

Factors affecting Accidental Toxic Ingestion Among Children Younger Than 5 Years

AMBREEN RAZA¹, MAHNAZ HAKEEM², HAFSA ZAHEER³, SANA SAMREEN⁴, FALAK NAZ⁵, BUSHRA AFROZE⁶

¹Pediatric Emergency Room Incharge, National Medical Centre Karachi Pakistan

²Senior Registrar Pediatric Medicine, Shalamar Medical and Dental College Lahore Pakistan

³Instructor Pediatric Medicine, Aga Khan Hospital for Women Karimabad Karachi Pakistan

⁴Woman Medical Officer Pediatrics, Sindh Government Hospital Liaquatabad Karachi

⁵Senior Registrar Pediatric Medicine, Naimat Begum Hamdard University Hospital Karachi

⁶Associate Professor Paediatrics & Child Health, Aga Khan University Hospital Karachi
Corresponding author: Ambreen Raza, Email: ambrinn.raza@gmail.com

ABSTRACT

Introduction: One million children die each year from injuries around the world, with poisoning being the fourth most common cause. Children below five years are at an increased risk because of their exploratory nature and hand to mouth activity, accounting for 15% of accidental poisoning related deaths in this age group. A community oriented study that studied the national health survey of Pakistan reported that the incidence of accidental poisoning was 4.3% among children below five years.

Objectives: To determine the socio-demographic factors affecting accidental toxic ingestion in children younger than five years at Aga Khan University Hospital, Karachi.

Materials & Methods: A descriptive cross-sectional study was carried out at the emergency Dept of the Aga Khan University Hospital in Karachi, Pakistan between August 2016 to July 2017. Children with a history of accidental ingestion were included in the study. Descriptive statistics and Chi-square association was used employed using SPSS version 23.

Results: A total of 97 children between the age group of 6 months – 5 years were enrolled, amongst 61 (62.88%) male, 74 (76.29%) children had unsafe storage of hazardous chemicals, 34 (35.05%) had large family size, 5 (5.15%), 3 (3.09%), and 3 (3.09%) of participants had lower socioeconomic status, uneducated, and rural residents respectively.

Practical implication

Conclusion: Awareness to parents regarding child protective strategies and usage of safe packaging in medicines may avoid accidental toxic ingestion.

Keywords: Accidental poisoning, Socioeconomic Status, Education.

INTRODUCTION

Around the world, one million children every year pass away from injuries, with poisoning being the fourth most frequent cause. Children under 5 years of age are at an increased risk due to their exploratory nature and hand to mouth activity, accounting for 15% of accidental poisoning related deaths in this age group.¹ A study done in South India showed the incidence of childhood injuries ranging from 0.33%- 7.6%.² In Iran, mortality rate due to poisoning ranges from 3-5%.³ A community oriented study that studied the national health survey of Pakistan reported that the incidence of accidental poisoning was 4.3% among children below five years.⁴

In Benin City, Osaghae et al. has reported some socio-demographic factors leading to accidental toxic ingestion, which includes male gender (56.9%), education of mother (52% had primary level education), high incidence in low socioeconomic groups (72%), type of housing (68% living in passage houses with poor storage practices due to limited space) and caregiver of child (parents in 41% cases).⁵

Raed et al. has highlighted some factors in a study from Egypt; including children attending nursery (17.2%), type of residency divided into rural or urban (79.9% from urban areas as there is frequent use of hazardous chemicals), location of poisoning (kitchen in 37.4% cases), type of containers (original in 34.1% cases) and time of incidence (afternoon in 47.4% due to tradition of taking day nap).⁶

