

## Original Article

## FREQUENCY OF ETIOLOGICAL AGENTS OF ACCIDENTAL POISONING IN CHILDREN PRESENTING IN EMERGENCY OF A TERTIARY CARE HOSPITAL

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**Objective:** To find out the frequency of etiological agents of accidental poisoning in children presenting to emergency of a teaching hospital of Lahore.

**Methods:** This cross sectional research was carried out in Emergency Department of Pediatrics from June 2018 to December 2018. A total of 220 diagnosed cases of accidental poisoning in children less than 12 years of age were included in study. Informed consent of the parents of children was obtained to include their data in the study. Data regarding age, gender, was recorded. Detailed interview was taken from parents regarding the name of the offending chemical, drug and inquiry was also made about the route of entry of the substance. Container, its covering or wrapping material where available was sent to laboratory for identification of poison. Samples from stomach were also taken and sent for analysis. All these cases were classified depending upon the substance involved in poisoning.

**Results:** Out of 220 cases, regarding age 47.73 % (n=105) were between 0-6 years while 52.27 % (n=115) were between 7-12 years. Mean age was 6.67+2.39 years. Majority (56.82%, n=125) were females. The substances responsible for accidental poisoning were pharmacological agents (36.82%, n=81), petroleum based products (24.55%, n=54), acid/alkali (20%, n=44) and insecticides (18.63%, n=41).

**Conclusions:** Pharmacological agents are the most common substances responsible for accidental poisoning in children presenting in emergency of a teaching hospital of Lahore.

**Keywords:** Accidental poisoning in children, Etiological factor, Pharmacological agents, Petroleum based products, Acid/alkali ingestion, Insecticides

### Introduction

Poisoning in children is quite common and is a significant cause of morbidity and mortality and fortunately most cases are preventable.<sup>1</sup> Poisoning is prevalent worldwide and no nation is immune to it, however the types of involved substance may vary in different populations because of a number of factors and ease of access. The ease of access of many substances involved in poisoning also depends on many factors like customs and social norms (kerosene oils and many other liquid poisoning substances are kept in empty soft drink bottles in Southeast Asia), economical and educational status of family etc.<sup>2</sup> Mortality due to accidental poisoning is high in children especially those who are less than 4 years because children in this age group are not able to tell about the incidence and they are often picked up and diagnosed quite late.<sup>3,4</sup> A number of agents has been recognized as common substances involved in poisoning in children and adolescents. These are antipsychotic agents, antiepileptics, pain killers including paracetamol and nonsteroidal anti-inflammatory drugs, antidepressants and sedatives.

Apart from these medicinal poisonings a number of other agents has also been commonly involved in accidental poisoning in children and these includes kerosene oil especially when it is contained in soft drink bottles, insecticides especially organo-phosphorous compounds, rat killing pills, bleach and caustics etc. Worldwide epidemiological researches on childhood poisoning are showing similar patterns being more common in less than 6-years of age children and among them boys are more involved than girls as they are more interested to explore the world as compared to girls and also more involved in outdoor activities. The incidence of accidental poisoning is especially high in boys.<sup>5,6</sup> The incidence of intentional poisoning done for suicidal purpose is more in adolescent females as compared to boys, the accidental poisoning done for homicidal purpose is not common in children.<sup>7</sup> The current study is done to determine the etiological agents of accidental poisoning in children as various local studies show a variable trend. This would help us to formulate recommendations for public education so that this preventable cause of childhood mortality and morbidity can be controlled.

## Methods

This study was a cross sectional survey conducted at Pediatric Emergency Department, Services Hospital, Lahore from June 2018 to December 2018. A sample size of 220 cases was determined with 95% confidence level, 4% margin of error and taking expected percentage of alkali/acid ingestion of 10%<sup>6</sup> in children with accidental poisoning. The study population was sampled using non-probability purposive sampling technique. Children presenting to the Emergency Room with age between 6 months to 12 years (both genders) with accidental poisoning were included in the study. According to WHO poisoning was defined as injury or destruction of the cells by the inhalation, ingestion, injection or absorption of a toxic substance. Two hundred and twenty children fulfilling the inclusion criteria, admitted in Emergency Pediatric Unit of Services Hospital, Lahore were enrolled. Informed consent of the parents of children was taken. Demographic profile age, gender, was recorded. Detailed interview of parents and children was done regarding name of the involved substance and about route of entry and timing. For recognition of poison container, its label and wrapper was taken. Samples from stomach were also taken where indicated and sent to hospital laboratory for analysis. Classification of cases was done according to offending agent involved. All cases were managed according to the departmental protocols. Etiological factors for accidental poisoning in children were recorded on a pre-designed proforma. The data was analyzed through SPSS version 16. Mean+SD was calculated for age. Frequency and percentage was calculated for categorical variable i.e. gender and etiological factors of poisoning in children i.e. pharmacological agents, petroleum based products, acid/alkali ingestion and insecticides. Stratification for age and gender was done to control the effect modifiers. Post stratification chi-square test was applied. A p value < 0.05 was taken significant.

