

A Study of Clinical Profile and Outcome of Pharmaceutical Poisonings in Children Less Than 12 Years in a Tertiary Care Hospital

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Received: 10-03-2023 / Revised: 18-04-2023 / Accepted: 03-05-2023

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Conflict of interest: Nil

Abstract

Background: Poisoning among children is one of the common medical emergencies encountered in Pediatric practice. The introduction of a variety of new drugs has widened the spectrum of toxic products children are exposed to. Since such data is very limited in our population, we in the current study aimed to analyze the spectrum and clinical profile of pharmaceutical poisonings in children less than 12 years in our hospital.

Methods: In our study, we retrospectively reviewed the medical records of n=49 children aged less than 12 years with pharmaceutical poison exposure, who presented to the Emergency Department at Niloufer Hospital in Hyderabad. A structured proforma was used to record all the pertinent information, including the nature of the poison, clinical features, the amount of time between the poisoning and the patient's arrival, the social and demographic makeup of the patient, physical examination results, investigations, the therapy administered, and outcomes.

Results: The study findings showed that the majority of the cases were of children less than 5 years of age, with a mean age of 2.8 years. Boys accounted for 61.2% of cases, while girls accounted for 38.8%. Accidental ingestion was the primary cause of poisoning, accounting for n=48 cases, while one case was due to suicidal intention. The most common type of poisoning was due to thyroxine tablet ingestion, accounting for 22.4% of cases. Interestingly, almost half of the study population (44.9%) did not show any symptoms of drug poisoning, highlighting the need for increased vigilance and surveillance to identify cases of drug poisoning in children.

Conclusion: The study also conducted a comparative analysis of symptoms of drug poisoning in our study population with those described in the literature. The results of the study underscore the need for additional research to determine toxic doses and clinical profiles of pharmaceutical poisonings in children. Of the 20 drugs studied, only 7 drugs had a known toxic dose or blood levels. Furthermore, the drug thyroxine was responsible for the majority of the cases, while phenytoin was responsible for the increased duration of hospital stay. Overall, the study emphasizes the importance of conducting additional research to expand knowledge and improve treatments for pharmaceutical poisonings in children.

Keywords: Clinical Profile, Pharmaceutical Poisoning, Children, Exposure, Ingestion.

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Introduction

According to WHO estimates, 3,45,814 persons worldwide died in 2004 from unintentional poisoning, 13% of them were under 20 years old. [1, 2] An acute poisoning-related death rate of about 45,000 people under 20 per year. According to estimations, there are 1.8 poisonings per 100,000 people worldwide and 0.6 to 11.6% in India every 20 years or less. Despite being more common and equally concerning given the early age at which the victims of juvenile poisoning experience their injuries, data on non-fatal consequences of poisoning are not yet easily available. [3, 4] The majority of young children's poisonings are accidental, take place at home, and are hence avoidable. With the help of contemporary preventative techniques, child poisoning incidents have dramatically decreased. [5] However, to design successful preventative programs, state healthcare planners require better data on the number and types of poisonings, the conditions under which they occur, and the severity of the issue. The range, epidemiology, cultural norms, level of parental knowledge, and accessibility of medical interventions all have a significant impact on the outcome of poisoning in children. Studies from industrialized nations show that common household items are the main culprits in severe pediatric poisonings and that medication and pharmaceutical use is down, probably as a result of the adoption of child-proof blister packaging and medicine bottling. Despite being common poisonings in children, exact toxic doses and the clinical spectrum are not available for many pharmaceutical toxicities in the literature. [6] Most of the information available about pharmaceutical toxicity is from adult studies. Since poisonings are compulsory to be reported in Western

nations, hence precise information on their epidemiology and clinical characteristics is accessible for such nations. Whereas in India such information is very scanty. Hence, we in the current study analyze the spectrum and clinical profile of pharmaceutical poisonings in children less than 12 years in our hospital.

