RESEARCH PAPER

Patterns and Outcomes of Household poisoning, Toxic exposures and Overdose in Pediatric and Adolescent Populations: A Retrospective Cross-Sectional Study in South India

Venkatadri rao[1], Rajkumar Gajenthiran[2*], Deepan[3]

[1]Post graduate Student, Department of Paediatrics, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education Chennai-603103, Tamil Nadu, India. Email: venkata3122@gmail.com. Orchid id: 0009-0008-9046-324X

[2]Professor, Department of Paediatrics, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education Chennai-603103, Tamil Nadu, India. Email: grkmedico@gmail.com. Orchid id: 0000-0002-7062-3209

[3]Associate Professor, Department of Paediatrics, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education Chennai-603103, Tamil Nadu, India. Email: deepancr1165@gmail.com. Orchid id: 0009-0005-2776-2317

***Corresponding author:** Rajkumar Gajenthiran, Professor, Department of Paediatrics, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education Chennai-603103, Tamil Nadu, India. Email: grkmedico@gmail.com | Orchid id: 0000-0002-7062-3209

Received: 5th March, 2026; **Revised:** 18th April, 2026; **Accepted:** 25th April, 2026; **Available Online:** 11th **June, 2026**

ABSTRACT

Background: Household poisoning in children and adolescents remains a common, largely preventable emergency, with accidental exposures predominating in young children and intentional/suicidal ingestions emerging in adolescents with distinct risk factors and outcomes.

Objective: To compare patterns of accidental, suicidal, and intentional poisoning, toxic exposures, and overdose among children and adolescents aged 6 months to 17 years.

Methods: This single-centre, hospital-based retrospective cross-sectional record review was conducted in the Department of Pediatrics, Chettinad Academy of Research and Education, with eligible cases (6 months–17 years) of clearly documented household poisoning identified from emergency/inpatient records, toxicology registers, and discharge summaries over a five-year abstraction period.

Results: Among 100 children/adolescents, accidental poisoning predominated (84%) and intentional/suicidal exposures accounted for 16%. Intentional/suicidal cases were much older (13.8±2.1 vs 3.8±2.2 years); 83.3% of accidental events occurred in <5-year-olds, while 87.5% of intentional/suicidal events were in 13–17 years. Urban residence was more common in intentional/suicidal cases (87.5%) and unemployed mothers were frequent (75.0%). Accidental cases more often involved 'agile/very active' children (71.4%). Prior poisoning history was 21% in the child and 6% in siblings. Agents differed markedly; accidental poisonings mainly involved kerosene (52.4%), whereas intentional/suicidal cases were predominantly due to medicines (50.0%) and pesticides (31.2%). Accidental incidents commonly occurred in the kitchen (45.2%) and morning (48.8%), often from non-original containers (61.9%); intentional/suicidal events clustered in bedrooms (50.0%) at night (56.2%). Nearly half received no first aid (45%). Intentional/suicidal cases had more altered sensorium (62.5%), longer stay (3.1 vs 1.6 days), more PICU admission (25% vs 2.4%), worse outcomes, and one death.

Conclusion: Accidental poisonings clustered in young children and were strongly linked to unsafe household storage (especially kerosene), whereas intentional/suicidal ingestions occurred in adolescents, involved medicines/pesticides, and carried greater severity and worse outcomes – highlighting the need for age-targeted prevention and care.

Keywords: Pediatric poisoning; Household exposure; Accidental poisoning; Suicidal poisoning; Kerosene ingestion; Pesticide overdose.

How to cite this article: Rao V, Gajenthiran R, Deepan. Patterns and Outcomes of Household poisoning, Toxic exposures and Overdose in Pediatric and Adolescent Populations: A Retrospective Cross-Sectional Study in South India. Int J Drug Deliv Technol. 2026;16(6): 76-86. DOI: 10.25258/ijddt.16.6.13