## Results

A total of 220 cases fulfilling the inclusion criteria were enrolled to determine the frequency of etiological factors of accidental poisoning in children presenting to a teaching Hospital, Lahore. Demographics are given in **Table 1&2**. The substances responsible for accidental poisoning were pharmacological agents (36.82%, n=81),

petroleum based products (24.55%, n=54), acid/alkali (20%, n=44) and insecticides (18.63%,

**Table-1:** Age distribution (n=220).

Age (in years)	No. Of Patients	Percentage
0-6	105	47.73
7-12	115	50.27
<b>Total</b>	<b>220</b>	<b>100</b>
<b>Mean± SD</b>	<b>6.67± 2.39</b>	

**Table-2:** Gender distribution (n=220).

Gender	No. Of Patients	Percentage
Male	95	43.18
Female	125	56.82
<b>Total</b>	<b>220</b>	<b>100</b>

**Table-3:** Frequency of etiological agents of accidental poisoning in children. (n=220).

Etiological factor	No. Of Patients	Percentage
Pharmacological agents	81	36.82
Petroleum base products	54	24.55
Acid/alkali ingestion	44	20
Insecticides	41	18.63
<b>Total</b>	<b>220</b>	<b>100</b>

**Table-4:** Stratification for etiological agents of accidental poisoning in children with regards to age.

Age (in years)	Pharmacological agents (n=81)	P-value
0-6	41	0.51
7-12	40	
	Petroleum base products (n=54)	
0-6	23	0.38
7-12	31	
	Petroleum base products (n=54)	
0-6	22	0.74
7-12	22	
	Petroleum base products (n=54)	
0-6	19	0.84
7-12	22	

**Table-5:** Stratification for etiological agents of accidental poisoning in children with regards to gender.

Gender	Pharmacological agents (n=81)	P-value
Male	45	0.00
Female	36	
	Petroleum base products (n=54)	
Male	22	0.68
Female	32	
	Petroleum base products (n=54)	
Male	22	0.01
Female	22	
	Petroleum base products (n=54)	
Male	79	0.00
Female	25	

n=41). Stratification for etiological agents of accidental poisoning in children with regards to age and gender are presented in **Table No. 4 & 5**. It was observed that there was no significant difference in the use of poisons with regards to age of the children however males were more likely to ingest pharmacological agents ( $p < 0.05$ ), acid/alkali ( $p = 0.01$ ) and insecticides ( $p < 0.05$ ) as compared to females.

## Discussion

We planned this study with the view to determine the frequency of etiological agents of accidental poisoning in children as various local studies shown a marked variation in results thus indicating the need for further studies so that trends of etiological agents of poisoning can be followed. In a study conducted at Karachi<sup>9</sup> accidental poisoning by various agents was recorded and kerosene oil poisoning (56%) was the commonest followed by insecticides (17.5%), pharmacological agents (16%) and acid/alkali ingestion (10%), the findings of this study are contrary to present research. A study conducted in northern India indicate that male are more prone to suffer from accidental poisoning and kerosene oil poisoning (27.9%) was the commonest substance followed by drugs (19.8%) and insecticides (11.7%). Many local, Indian and studies done in other parts of world also reveals male preponderance in childhood poisoning.<sup>10,11,12</sup> However few studies from Ankra and Trinidad are indicating female preponderance<sup>13,14</sup> and these findings are similar to our study. Although boys were more commonly affected in the under 5 age group, this was balanced by a higher number of adolescent girls. Insecticides in this study

accounted for 18.63% cases. Kerosene is used as a cooking fuel in our country by low income families and is stored in bottles usually within easy reach of children. These are many a times stored in empty water bottles predisposing young children to accidentally consume them. Relative data has discovered that poisoning in developed world is usually with household substances but when we talk about developing countries, the patterns are somewhat different. Many toxic agents which should be out of reach of children are kept in houses where children can have easy access. Preventive measures should be taken to keep all these substances out of the reach of children. These agents should be contained in proper containers and at places where children can't have access. Proper awareness and health education of the community is also very important and that can be done by seminars, by newspapers and by electronic media.

We are of the view that the frequency of etiological agents of accidental poisoning in children is different in different nations and the reason for this variation is customs, life style and educational status etc. However, our study can help us to formulate recommendations for the public education so that this preventable cause of childhood mortality and morbidity can be controlled.

## Conclusion

We concluded that the pharmacological agents are the most common agents for accidental poisoning followed by petroleum based products, acid/alkali ingestion and insecticides.

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