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Correlation of Age with Epidemiology and Clinical Outcome in Children with Accidental Poisoning- A Prospective Cohort Study

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Abstract:

Back ground: Children are inquiring and interested about the world around them, exploring it with all of their senses, including their sense of taste [1]. As a consequence, when hazardous chemicals are mistakenly swallowed, the house and its surrounds may be a deadly environment every year, millions of calls are made to poison control centres and thousands of children are admitted to emergency rooms as a result of this. Hence the present study was designed to assess the epidemiology and clinical outcome in children with accidental poisoning. **Aim and objectives:** To study the epidemiology, clinical outcome in relation to age in children with accidental poisoning. **Materials and methods:** A Prospective cohort study was undertaken in a tertiary care Hospital, Karaikal on 50 children less than 12 years of age admitted in our ICU and paediatric ward with history of poisoning or intoxication during the study period of July 2020 to November 2021. All children under the age of 12 who present with a history of poison intake or intoxication, regardless of signs and symptoms, and whether or not the poison or container is present, Children who have a shaky history of poisoning but who are exhibiting clear signs and symptoms of poisoning are considered to be poisoned are included in the study. **Results:** In this research, the youngest age group (1-3 years) had the greatest number of cases (50.0 %), followed by the oldest age group (6.1 – 12 years) (24.5 %). In our investigation, two patients were hospitalized who were less than one year of age. However, the newest case is 2 months old. In the age period of 3-6 years, female dominance outnumbers high prevalence. In this study, the mean time from poisoning and presentation was 4.31 hours. When comparing urban and rural populations, the duration was shorter in urban areas. If the youngster appeared with a distorted sense of smell, the result will be considered suspect. The p -value of chi-square is 0.602 -<0.01 which indicates that the result is statistically significant. Children in intensive care units (ICUs) die at a higher rate than other children. According to the chi square test, this is also statistically significant (p-0.001).

Conclusion: Poisoning in children is one of the medical crises that affects children, and it has a high death and morbidity rate.

Key words: Children,poisoning,inhalational,oral route.

Introduction: Children are inquiring and interested about the world around them, exploring it with all of their senses, including their sense of taste [1].As a consequence, when hazardous chemicals are mistakenly swallowed, the house and its surrounds may be a deadly environment every year, millions of calls are made to poison control centres and thousands of children are admitted to emergency rooms as a result of this [2].The pattern of poisoning varies depending on the age group, the kind of exposure, and the nature and amount of the poison used [3].Every year, roughly 3 million individuals, many of whom are children under the age of five, consume or come into touch with a deadly chemical. The American Academy of Paediatrics (AAP) provides information on how to avoid and cure toxic exposures in children [4]. Children and adolescents under the age of 20 died from acute poisoning in 2004, accounting for more than 45 000 fatalities globally (13 % of all fatal unintentional poisonings in 2004) [5]. Poisoning is the fourth leading cause of accidental injury in 16 high- and middle-income nations, after only road traffic accidents, fires, and drowning [6]. The risk of lethal poisoning is greatest among infants under one year of age, with a minor increase around the age of 15 years. The greatest rates are seen in Africa, as well as low- and middle-income nations in Europe and the Western Pacific Region, among other places. Pharmaceuticals, home chemicals (e.g., bleach, cleaning agents), pesticides, toxic plants, and attacks from insects and animals are all common poisoning agents in high-income nations. Fuels such as paraffin and kerosene, medications, and cleaning chemicals are all examples of poisonous substances that are often found in low- and middle-income nations. Poisoning in children is one of the most prevalent crises seen in paediatric treatment [7]. Since the growth in the use of chemicals in the home, the number of instances of acute poisoning have also grown. Accidental poisoning is more prevalent in children than in adults, and the vast majority of instances are avoidable. Among those who are admitted to the hospital Poisoning is the twelfth most prevalent cause of death among children. It accounts for the vast majority of all cases and fatalities. The oral ingestion of dangerous chemicals is the cause of many poisoning incidents in children under the age of five. Caustics, insecticides, and medications are readily available in today's home and create ideal conditions for children's inquisitiveness to end in tragedy [8]. Caustics, insecticides, and medicines are all readily available in today's household. These agents are often mistaken for soft drinks or water by young children. Various studies have shown an average incidence rate ranging from 0.3 % to 7.6%. The kind of poisoning and the prevalence of poisoning vary from hospital to hospital as well, and this has an impact on the emergency paediatrics treatment in the local region in particular [9]. Accidental poisoning is more common in the preschool or toddler age group (children under the age of 5 years) because children under this age have an exploratory tendency for the substance by putting it in their mouth, whereas suicidal poisoning is more common in the adult age group (over the age of 5 years), because of arguments between parents or stress [10].So far, no research on poisoning have been conducted at this hospital, and as a result, there is an urgent need for a study to

determine the definitive and thorough epidemiological evidence of poisoning in this setting [11]. Hence the present study was designed to assess the epidemiology and clinical outcome in children with accidental poisoning.

