

Demographic Profile and Outcome of Acute Poisoning and Envenomation among Children in Tertiary Care Hospital: An 8-Year Ambispective Study

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How to cite this article: Aradhanaba Gohil, Rajesh N Pankhaniya, Rahul Tandon et. al. Demographic Profile and Outcome of Acute Poisoning and Envenomation among Children in Tertiary Care Hospital: An 8-Year Ambispective Study. Indian Journal of Forensic Medicine and Toxicology 2023;17(3).

Abstract

Background: Poisoning and Envenomation in children are quite common medical emergencies requiring hospitalization. Different regions may have different profiles depending on location and standards of living. To know the profile and outcome of acute poisoning and envenomation among children at our region this study was undertaken.

Methods: The ambispective study from year 2014 -2021 reviewed all maximum possible cases of pediatric poisoning and envenomation by retrieving files from the medical record department and pertinent information collected.

Results: Out of 188 analyzed data, 97 (51.3%) were males. Median (Q1, Q3) age in years was 9.5 (2.7, 15.3). Total cases of acute poisoning were 91(48.4%), 80(42.6%) snakebite/scorpion/other bites whereas 17(9%) drowning & hanging. In outcome, deaths were in 7(3.7%) whereas 167(88.8%) discharged, 12(6.3%) LAMA and referral 2(1.1%). Accidental and suicidal poisoning cases were 123(65.4%) & 39(20.8%) respectively. Among substance poisoning, the top 2 causes were organophosphorus poisoning 37(41.1%) & kerosene 13(14.4%). Ventilator support, vasoactive drug support, debridement and dialysis were required in 58(30.9%), 21(11.2%), 14(7.5%) & 3(1.6%) cases respectively. Metabolic acidosis and hyponatremia in 25(13.3) & 16(8.5%) cases whereas mortality was significantly associated with the need for vasoactive support and aluminum phosphide poisoning.

Conclusion: In children, acute accidental poisoning was commonest followed by envenomation at our tertiary care center. Vasoactive support and aluminum phosphide poisoning were predictors of poor outcomes.

Keywords: Accidental poisoning, kerosene, organophosphorus, snake bite, suicidal

Introduction

Today's children are growing up in a very different world and industrialization has increased

their chances of surviving, growing up, and being happy while simultaneously posing considerable hurdles or risks to their development and their life.¹

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Poisoning in children including adolescents is one of the quite common emergencies. Acute poisoning (intoxication) incidents have risen in tandem with the rise in household chemical use, but such incidents of accidental poisoning are avoidable also.² The prevalence and type of poisoning vary from hospital to hospital and have a significant impact on the treatment provided in the emergency. Unintentional poisoning was blamed for 106683 deaths and the loss of 6.3 million healthy years (disability-adjusted life years) in 2016, according to the World Health Organization.²

There is a correlation between the kind of poisoning with a child's developmental stage. Pincer grip development enhances this effect more.³ Toxic chemicals are readily available in modern homes and children have a lower ability than adults to metabolize toxins, so they are more susceptible to the effects of environmental poisons.³ The majority of poisonings in children less than 5 years of age are unintentional, particularly in the 18-months to 3-year-old range.^{4,5} Also, a larger proportion of instances are associated with a low socioeconomic position because of limited space.⁵ However, adolescents who are under a lot of stress in today's competitive world are more likely to intentionally poison themselves.⁶

Another common cause of pediatric emergency room visits is envenomation. There are many cases of envenomation in India because it is still a developing nation and many live in villages, farms, or areas without proper shelter. Snake venom is the most prevalent envenomation followed by scorpion stings. Rapid urbanization and deforestation have resulted in a regular interaction between people and snakes.⁷⁻⁹ All fatalities in the 5- to 12-year-old age are estimated to account for 3% of all deaths.¹⁰

An understanding of the country's geographic distribution of poisoning may assist identify risk factors for poisonings. Toxic poisoning in children is determined by the age, socioeconomic, cultural, and religious behaviors that are widespread in each location.¹¹ In order to keep watch on the recent past with the objectives of knowing the burden of poisonings, its pattern, outcome, and trends, the present study was undertaken to study the profile of acute poisoning and envenomation in children in the Central Gujarat region.