A study from Karachi focusing on the effect of maternal education and employment in childhood poisoning highlights that most of the victims had educated mothers (56.2% out of which 20% were working), 3 or more siblings (61.9%), marital status of parents (89% living with partner), and storage of chemicals in familiar containers (67.61% cases). A case-control study conducted in Thailand identified that youngest and the second youngest children were more prone to accidents due to lack of supervision by an adult (36.1%).⁷ Children with behavioral issues are also reported to be at increased risk of accidental poisoning.⁸ These factors show a discrepancy from country to country in frequency, and are different in different age groups.⁹ To our knowledge there are limited studies done in Pakistan showing the pattern of socio-demographic factors predisposing to poisoning

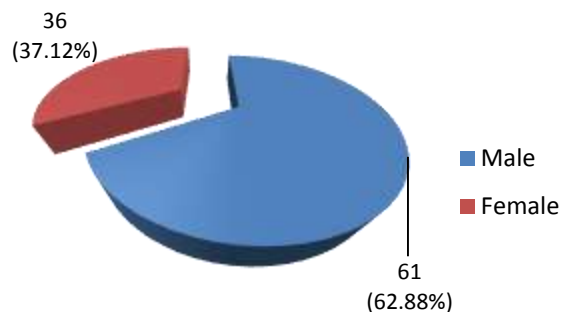
amongst children in Pakistan so our aim is to identify factors associated with unintentional toxic ingestion.

MATERIALS & METHODS

A descriptive cross-sectional study was carried out at the emergency Dept of the Aga Khan University Hospital in Karachi, Pakistan between August 2016 to July 2017. Children with a history of accidental ingestion were included in the study. Descriptive statistics and Chi-square association was used employed using SPSS version 23. Children aged 6 months to 5 years of either gender with history of accidental ingestion including corrosives, drugs (pharmaceutical agents, homeopathic and herbal medicines), cosmetics, hydrocarbon products, insecticides, pesticides and detergent substances were included in the study. Based on the history, children admitted with food poisoning, accidental ingestion of solid non-chewable objects (coins, buttons, beads, stones), snake bite and insect bites, and Intellectually challenged children were excluded from the study.

RESULTS

We observed that the out of the 97 patients, there were 61 (62.88%) male and 36 (37.12%) were female with nearly a male to female ratio of 2:1 (Figure 1).



The age range in this study was from 6 months to 5 years with mean age of 2.26 ±1.14 years. Majority of the patients 65 (67.01%) were between 6 months to 2.5 years of age. Mean time of ingestion was 1.97 ± 1.62 hours (Table).

Table-1: Distribution of patients according to age and time of ingestion (n=97).

Age	No. of Participants	%
06 m to 2.5 years	65	67.01
2.6 years to 5 years	32	32.99
Time to of ingestion (Hours)		
0-3 hours	85	87.63
>3 hours	12	12.37
Total	97	100

We observed that most of the children belonged to middle class family (83.51%), for 96.91 children had educated parents, nearly 2/3rd (64.95%) of the children were staying in large family.

For 76.29% cases, unsafe storage of hazardous chemicals was reported. Only a 3.09% were staying in rural settings. (Table II).

Table 2: Socio-Demographic Factors and Accidental Ingestion of Toxins

Outcome	Frequency	Percentage
Socioeconomic Status		
Lower class	5	5.15
Middle class	81	83.51
Upper class	11	11.34
Education of Parents		
Uneducated	3	3.09
Educated	94	96.91
Large Family Size		
Yes (>3 siblings)	34	35.05
No (≤3 siblings)	63	64.95
Unsafe storage of Hazardous Chemicals		
Yes	74	76.29
No	23	23.71
Type of Residency		
Rural	3	3.09
Urban	94	96.91

We analyzed the association of socio-demographic factors with reporting of time to hospital after Accidental toxic ingestion using Chi-square test of association. It was observed that none of the factors included in the study showed significant association (Table III).