Aim and objectives: To study the epidemiology, clinical outcome in relation to age in children with accidental poisoning.

Materials and methods: A Prospective cohort study was undertaken in a tertiary care Hospital, Karaikal on all children less than 12 years of age admitted in our ICU and paediatric ward with history of poisoning or intoxication during the study period of July 2020 to November 2021.

Inclusion criteria1. All children under the age of 12 who present with a history of poison intake or intoxication, regardless of signs and symptoms, and whether or not the poison or container is present. 2. Children who have a shaky history of poisoning but who are exhibiting clear signs and symptoms of poisoning are considered to be poisoned.

Exclusion criteria1. Chronic poisoning 2. Children with suicidal tendencies. 3. Cases of Snake bite, scorpion sting, insect bite, animal bite, and other poisonous bite, food poisoning will be excluded. 3. Idiosyncratic reactions to drug.

Method of collection of data: Children hospitalised with a history of poisoning to the intensive care unit and paediatric ward throughout the research period will be evaluated in terms of age, gender, and sociodemographic information. Following the selection of the patient, a complete pre-set proforma outlining the circumstance will be filled out. In order to conduct our research, we received approval from our hospital's ethical review board. Before enrolling children in the research, informed agreement was sought from their parents and other caregivers, as required by law. Details of the poison will be recorded, including the name of the poison, the kind of agent used, the route of exposure, the time of arrival at the hospital following exposure to the poison, and the style of poisoning. The clinical examination will consist of taking vital signs and doing a systemic examination of the CVS, RS, Abdomen, and CNS.According to the type of poisoning, necessary investigations will be performed, including complete blood hemograms, renal function tests, and liver function tests, chest x-rays, electrocardiograms, echocardiograms, urine routines, ultrasound abdomens, cholinesterase levels, ABG analyses, serum calcium, serum electrolytes, and treatment will be administered according to standard protocol, including psychiatric counselling, with the outcome being recorded. The youngster will be subjected to a thorough investigation and treated in accordance with normal guidelines.
- Children who are admitted will be followed up with.

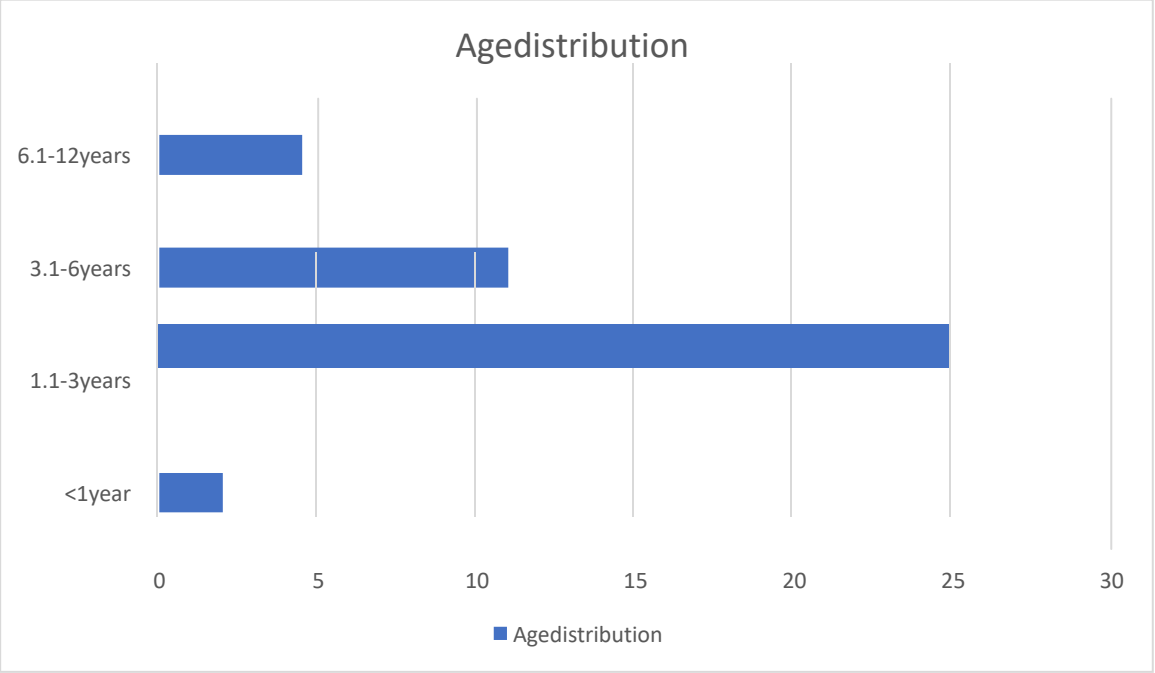
-Children who are treated as outpatients will be monitored for a length of time throughout their recovery.
- Additional information on the kid's family and socioeconomic status will be collected from the person who is accompanying the youngster.