Material and Methods

This descriptive, observational, ambispective study was done at the Paediatrics Department of 1000 bedded NABH- accredited multi-specialty teaching hospital. Ninety bedded Pediatric department is having eight bedded Paediatric Intensive care units with six step-down beds. All case records from 1st January 2014 to 31st December 2021 were included. (Retrospective arm - 2014 to mid-2021 and prospective arm- July 2021-Dec 2021). The inclusion criteria were age group from 1 month to 18 years who were admitted at the Pediatric Intensive care unit (PICU) and/or Pediatric Ward. The Keywords used for record tracing were Ingestion, Poisoning, Intoxication, Snakebite, Animal bite, Bite, Drowning, Hanging, Suicidal, and Accidental. Cases excluded whose details were not found in the record and also cases of food poisoning and dog bite. All demographic details, history related to poisoning, and management with outcomes, etc were entered in a Microsoft excel sheet. Waiver of Consent was asked from the ethical committee as it was a records-based study. Statistical analysis was performed using STATA (14.2). Descriptive statistics [Mean (SD), Frequency (%)] was used for the baseline profile of the study population and clinical outcomes. The Chi-square/ Fisher's exact test was performed to determine the relationship between categorical variables (morbidity and its associated factors).

Findings

The present study finally included a total of 188 cases for analysis. (See figure1). Table 1 is showing demographic details. Mean (SD) & median (IQR) age was 9.28 (6.11) years and 9.5(2.7,15.31). Most of the study participants (38.8%) belonged to 0 to 5 years of age. The total number of boys was Ninety-seven (51.6%). The highest incidence of poisoning cases 77(41%) was seen in winter. Accidental poisoning was in 91(48.4%) whereas envenomation was 67(35.6%) among studied cases. The top two substances found among poisoned children were organophosphorus and kerosene 37 (40.7%) and 13(12.3%) respectively as per figure 2. The most common system involved among children with poisoning and envenomation was the central nervous system, i.e., 95(50.5%). The number of poisonous substances was unknown in 49.45% of the patients. 58(30.9%) of the children required ventilatory support (See figure 3). The children requiring ventilators for two to seven days and up to 14 days were 67.2% and 10.4 % respectively.

Vasopressor/ionotropic support and dialysis were required in 21(11.2%) and 3(1.6%) respectively. No documented hyperglycemia or hypoglycemia in any records. Major surgical intervention- debridement was in 6.4%, aspiration pneumonia in 2.7% and CPR was required in 2.7% of the children. Psychiatric consultation was indicated in 29.7% (56/188) of cases which were in around 2/3rd of them. Table 2 shows underlying issues leading to intentional poisoning. The mean stay at the pediatric intensive unit among poisoned children was 2.75 days. Less than 1 day was required among 41(21.8%) of the children while 1-5 days, 6-14 days, and 14-30 days stay at PICU was

required among 127(67.6%), 19(10.1%) and 01(0.5%) respectively. The mean stay at the hospital was 4.4 days. 11(5.9%) of the cases were required to stay in the hospital only for one day while 150(79.8%) of the children with poisoning stay at the hospital for up to 7 days. Children who needed to stay 8-14 days and 15-21 days at the hospital were 12.2% and 2.1% respectively. In the present study, mortality was seen among 07(3.7%) of the children whereas 167(88.83%) were discharged. 14(7.45%) were transferred to other hospitals or discharged against medical advice. The association of the outcome with various parameters is as per Table 3.

