to its catchment's area (urban as well as rural area). Corrosives were found to be the leading cause of mortality in our study; same result has also been shown by other international studies.[17]

A study from Ahwaz Iran reported 71% poisoning cases in children between 1-5 years of age. In this study accidental ingestion was the cause in 77.8% while suicidal attempt accounted for 6.2%. The most common ingested substance was petroleum products (16%)

Alkaline cleaners (12.6%), Opiates(11.9%) tricyclic antidepressants (8.4%) and benzodiazepines (7.7%).[24] However in our study the Tricyclic Antidepressants were the leading cause of poisoning which is similar to the substance abuse in Ahwaz study if we combine poisoning due to TCAs and Benzodiazepines.

CONCLUSIONS

Acute poisoning is an important paediatric medical emergency and has got an important effect on morbidity and mortality in this age group. Toddlers are the most vulnerable group in children to acute poisoning. Kerosene oil, drugs, organophosphorus and opiate are the common aetiological agents of poisoning in children. Hospital outcome is poor in patients with corrosives poisoning

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