Results:

Table1-AgeDistributionofpoisoning

Agedistribution	**No.ofPatients**	**%age**
<1yr	2	4.0%
1.1–3yrs	25	50.0%
3.1–6yrs	11	22.0%
6.1–12yrs	12	24.0%
Total	50	100.0%

Figure–1BardiagramShowingAgeDistribution

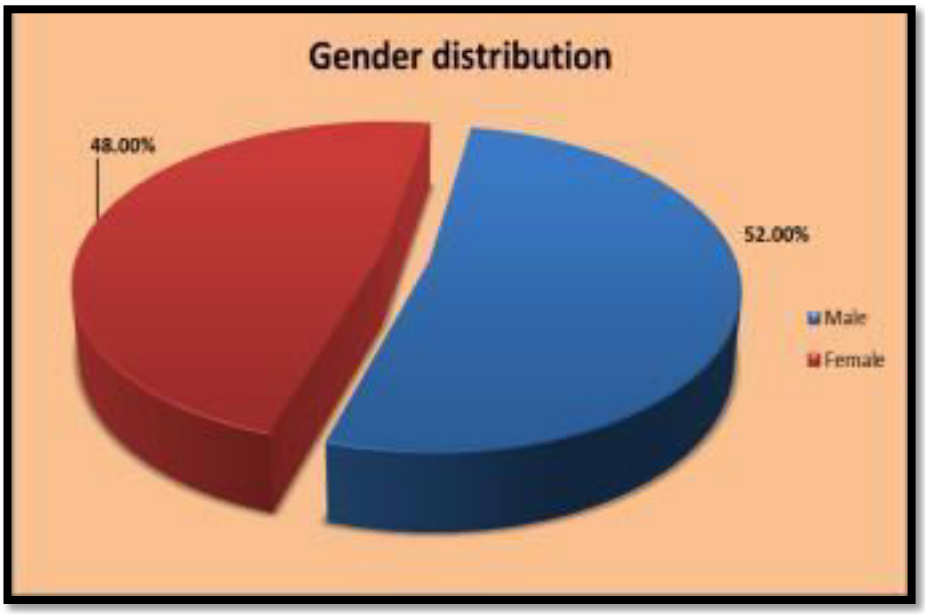


The mean age of case was 6.64years. In this study maximum number of cases 50%was seen in the1.1–3 years age group (n-25) followed 24.0% in the age group 6.1-12 years (n-12). Similarly, 22% in the age group 3.1–6 years (n=11)and less commonly 4.0%in the less than one-year age group.

Table2-Gender wise distribution of poisoning

Genderdistribution	No.ofPatients	%age
Male	26	52.0%
Female	24	48.0%
Total	50	100.0 %