Table 1: Baseline characteristics of study participants

Variables		Number	Percentage
AGE	0-5 years	73	38.8
	6-10 years	30	16.0
	11-14 years	29	15.4
	15-18 years	56	29.8
GENDER	Males	97	51.6
	Females	91	48.4
	Rural	85	45.2
	Urban	103	54.8
SEASON	Winter	77	41.0
	Summer	53	28.2
	Monsoon	58	30.9
MAJOR SYSTEM INVOLVED	Central Nervous system	95	50.5
	Respiratory system	66	35.1
	Gastrointestinal involvement	57	30.3
	Circulatory system involvement	15	8.0
	No system involvement	49	26.1
MODE OF POISONING	Ingestion	91	53.22
	All bites	80	46.78
	Inhalation	00	0.0
	Any other routes	00	0.0
QUANTITY	Known	46	50.55
	Unknown	45	49.45
OUTCOME	Discharged	167	88.83
	DAMA or transferred	14	7.45
	Death	7	3.72

Table 2: Psychiatric disorder among study participants (n=36)

Psychiatric disorder	Number	Percentages
Only Counselling done	18	50.00
Adjustment disorder	09	25.00
Depression	05	13.89
Anxiety	02	5.56
Conduct disorder	01	2.78
Bipolar disorder	01	2.78

Table 3: Association of outcomes with various parameters

VARIABLES		DISCHARGED*	DAMA OR DEATH	P VALUE
AGE	0-5 years	64 (38.32%)	09 (42.86%)	0.93
	6-10 years	27 (16.17%)	03 (14.29%)	
	11-14 years	27 (16.17%)	02 (09.52%)	
	15-18 years	49 (29.34%)	07 (33.33%)	
SEASON	Winter	66 (39.52%)	11 (52.38%)	0.474
	Summer	49 (29.34%)	04 (19.05%)	
	Monsoon	52 (31.14%)	06 (28.57%)	
MODE OF POISONING	Ingestion	67(46.85%)	14(77.78%)	0.013
	Bites	77(53.15%)	04(22.22%)	
QUANTITY	Known	38 (22.75%)	08 (38.09%)	0.123
	Not known/ Not applicable	129 (77.25%)	13 (61.9%)	
VENTILATOR REQUIREMENT	Required (n=58)	48 (28.74%)	10 (47.62%)	0.078
	Not required	119 (71.26%)	11 (52.38%)	
INTROPIC SUPPORT	Required (n=21)	15 (8.98%)	06 (28.57%)	0.017
	Not required	152 (91.02%)	15 (71.43%)	