Source of support: Nil

Conflict of interest: None

Introduction

Poisoning remains an important, preventable cause of morbidity and mortality in children and adolescents worldwide, reflecting unsafe access to hazardous substances and gaps in chemical safety, supervision, and timely care.(1) Global health monitoring frameworks continue to track deaths due to unintentional poisonings as an indicator of inadequate management of hazardous chemicals and the effectiveness of prevention and health-system response.(2) Although many childhood poisonings are non-fatal, they contribute to emergency visits, hospital admissions, and avoidable healthcare costs, and a substantial proportion is considered

preventable through safer storage, packaging, and broader chemical-safety interventions.(3, 4)

The epidemiology of pediatric poisoning is strongly age-dependent. Young children – particularly toddlers and preschoolers – are prone to exploratory ingestions because of developmental hand-to-mouth behaviour, mobility, and limited hazard perception, whereas older adolescents are more likely to present with intentional self-harm or suicidal ingestion, often in the context of psychosocial stressors.(5, 6) In many low- and middle-income settings, the household environment is central to exposure risk: fuels, cleaning agents, and medications may be stored within reach or transferred into non-original containers, increasing the likelihood of accidental ingestion.(7) In India and similar contexts, kerosene continues to be reported as a common agent in accidental childhood poisoning, particularly where it remains in household use and is stored in beverage bottles or other easily accessible containers, leading to mistaken ingestion.(8) Clinically, kerosene poisoning is important because aspiration pneumonitis is a major complication, and inappropriate first aid (e.g., inducing vomiting) can increase aspiration risk.(9) By contrast, intentional self-poisoning – especially with pesticides – is a major public health concern in parts of Asia, given the high intrinsic toxicity of many agents and challenges in timely access to effective treatment.(10, 11)

Management strategies for poisoning have also evolved toward selective, evidence-informed interventions. Benson et al. (2013) emphasizes that gastric lavage should not be performed routinely, and gastrointestinal decontamination (including activated charcoal) should be reserved for carefully selected situations, balancing potential benefit against procedure-related harms and aspiration risk.(12) Despite the clinical and preventive importance of poisoning, Indian hospital-based data that simultaneously compare accidental versus intentional/suicidal pediatric poisoning across demographics, household circumstances (storage, container type, supervision), exposure context (place/time), and clinical outcomes remain limited in many regions. Therefore, the present study aimed to compare patterns of accidental, suicidal, and intentional poisoning, toxic exposures, and overdose among children and adolescents aged 6 months to 17 years.

Materials and Methods

This was a single centre, hospital-based, retrospective, cross-sectional, record-based study conducted in the Department of Pediatrics, Chettinad Academy of Research and Education, Tamil Nadu, India over a period of six months; with data abstracted over a period of five years. The study was approved by the Institutional Human Ethics Committee (IHEC) with reference number IHEC-I/4317/25 dated 22/10/2025. Pediatric and adolescent patients aged 6 months to 17 years; with clearly documented history of household poisoning (accidental, suicidal, or intentional) were included in the study. However, patients with poisoning due to insect, animal, or snake bites; without definitive history of household poisoning; and poisoning through non-ingestive routes (e.g., ocular, nasal, dermal) were excluded.

Based on a 95% CI, expected accidental-poisoning proportion of 0.88 from an Indian cohort,(13) and 6% absolute precision, the calculated minimum required sample size was rounded off to 100 children/adolescents (using single-proportion formula). The patients were enrolled using non-probability sampling technique – convenience sampling/complete enumeration. Data were abstracted retrospectively from emergency and inpatient case records, toxicology registers, and discharge summaries for all eligible children. We used a pre-piloted, standardized proforma to extract information on patient demographics (age, gender, residence) and family context (parental education/occupation, household type, family size, income, parental employment, marital status). Event-level details were recorded, including the intent (accidental, suicidal, intentional), the specific agent (pharmaceuticals, household chemicals, insecticides/pesticides, hydrocarbons/kerosene, others), the place and time within the home, the container and storage practices, availability/access (e.g., unsafe storage, decanting into drink bottles), persons present, prior poisoning episodes in the child/siblings, first aid administered, and time to first medical contact. Clinical features at presentation, initial management, and outcomes (recovery, complications, mortality) were captured along with length of stay and direct/indirect costs. Risk-reduction variables (caregiver awareness, prior warnings, perceived preventability) were also documented.