Figure–2Pie Chart Showing Sex Distribution

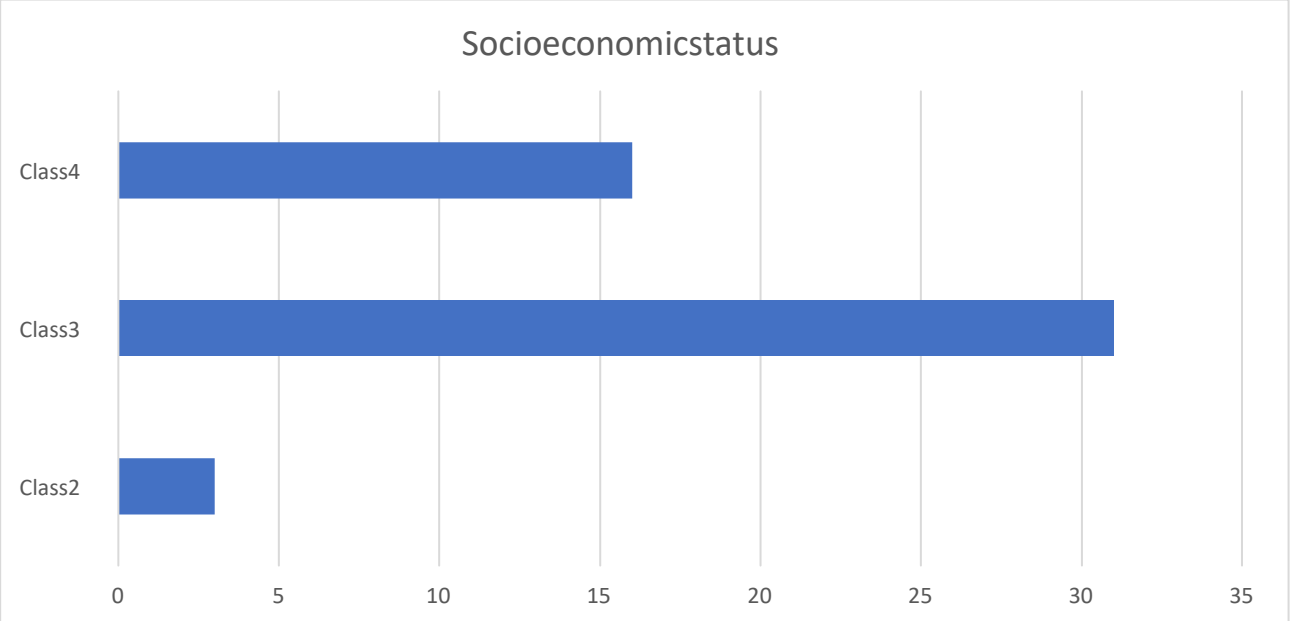


In our study out of 50 cases 52.0% were male children (n-26) and 48.0% were female children (n-24).Male tofemale ratio1.08: 1

Table3-Socioeconomicstatus

SocioEconomicStatus	No.ofPatients	%age
ClassII	3	6.0%
ClassIII	31	62.0%
ClassIV	16	32.0%
Total	50	100.0 %

Graph-3Socioeconomicstatus



In this study maximum 62.0% (n=31) belong to lower middle socio economic status followed by 32.0%in lower class and 3% inmiddle class.

Table5–Correlation between Age with Route of Poisoning

Agedistribution	**RouteofPoisoning**		**Total**
	Inhalation	**Oral**	
<1year	0(0.00%)	2(4.00%)	**2(4.00%)**
1.1–3year	0(0.00%)	25(50.00%)	**25(50.00%)**
3.1–6year	0(0.00%)	11(22.00%)	**11(22.00%)**
6.1–12year	1(2.00%)	11(22.00%)	**12(24.00%)**
Total	**1(2.00%)**	**49(98.00%)**	**50(100%)**
ChiSquaretestvalue	**3.231**	**Pvalue**	**0.357(p>0.05)**