*Transfer and Referral were not considered

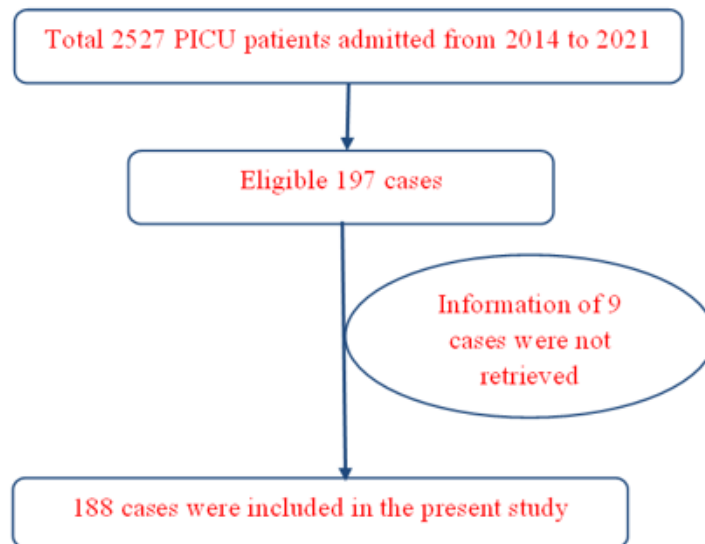


Figure 1: Flow chart of study

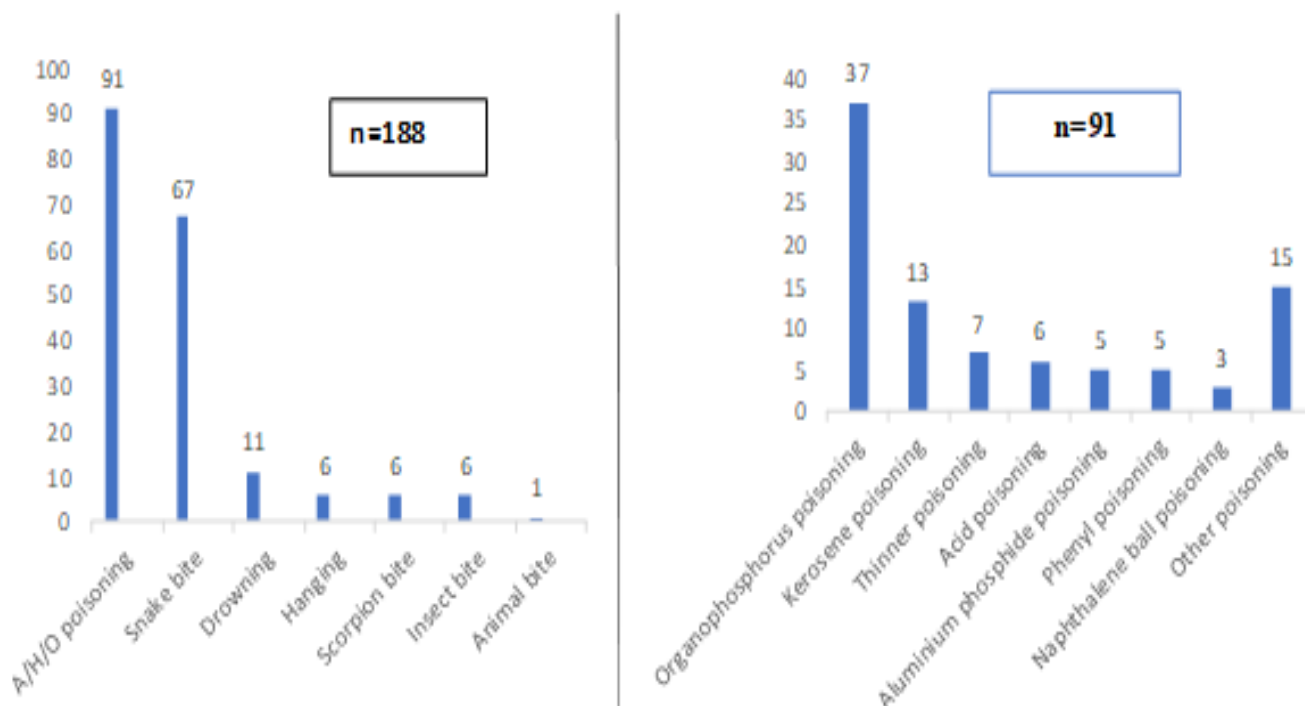


Figure 2: Diagnosis of study cases

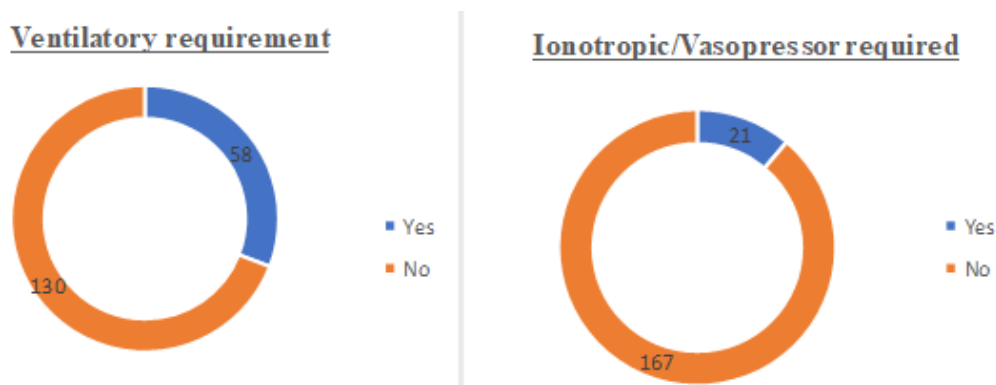


Figure 3: Supportive care requirement of poisoned patients

Discussion

In the present study, acute poisoning and envenomation contributed 3.6% & 3.16% of total PICU admissions suggesting that it is not an uncommon occurrence. The male predominance of 72% was reported by Jadhav S et al¹² but the present study did not find male predominance (51.6%) though it is said that more aggressive and exploratory natures along with a relative lack of restrictions in society, particularly in Asian nations males can be more affected. In the current study, 54.8% of patients were from urban areas but Vasavada et al¹³ reported 83.5% from urban areas whereas Qazi M et al.¹⁴ reported

67% of rural residents experienced poisoning. This may be explained by the fact that the study center is located where and what type of hospital set up? Our hospital is in rural areas and run by the trust with the motto of no profit no loss.

Organophosphorus (40.7%) was the most used chemical among poisoned youngsters, according to the present study but Qazi M et al.¹⁴ reported higher (57.3%). In developing nations like India OP compounds are used as domestic and agricultural pesticides but not sold in child-resistant packaging as done in western nations. Organophosphorus and Hydrocarbons were more prevalent in the

underprivileged population.¹⁵ but in the current study Kerosene poisoning was in 12.3% cases only. This low prevalence is possible because of Liquefied Petroleum Gas (LPG) which is now the fuel of choice.

In India, the prevalence of snake bites fluctuates owing to various patterns of rainfall and agricultural operations which is reflected by the 35.6% of the children who had envenomation in the present study against 23.35% reported by Qazi M et al.¹⁴