Statistical analysis: Continuous variables were summarized as mean (SD) if approximately normally distributed (assessed by Shapiro–Wilk and visual inspection of histograms/Q–Q plots) and compared using Welch's t-test; skewed variables were summarized as median (IQR) and compared using the Mann–Whitney U test. Categorical variables were presented as n (%) and compared using the χ^2 test; Fisher's exact test was used where expected cell counts were <5. Two-sided α was set at 0.05. Analyses were conducted in Stata (v17).

Results

Among the 100 children/adolescents, accidental poisoning predominated (84%), while intentional/suicidal exposures accounted for 16%. The intentional/suicidal group was markedly older than the accidental group (mean age 13.8 ± 2.1 vs 3.8 ± 2.2 years; $p < 0.001$), with 83.3% of accidental

cases occurring in children <5 years (70/84), whereas 87.5% of intentional/suicidal cases were in 13–17 years (14/16) ($p < 0.001$). Parents of intentional/suicidal cases were also older, with higher mean father's age (39.8 ± 6.5 vs 34.7 ± 6.0 years; $p = 0.009$) and mother's age (35.2 ± 5.8 vs 29.9 ± 5.0 years; $p = 0.003$). Urban residence was more common in the intentional/suicidal group (87.5% vs 64.3%), while rural representation was higher among accidental cases (35.7% vs 12.5%), showing a significant association ($p = 0.026$). Maternal education differed significantly ($p = 0.032$), with graduate+ mothers more frequent in the intentional/suicidal group (25.0% vs 9.5%), whereas paternal education showed a borderline association ($p = 0.050$). A striking difference was noted in mother's occupation: 75.0% of intentional/suicidal cases had unemployed mothers (12/16) compared with 11.9% in accidental cases (10/84) ($p < 0.001$). Other variables – such as father's occupation, parents' living status, family size, socioeconomic status, and parental employment pattern – did not show statistically significant differences ($p>0.05$).

A previous poisoning episode in the child was reported in 21.0% overall (20/84 accidental vs 1/16 intentional/suicidal), but this difference was not statistically significant ($p=0.181$), and prior poisoning in siblings was uncommon (6.0%; $p=0.597$). The type of agent differed markedly by intent ($p<0.001$): accidental cases most commonly involved kerosene (52.4%) followed by medicines (21.4%) and household chemicals (19.0%), whereas intentional/suicidal cases were predominantly due to medicines (50.0%) and insecticides/pesticides (31.2%), The place of incident within the home also differed significantly ($p=0.043$): accidental events most often occurred in the kitchen (45.2%), while intentional/suicidal events were more frequent in the bedroom (50.0%). Most incidents occurred at the parents' home (86.0%) without a significant group difference ($p=0.139$). The time of day showed a strong association with intent ($p<0.001$): accidental episodes occurred mainly in the morning (48.8%), whereas intentional/suicidal episodes were predominantly at night (56.2%). Although time to first medical consultation tended to be quicker for accidental cases (e.g., <2 hours: 52.4% vs 25.0%), this did not reach statistical significance ($p=0.084$). The mother was the most common supervising person at the time of exposure (58.0% overall), with no significant group difference ($p=0.232$). Finally, storage/packaging patterns differed ($p=0.019$): accidental poisonings more often involved substances kept in non-original or unlabelled containers (61.9%), while intentional/suicidal cases more frequently involved original containers (56.2%).

Among the 100 children/adolescents, nearly half received no pre-hospital first aid (45.0%), with 'none' being more common in the intentional/suicidal group (68.8% vs 40.5%), while common home measures included milk/water (27.0%) and induced vomiting (23.0%); however, these differences were not statistically significant ($p=0.154$). About 27.0% visited another facility before reaching the index hospital (43.8% intentional/suicidal vs 23.8% accidental; $p=0.100$). Clinical presentation differed markedly by intent ($p<0.001$): 47.6% of accidental cases were asymptomatic at presentation (40/84), whereas none of the intentional/suicidal cases were asymptomatic; instead, drowsiness/altered mental status predominated in the intentional/suicidal group (62.5% vs 10.7% in accidental). Hospital decontamination was rarely required overall (92.0% received none), but was significantly more frequent in the intentional/suicidal group (including gastric lavage/activated charcoal/both) compared with accidental cases ($p<0.001$). The intentional/suicidal group also had a longer hospital stay (mean 3.1 ± 1.8 days vs 1.6 ± 0.9 days; $p=0.016$) and required a higher level of care (PICU admission 25.0% vs 2.4%; $p=0.005$). Outcomes were significantly worse in the intentional/suicidal group ($p=0.008$): while most children recovered without complications overall (92.0%), this was 95.2% in accidental cases versus 75.0% in intentional/suicidal cases, with one death occurring in the intentional/suicidal group (6.2%). Consistent with greater severity, antidotes were administered only in the intentional/suicidal group (37.5% vs 0%; $p<0.001$).