Graph5–Correlation between Age with Route of Poisoning

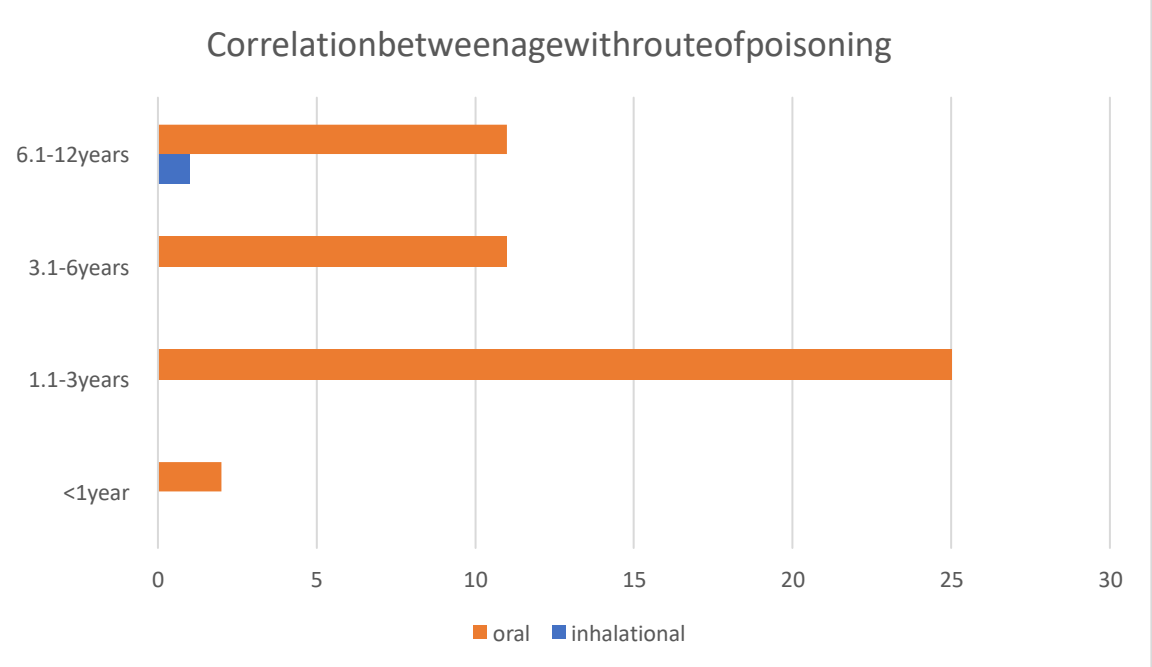
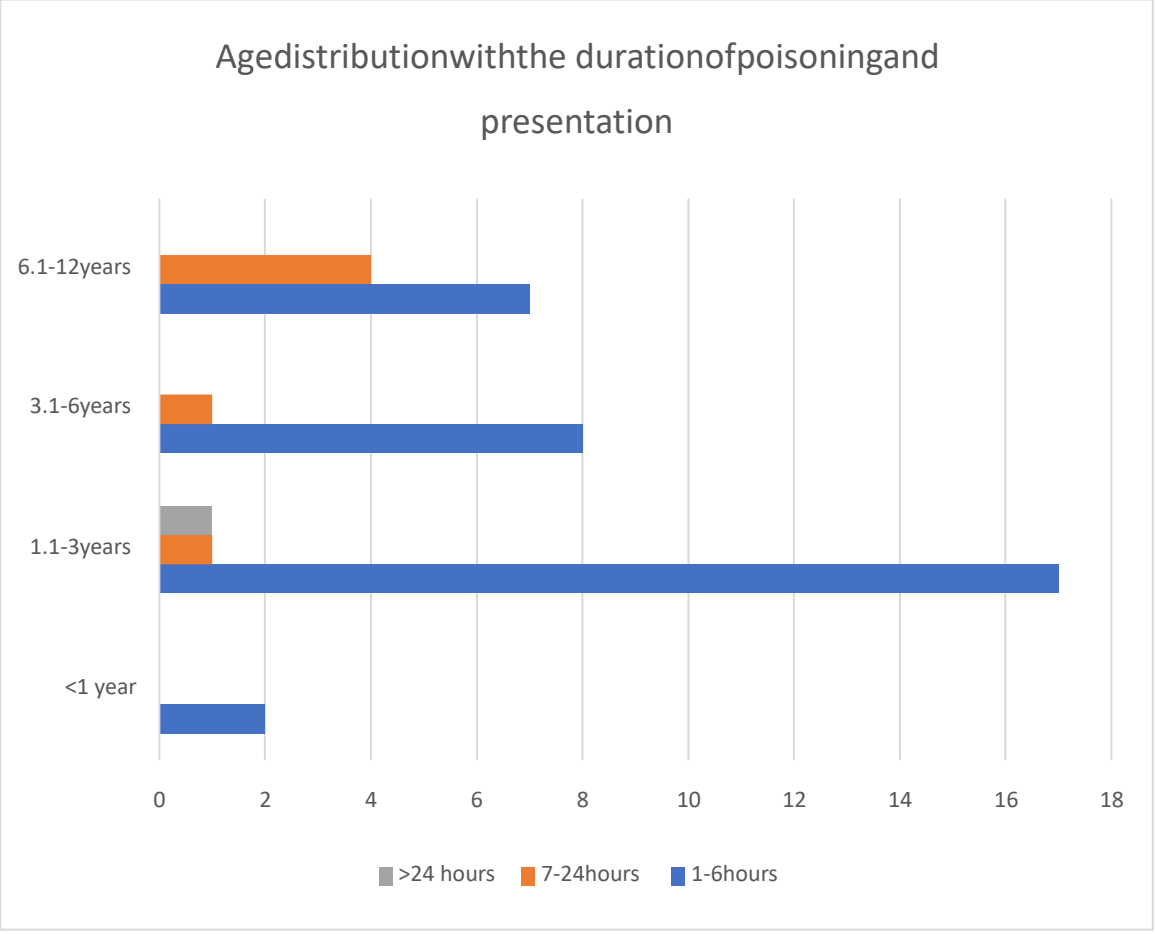