In this research, 20.8% of the children/adolescents had stressful situations that resulted in a suicide attempt, while 13.8% had poisoned for an unclear cause. There is a rise in teen suicide by poisoning, which is likely brought on by stress over academic performance, bullying at school, failed relationships, parental conflict, drug abuse, and emotional insecurity due to related psychological conditions like depression and anxiety, among other things.¹⁶ Table 2 suggested various underlying issues in psychiatry consultation. The commonest issue was adjustment disorder (25%) in the present study but according to Krishnakumar P et al.¹⁷ conduct disorder (CD)/oppositional defiant disorder (ODD) was the most prevalent in their study. Early detection and treatment of mental diseases are essential for avoiding suicide since it has been shown that untreated and undertreated psychiatric conditions are related to teenage suicide attempts.

In the current study, 30.9% of the children needed ventilator support whereas 6.25% as per Yadav S et al.¹⁸ However, in our study, 22.4% required a ventilator for less than a day and the majority of patients had neurotoxic snake bite. In the current study, 11.2% of patients required vasopressor or inotropic drugs which as per Table 3 also one of the predictors of poor outcomes. The mean hospital stay was 4.4 days. The mean hospital stays in the research by Budhathoki S et al.¹⁹ was 3.78 days. Poisoning killed 3.72% of the children in the current study which was similar to those reported by 3% of Morbiwala S et al.²⁰ but Budhathoki S. et al.¹⁹ and Islam MN et al.²¹ was reported higher i.e., 12% and 6.66% respectively.

Conclusion

In children, acute accidental poisoning was commonest followed by envenomation in our tertiary care center. The main reason was accidental poisoning in younger children whereas suicide among adolescents. Vasoactive support was a predictor of poor outcomes. Overall mortality was low and was mainly in aluminum phosphide poisoning.

Recommendations

An understanding of the country's geographic distribution of poisoning may assist identify risk factors for poisoning. There should be such data from various regions.

Conflict of interest: None

Source of Funding: self

Ethical clearance: Yes (IEC/BU/130/Faculty/8/157/2021 dated 1st June 2021).

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