Discussion

Accidental poisoning constituted the clear majority of presentations in this cohort (84%), a pattern that aligns with the well-described epidemiology of childhood poisoning by Sminkey wherein most exposures in younger children are unintentional and occur in domestic settings.(14) The sharp age gradient in intent observed here – mean age 3.8 years for accidental events versus 13.8 years for intentional/suicidal events, with 83.3% of accidental episodes in children <5 years and 87.5% of intentional/suicidal episodes in 13–17-year-olds – fits a developmental framework; toddlers and preschoolers are at peak risk of exploratory ingestion because of hand-to-mouth behaviour, increasing mobility, and limited hazard awareness, while adolescence is the age at which deliberate self-harm and suicidal behaviour become prominent, often via poisoning because substances are readily accessible at home. This is in corroboration with Kesapli et al. (2018) and McGregor et al. (2009).(15, 16) The adolescent vulnerability is clinically important because suicide is a leading cause of death in young people globally, and self-poisoning remains a common method in many low- and middle-income settings, as noted by Renaud et al. (2022).(17)

Parental age differed significantly between groups (fathers 39.8 vs 34.7 years; mothers 35.2 vs 29.9 years in intentional/suicidal vs accidental), which likely reflects the older age distribution of parents of adolescents compared with parents of preschool children rather than a causal mechanism; nevertheless, Arun et al. (2017) and Zhang et al. (2023) noted that older parental age can coexist with distinct family and psychosocial contexts during adolescence (academic pressures, interpersonal conflict, emerging mental health concerns) that influence self-harm risk.(18, 19) The residence signal – urban predominance in intentional/suicidal poisonings (87.5%) and higher rural representation among accidental exposures (35.7%) – is plausibly related to differences in household fuel use and chemical storage patterns (kerosene still being used in rural/low-resource households) as well as differences in access to pharmaceuticals and psychosocial stressors in urban settings, in corroboration with Bonvoisin et al. (2020) and Kumar et al. (2019).(20, 21) Notably, maternal education showed a significant association (graduate+ mothers 25.0% in intentional/suicidal vs 9.5% in accidental), and paternal education was borderline (p=0.050). Higher parental education can correlate with urban residence and better access to prescription medications (increasing availability of ingestible agents), while adolescent self-harm is multi-factorial and not 'explained' by education level alone, as noted by McGregor et al. (2009).(15) Mother's occupation was the most striking sociodemographic correlate; 75.0% of intentional/suicidal cases had unemployed mothers versus 11.9% in accidental poisonings. While employment status can reflect household socioeconomic arrangements and caregiver presence, it can also be a proxy for broader family functioning (supervision dynamics, time spent at home, caregiver stress, and social support).(22) In contrast, father's occupation, parental living status (together vs single/separated/widowed), family type (nuclear/joint/three-generation), number of family members, socioeconomic status, and parental employment pattern (both working vs father only etc.) did not differ significantly. This non-significance is still informative. It suggests that, within this hospital-based cohort, intent was more tightly linked to the child's developmental stage and agent availability than to broad structural household characteristics, which often show heterogeneous associations across regions and study designs.(15, 22)

Behavioural characterization of the child ('agile/very active') was significantly more common in accidental poisonings (71.4% vs 37.5%). Peden (2008) noted that hyperactivity and high activity levels can increase exposure opportunity – climbing, rapid exploration, and brief lapses in supervision – especially in the high-risk <5 age group.(22) Prior poisoning history in the child (21% overall) and in siblings (6%) did not differ significantly by intent, but these variables are clinically relevant because repeat exposures often indicate persistent hazards in the home environment (unsafe storage, decanting, easy access) and provide a tangible target for prevention counselling, as noted by Dayasiri et al. (2017) and Litovitz et al. (1989).(23, 24)