Materials and Methods

This retrospective study was conducted with a review of the medical records of n=49 children aged less than 12 years with pharmaceutical poison exposure, who presented to the Emergency Department at Niloufer Hospital in Hyderabad. After obtaining permission from the Institutional Ethical Committee and the Medical Superintendent of Niloufer Hospital, Hyderabad. Pharmaceutical poison exposure was defined as the ingestion, either accidentally or intentionally, of pharmaceutical substances at doses other than the therapeutic dose or ingestion of substances not usually recommended for oral intake. Children in whom poisoning was due to non-pharmaceutical substances were not included in this study. A structured proforma was used to record all the pertinent information, including the nature of the poison, clinical features, the amount of time between the poisoning and the patient's arrival, the social and demographic makeup of the patient, physical examination results, investigations, the therapy administered, and outcomes. To assess the family's socioeconomic position using the Kuppuswamy Scale, a record of the mothers' and fathers' educational backgrounds, occupations, and family incomes were made.

Statistical analysis: All the relevant data was collected and uploaded on an MS Excel

spreadsheet and analyzed by SPSS version 19 in Windows format. Descriptive analyses of independent variables (gender, age, categories of pharmaceuticals, clinical presentation, duration of symptoms, treatments, and outcomes) are reported as numbers, percentages, means, and standard deviations. The quantitative analysis was done with a chi-square test and p-values of <0.05 were considered significant.

Results

A total of n=49 cases were analyzed and studied during the duration of the study. Out of the n=49 cases admitted for

pharmaceutical poisoning, the majority n=22(44.8%) were less than 5 years of age, with a mean age of 2.8 ± 1.5 years. 61.2% of cases were boys, and 38.8% were girls. Accidental ingestion accounted for 48 cases, while one case was due to suicidal intention. The most common poisoning was due to thyroxine tablet ingestion, which accounted for 22.4% of cases. Other groups of drugs included antiepileptics (16.3%), antihistamines (10%), antiparasitic (8.2%), NSAIDs (8.2%), antihypertensives (6.1%), micronutrients (4.1%), sedatives (4.1%), stool softeners (2.1%), and others (16.3%).

Table 1: Frequency of drug ingested according to the category.

Category of Drug	Frequency	Percentage
Antiepileptic	8	16.33
Antihistamine	5	10.20
Antiparasitic	4	8.16
Hormonal	11	22.45
NSAIDS	4	8.16
Antihypertensive	3	6.12
micronutrients	2	4.08
Stool softener	1	2.04
Sedatives	2	4.08
Bronchodilator	1	2.04
Others	8	16.33

Out of n=49 cases admitted for pharmaceutical poisoning, the majority were children under 5 years old, with a mean age of 2.8 years. 61.2% of cases were boys and 38.8% were girls. N=48 cases were due to accidental ingestion, and one case was due to suicidal intent. The most common poisoning was due to thyroxine tablet ingestion, accounting for 22.4% of cases. Other drug groups include antiepileptics (16.3%), antihistamines (10%), antiparasitics (8.2%), NSAIDs (8.2%), antihypertensives (6.1%), micronutrients (4.1%), sedatives (4.1%), stool softeners (2.1%), and others (16.3%).

Almost half of the study population (44.9%) did not have any symptoms. Vomiting was the most common presenting symptom (32.9%), followed by drowsiness (14.3%), seizures (8.2%), altered sensorium (10.2%), abdominal pain (6.1%), ataxia (4.2%), and others (table 2). Antidote was administered in three cases, one case of iron poisoning, and two cases of paracetamol ingestion. Most cases required a hospital stay of less than 5 days, with a mean duration of 4.5 days. Out of 49 cases, only one case (due to lice killer herbal cream ingestion) resulted in death due to poisoning; all other cases were discharged successfully.

Table 2: Frequency of symptoms in our study

Symptoms	Frequency	Percentage
No symptoms	22	44.89
Vomiting	16	32.65
Seizures	4	8.16
Drowsiness	7	14.28
Ataxia	2	4.08
Altered sensorium	5	10.20
Excessive cry	2	4.08
Abdominal pain	3	6.12
Giddiness	1	2.04
Others	8	16.32