Table6-Age distribution with duration between poisoning and presentation

Agedistribution	Duration between poisoning andpresentation				Total
	<hr	1-6hrs	7-24hrs	>24hrs	
<1yr	0(0.0%)	2(4.0%)	0(0.0%)	0(0.0%)	**2(4.0%)**
1.1-3yrs	6(12.0%)	17(34.0%)	1(2.0%)	1(2.0%)	**25(50.0%)**
3.1-6yrs	2(4.0%)	8(16.0%)	1(2.0%)	0(0.0%)	**11(22.0%)**
6.1-12yrs	0(0.0%)	7(14.0%)	4(8.0%)	1(2.0%)	**12(24.0%)**
Total	**8(16.0%)**	**34(68.0%)**	**6(12.0%)**	**2(4.0%)**	**50(100%)**
Chisquaretestvalue		**11.060**	**Pvalue**	**0.272(p>0.05)**	

Graph6-Age distribution with duration between poisoning and presentation

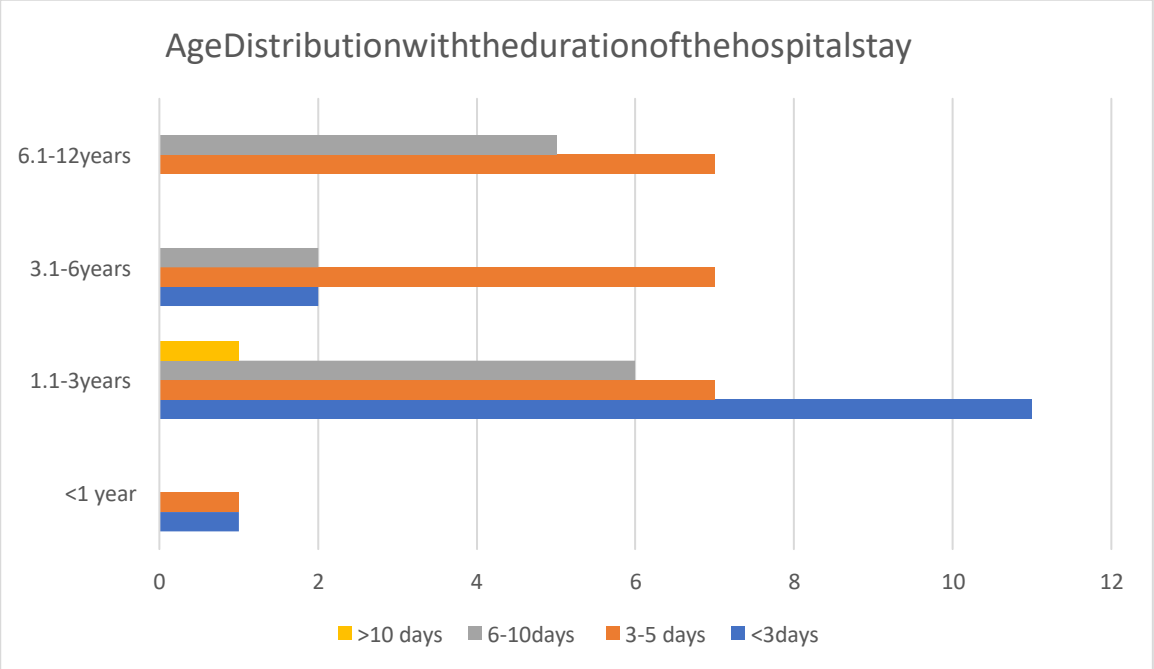


The mean duration between poisoning and presentation was 5.41 hours. In this study most of the children 68% reached the hospital within 1-6 hours. 16% Reached the hospital within one hour and 12.0% reached the hospital within 7-24 hours. Only 4.0% reached the hospital more than 24hours with Chi-square of p-value0.272 is not significant.