Table 3: Stratification of socio-demographic factors with respect to time of ingestion

socio-demographic factors		0-3 hours (n=85)	>3 hours (n=12)	p-value
Lower socioeconomic status	Yes	04 (4.71%)	01 (8.33%)	0.595
	No	81 (95.29%)	11 (91.67%)	
Uneducated Parents	Yes	03 (3.53%)	00 (0.0%)	0.509
	No	82 (96.47%)	12 (100.0%)	
Large family	Yes	28 (32.94%)	06 (50.0%)	0.246
	No	57 (67.06%)	06 (50.0%)	
Unsafe storage of hazardous chemicals	Yes	66 (77.65%)	08 (66.67%)	0.402
	No	19 (22.35%)	04 (33.33%)	
Rural Residency	Yes	02 (2.35%)	01 (0.0%)	0.263
	No	83 (97.65%)	11 (100.0%)	

DISCUSSION

Pediatric acute poisoning is a significant contributor to avoidable morbidity and mortality. Globally, because to varying availability, accessibility, and environmental conditions, the causes of poisoning and associated risk factors vary greatly across diverse geographic regions. According to the WHO, the global fatality rate for children under the age of five from acute, unintentional

poisoning ranges from 0.3 to 7 per 100,000 people. ⁶ Among developing nations, accidental poisoning in children of all ages is on the rise. Unintentional poisoning is more likely when home chemicals, medications, and insecticides are readily available. These unintentional ingestions have developed into serious health risks that cause long-term morbidity and severe toxic effects in children.

We observed that the out of the 97 patients, there were 61 (62.88%) male and 36 (37.12%) with nearly a male to female ratio of 2:1. Compared to our findings, Osaghae et al. reported 56.9% male participants in his study conducted in Benin City. Perhaps, these demographic differences in gender distribution are due to social cultural and genetic variations⁵.

We observed that most of the children belonged to middle class family (83.51%), Similar to our findings, Osaghae et al. has reported that 72% of cases of unintentional toxic ingestion were observed in low socioeconomic groups⁵. Studies have also observed that socioeconomic status increases the risk of unintentional injuries in pediatric population⁷. In line with our finding, another cohort study from Greece reported that majority of cases belonged to lower income families ⁸. A study conducted in Malaysia observed significant association between low socioeconomic status and unintentional poisoning.⁹

In this study 96.91% children had educated parents, our finding is in contrast with the published research from Malaysia⁹. Also our findings appears to have disagreement with the cohort study conducted in Greece which reported an increased incidence of childhood poisoning among the children of less educated fathers.⁸ And a community based research from southern Brazil which observed that poor education among mothers increases the odds of unintentional injuries in pediatric population.⁷ In our study, nearly 2/3rd (64.95%) of the children were staying in large family. It reported that there is association of increased incidence of childhood poisoning for the children living in crowded conditions and large size families. ⁸ a family with more than 4 children has higher odds of accidental childhood poisoning⁹. Another study conducted in Jordan¹⁰ found that larger households were home to 57% of the children who had been unintentionally poisoned. Children under the age of five who come from large families or have several siblings are more likely to accidentally poison themselves. ¹¹ There were 76.29% cases in our study who reported unsafe storage of hazardous chemicals was reported. However, there haven't been many epidemiological studies done to look at how poisons are kept in young children's homes. In the Netherlands, Beirens TM et al. conducted a cross-sectional survey and discovered that 98% of toddlers had been exposed to pharmaceutical poisoning and 99% had been exposed to home chemical poisoning¹². The improper and unsafe storage of household chemicals and medications has been linked to acute accidental poisoning in children¹³. We observed that only a 3.09% were staying in rural settings. In line with our finding, Raedet al. has highlighted that 79.9% cases belonged to urban areas⁶. In contrast to our results, a study conducted in India reported that there were 65.4% of the cases which belonged to rural areas ¹⁴. This variation is perhaps because of the selection study settings for different studies. We analyzed the association of socio-demographic factors with reporting of time to hospital after Accidental toxic ingestion using Chi-square test of association. It was observed that none of the factors included in the study showed significant association. Young maternal age¹⁵, unsafe storage of hazardous chemicals¹⁶, and overcrowding¹⁶ have also been associated with an increased risk of unintentional injuries. Education of parents and caregivers concerning safe storage practices of toxic household chemicals and drugs was found to be an effective tool in prevention of pediatric poisoning. The present study thus confirms previously known risk factors for unintentional child injuries in various geographical areas.