Discussion

Any drug can cause toxic effects when taken at an inappropriate dose. Drugs that are available in households, whether belonging to children or adults, can be accidentally ingested by children. In the current study, we found the majority $n=22(44.8\%)$ were less than 5 years of age, with a mean age of 2.8 ± 1.5 years. According to other Indian studies by Brata Ghosh et al., [7] NK Bhat et al., [8] U Kohli et al., [9] and similarly by KP Dawson et al., [10] N Andiran et al., [11] S Budhathoki et al., [12] poisoning is more prevalent in children between the ages of 1 and 5 years. In concordance with the observation of our study, maximum poisoning occurred in this age range. Rapid neurocognitive development, increased activity, interest in the environment, a propensity to mouth items, and the inability to distinguish between dangerous and innocuous chemicals seem to be the causes of this. [8,13] In this study we found 61.2% of cases were boys, and 38.8% were girls. According to S Rathore et al., [14] NK Bhat et al., [8], and K Basu et al., [15], males were more frequently involved in incidents of poisoning. Pharmaceuticals accounted for 12% of all poisonings in children under

12 years old in our hospital. A few studies from South India have shown that up to 30% of poisonings in children were due to pharmaceuticals. [16] The most prevalent agents, according to research from industrialized countries, including those by KP Dawson et al., [10] and T Rajka et al., [13] are medications and pharmaceuticals. According to Indian research by S Rathore et al., [14] Brata Ghosh et al., [7] and U Kohli et al., [9] kerosene is the most often observed agent both globally and in metropolitan areas. Even though research from rural India conducted by NK Bhat et al., [8] indicated that pesticides were the most often used substance causing severe pediatric poisonings. The most common drug ingested in our study was thyroxine, whereas, in many Western studies, it was psychotropic drugs and analgesics. [17, 18] The increased incidence of thyroxine ingestion may be due to the increased prevalence of hypothyroidism and the availability of thyroxine tablets at home in our region. It might also be due to the packaging of thyroxine tablets in boxes instead of strips, which children might misunderstand as chocolates. Most cases of thyroxine ingestion were asymptomatic due to a small amount ingested. [19]

Table 3: Classification of drugs based on toxicity.

Low risk	Antibiotics (except ciprofloxacin, sulfasalazine, chloramphenicol), antacids, calamine lotion, vitamin preparations (not containing iron), etc.
Intermediate risk	Antihistamines, laxatives, salbutamol, ibuprofen, thyroxine etc.
High risk	Antiepileptics, digoxin, iron, lithium, paracetamol, salicylates, metoclopramide, opioids, etc.

Antiepileptics were the next most common drugs ingested, with phenytoin accounting for the increased duration of hospital stay in my study. Almost all cases were accidental ingestions, except for one case of a 12-year-old female child who intentionally ingested the drug. This might be due to the age group studied in my study being less than 12 years. Other studies have shown that intentional poisoning was more common after 11 years of age and accidental ingestions were the most common reason for poisoning in children under 10 years old. [17] Of the 20 drugs ingested in our study, only 7 drugs had a known toxic dose or blood levels. We were unable to find toxic doses in the literature for the rest of the drugs. Many of the manifestations of the drugs were known from adult studies. Most cases were discharged successfully, with only one case of lice killer herbal cream ingestion resulting in death. [20] Three cases were left against medical advice. The lower mortality rate in our study was due to accidental ingestions being more common in my study. More than half of our cases were asymptomatic when they were diagnosed, and the majority of the remaining patients had vomiting in 32.65% of cases followed by drowsiness and altered sensorium in 14.28% and 10.2% respectively other common complaints include abdominal pain seizures, and other nonspecific symptoms. Most of the patients in our research did not require any kind of specific therapy, they were admitted for observation and discharged after one or two days. Only n=2 patients required ventilator care and required a higher duration of hospital stay whereas 16.32% of patients received supportive treatment such as antiemetics, oxygen supplementation,

chelating medicines, and PPI/H2 blockers, etc.

Conclusion

The clinical profile of pharmaceutical poisoning presented to a tertiary care hospital in Hyderabad was analyzed. Accidental and unintentional ingestion was the most frequent method. At the time of presentation till discharge, the majority of children had no symptoms. The drug thyroxine was responsible for the poisoning in the majority of cases and phenytoin was responsible for the increased duration of hospital stay. The majority of poisoning patients who were hospitalized had moderate poisoning and merely needed to be observed without any special care.

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