Table7-Age distribution with duration of hospitalstay

Agedistribution	**Durationofhospitalstay**					**Total**
	<3days	**3-5days**	**6-10days**	**>10days**		
<1yr	1(2.0%)	1(2.0%)	0(0.0%)	0(0.0%)		**2(4.0%)**
1.1-3yrs	11(22.0%)	7(14.0%)	6(12.0%)	1(2.0%)		**25(50.0%)**
3.1-6yrs	2(4.0%)	7(14.0%)	2(4.0%)	0(0.0%)		**11(22.0%)**
6.1-12yrs	0(0.0%)	7(14.0%)	5(10.0%)	0(0.0%)		**12(24.0%)**
Total	**14(28.00%)**	**22(44.0%)**	**13(26.0%)**	**1(2.0%)**		**50(100%)**

Graph7-Age distribution with duration of hospital stay

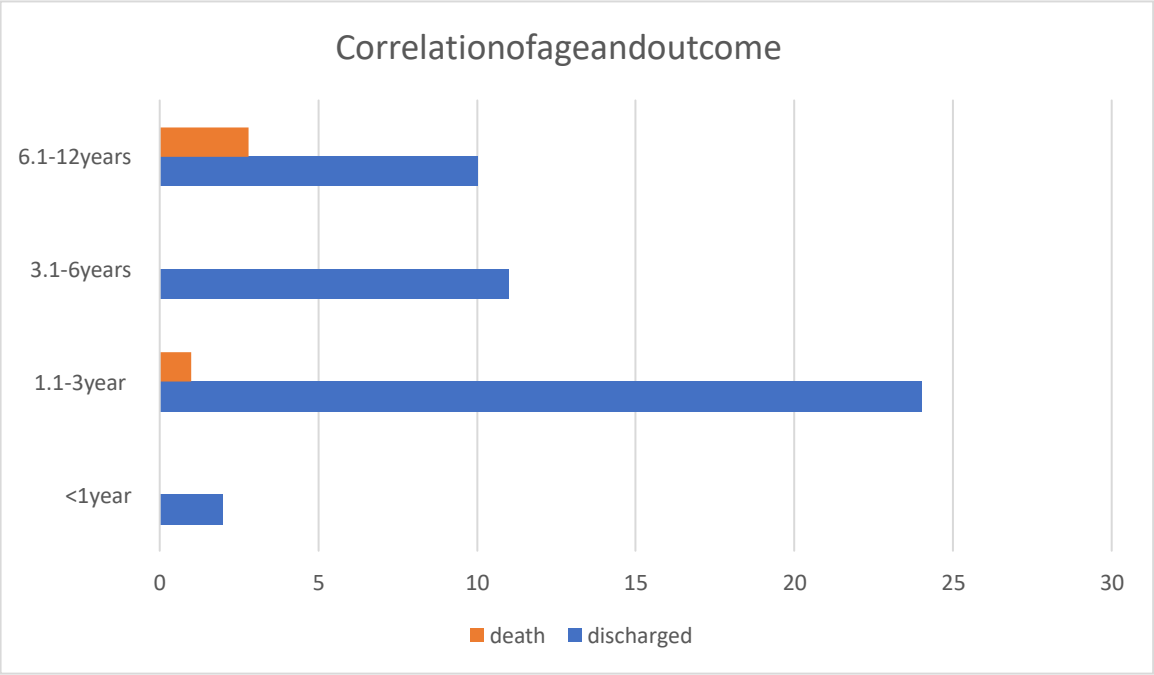


In this study44.0%of the children was being discharged within 3–5 days and 28%in less than 3days,26.0% in6–10 days,only1inmore than10days.

Table8-Correlation of age and outcome

Agedistribution	Outcome		Total
	Discharged	Death	
<1yr	2(4.0%)	0(0.0%)	**2(4.0%)**
1.1-3yrs	24(48.0%)	1(2.0%)	**25(50.0%)**
3.1-6yrs	11(22.0%)	0(0.0%)	**11(22.0%)**
6.1-12yrs	10(20.0%)	2(4.0%)	**12(24.0%)**
Total	**47(94.0%)**	**3(6.0%)**	**50(100%)**

Graph8-Correlation of age and outcome



Graph8-Correlationofageandoutcome

In the present study, mortality rate in 6.1 - 12 year is 4% and least belonging to 3 – 6 years(0%)and less than 1year. Outcome of death in relation to the age group according to the chisquare –X2-P-3.428 which is not significant.