CONCLUSION

This study has observed that certain factors including lower socioeconomic status, large family size, unsafe storage of hazardous chemicals and rural residency appeared to be the common socio-demographic factors leading to accidental toxic ingestion in children younger than five years.

Recommendations: There is dire need of the hour to put legitimate efforts to prevent accidental toxic ingestions among children and implement health promotional programs for parents and caregivers regarding poisoning hazards in order to decreasing the incidence of morbidity and mortality associated with poisoning.

REFERENCES

- Ahmed B, Fatmi Z, Siddiqui AR, Sheikh AL. Predictors of unintentional poisoning among children under 5 years of age in Karachi: a matched case-control study. *Injury prev.* 2011;17(1):27-32.
- Tshiamo W. Paraffin (kerosene)* poisoning in under-five children: a problem of developing countries. *Int J NursPract* 2009; 15: 140-4
- Sadeghi-Bojd S, Khajeh A. Chronological variations of children poisoning causes in Zahedan, South of Iran. *Int J High Risk Behav Addict.* 2014;3(3).
- Siddiqui E, Ejaz K, Kazi SGI, Siddiqui S, Raza SJ. Mothers's education and working status; do they contribute to corrosive poisoning among paediatric patients of Karachi, Pakistan? *J Pak Medi Assoc.* 2013;63(8):992.
- Osaghae D, Sule G. Accidental childhood poisoning in Benin City: Still a problem? *J Med Biomed Res.* 2014;12(2):19-26.
- World Health Organization, "Review: World Health Statistics Annual 1988," Biometrics, 1988.
- de Lourdes Drachler M, de CarvalhoLeite JC, Marshall T, Anselmo Hess Almaleh CM, Feldens CA, Vitolo MR. Effects of the home environment on unintentional domestic injuries and related health care attendance in infants. *ActaPaediatr* 2007;96(8):1169-73.
- Paritsis N, Pallis D, Deligeorgis D, Doxiadis S, Phylactou C, Vlachonicolis I. An epidemiological study of the factors influencing poisoning in children aged 0-5 years. *PaediatrPerinatEpidemiol* 1994;8(1):79-89.
- Azizi BHO, Zulkifli HI, Kasim MS. Risk factors for accidental poisoning in urban Malaysian children. *Ann Tropical Paediatr.* 1993;13:183-88.
- Morrongiello BA, MacIsaac TJ, Klemencic N. Older siblings as supervisors: Does this influence young children's risk of unintentional injury? *SocSci Med* 2007;64(4):807-17.
- Schwartz S, Eidelman AI, Zeidan A, Applebaum D, Raveh D. Childhood accidents: the relationship of family size to incidence, supervision, and rapidity of seeking medical care. *Isr Med Assoc J* 2005;7(9):558-63.
- Qadri H, Mir U, Ahmed B. Unintentional childhood poisoning, epidemiology and strategies for the prevention and policy change in Pakistan. *JAMC: Journal of Ayub Medical College, Abbottabad.* 2013;25(3-4):90.
- Kendrick D, Majsak-Newman G. Poison prevention practices and medically attended poisoning in young children: multicentre case-control study. *Injury Prevention.* 2017;23:93-101.
- Agarwal G, Bithu K, Agarwal R. An epidemiological study of acute poisoning in children in a tertiary care hospital of western Rajasthan, India. *Int J Contemporary Pediatr.* 2016;1249-1251.
- Orton E, Kendrick D. Independent risk factors for injury in pre-school children: three population-based nested case-control studies using routine primary care data. *PLoS ONE.* 2012;7:e35193.
- Peden M. World report on child injury prevention appeals to "Keep kids safe. *Injury Prevention.* 2008;14:413-414.