Discussion: In this research, we are attempting to provide information on poisoning cases that have been admitted to our hospital throughout a 12-month period. During the course of the current investigation, 50 children with poisoning were admitted to the hospital for treatment. In this research, the youngest age group (1-3 years) had the greatest number of cases (50.0 %), followed by the oldest age group (6.1 – 12 years) (24.5 %). In our investigation, two patients were hospitalized who were less than one year of age. However, the newest case is 2 months old. In the age period of 3-6 years, female dominance outnumbers high prevalence. According to the findings of the Vasanthan et al. research and the Achinta Mandal et al. study [12,13], the most common age group for poisoning is the 1–3-year-old group. Surjit Singh and colleagues conducted research in which one hundred and thirty children were between the ages of 0 and 5 years. A number of national and international studies have predicted an increase in the number of incidents of deliberate poisoning in the future. According to several literature studies, children under the age of five years have been the most severely impacted. It is believed that the high occurrence in children under the age of 5 years is due to their inherent sense of curiosity and increased oral exploring activity, which is aided by their newly acquired mobility and hand abilities [12]. Previous research has shown that young children aged 1–3 years are the most sensitive to accidental poisoning, and that a variety of variables, including the kind of drug, the development of the child, supervision, and safety measures, may all play a role in the risk of poisoning. These children have a limited knowledge of the hazards involved with drugs and substances, as well as spending more time outside the family than other children their age. The trend that we discovered in our research is consistent with the pattern that has been seen by others. Highest incidence of poisoning occurred in male children (52 %) than female children (48 %). This is comparable to the findings of several other research, which indicated a male majority. In prior research conducted by Maharani et al., it was shown that men had a higher risk of poisoning (92 cases, or 61.33 %) than females (58 cases, 38.66 %). Our findings were consistent with those of earlier studies conducted by Sharma et al. (2002) and others (Dash et al., 2005; Singh et al., 1984), but they were in contrast to those of Pokhrel et al. (2008), who found that females were

more likely than men to be affected [13,14,15]. In this study, the mean time from poisoning and presentation was 4.31 hours. When comparing urban and rural populations, the duration was shorter in urban areas. In part, this may be explained by the increased travel distance that these rural patients had to travel to get to our hospital, as well as the fact that they had first care at a local hospital. Kohli et al. conducted research that was comparable to this. The mean length of stay in the hospital was 4.5 days, with a shorter stay in the event of an expired case. This might be owing to the fact that the patient was in poor overall health at the time of presentation. Supportive treatments and antidotes are less effective if there is a significant delay between the presentation of the toxin and its administration. Buthathoki et al. found that the mean length of a hospital day ranged from 0.66 days' in Nigerian research to 3.8 days and 3.78 days in a study conducted in South Africa. In our research, 94 % (n = 47) of children who were poisoned survived and were released from the hospital. Approximately 6% (n = 3) of the cases resulted in death. It was found that the mortality rate in this research was comparable to earlier studies. The pesticide group, particularly OPC, was responsible for the greatest number of deaths (n-5), which were followed by cow dung powder and kerosene oil, with males predominating. When children were admitted to the hospital more than 6 hours after ingesting poison, the outcome was bad. According to the chi square test, the p-value is 0.602, which indicates that the difference is statistically significant. If the youngster appeared with a distorted sense of smell, the result will be considered suspect. The p -value of chisquare is 0.602 -<0.01 which indicates that the result is statistically significant. Children in intensive care units (ICUs) die at a higher rate than other children. According to the chi square test, this is also statistically significant (p-0.001).

Conclusion: Poisoning in children is one of the medical crises that affects children, and it has a high death and morbidity rate. A child's curiosity, mouthing habits, and exploring nature are all factors that
contribute to unintentional poisoning in children under the age of five. As a result of modestprecautions, unintentional poisoning deaths among children are greatly reduced. Despite the fast
changes in society and the economy, kerosene and pesticides are still the most prevalent agents
implicated in paediatric poisoning. This is due to the fact that our centre is surrounded by several
rural communities. Negligence and ignorance are the primary causes of poisonings in children, and
they can be avoided if parents pay closer attention to their children at home. Even if a comprehensive programme to protect children from

poisoning does not yet exist on a community level, modest preventative interventions like parent education and medicine storage in childresistant containers might help reduce the death and morbidity rates among children who have been poisoned.

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