The toxic agent distribution strongly differentiated intent (p<0.001). Accidental poisonings were dominated by kerosene (52.4%), followed by medicines (21.4%) and household chemicals (19.0%). This mirrors the enduring role of hydrocarbons as a pediatric poisoning problem in parts of India, where kerosene may be stored in beverage bottles or other non-original containers and kept within reach.(21) Clinically, this matters because kerosene's low viscosity and volatility make aspiration pneumonitis a key risk, particularly when vomiting is induced or occurs spontaneously. In the intentional/suicidal group, medicines (50.0%) and insecticides/pesticides (31.2%) predominated, consistent with Bonvoisin et al. (2020) and Chowdhary et al. (2007) that deliberate self-harm frequently involves readily available pharmaceuticals or agricultural chemicals, and that pesticide self-poisoning contributes substantially to suicide burden in India and globally.(11, 20) The 'where' and 'when' of exposure also mapped onto intent. Accidental incidents clustered in kitchens (45.2%), plausibly reflecting storage of kerosene/cleaning agents and routine household activity during daytime, whereas intentional/suicidal incidents were more common in bedrooms (50.0%), consistent with privacy-seeking behaviour during self-harm.(15) Most events occurred in the parents' home (86%), reinforcing that prevention must focus on household-level risk reduction rather than rare external exposures. Time-of-day patterns were highly discriminating; accidental exposures occurred mainly in the morning (48.8%), while intentional/suicidal poisonings occurred predominantly at night (56.2%), a period associated with reduced supervision, heightened emotional distress, and greater privacy.(15) Although time to first medical consultation tended to be shorter in accidental cases (<2 hours: 52.4% vs 25.0%), the lack of statistical significance suggests that access barriers and caregiver appraisal of severity may affect both groups; importantly, any delay can be consequential for rapidly toxic agents such as organophosphates and other pesticides.(25)

Supervision variables add nuance; the mother was the primary supervising person in 58% overall (non-significant by intent), reminding us that poisoning prevention is not solely a 'supervision' problem – hazardous product accessibility, child behaviour, and packaging/storage are pivotal.(22) In fact, container type showed a significant association (p=0.019): accidental poisonings frequently

involved substances stored in non-original/unlabelled containers (61.9%), a well-recognized risk factor for pediatric kerosene ingestion and household chemical poisoning because children may mistake the liquid for a beverage, as noted by Abu-Ekteish (2002) and Ahmed et al. (2011).(26, 27) Conversely, intentional/suicidal cases more often involved original containers (56.2%), consistent with deliberate access to clearly identified medications or pesticides rather than mistaken ingestion.(15)

Pre-hospital practices in this cohort highlight both gaps and opportunities. Nearly half received no first aid (45%), and a sizeable proportion were given milk/water (27%) or had vomiting induced (23%). While these measures are common in community practice, AAP guidance emphasizes contacting poison information services/medical care rather than using emesis as routine home treatment, and the decline of emesis-based strategies (e.g., ipecac) reflects limited evidence of benefit and potential harm.(28, 29) Induced vomiting is particularly concerning in suspected hydrocarbon ingestion because aspiration during gagging/vomiting is a major pathway to pneumonitis.(21) The proportion visiting another facility before the index hospital (27%) suggests care-seeking pathways that could introduce delays; strengthening early triage advice and referral pathways through poison information services or standardized emergency protocols could reduce time-to-definitive care.

Clinical severity differences by intent were pronounced and internally consistent. Almost half of accidental cases were asymptomatic (47.6%), consistent with low-dose exploratory ingestions and early presentation, whereas none of the intentional/suicidal cases were asymptomatic and most presented with drowsiness/altered mental status (62.5%), a red flag for significant ingestion, co-ingestants, or centrally acting agents.(15) Gastrointestinal decontamination was rarely used overall (92% none), but significantly more frequent in intentional/suicidal poisonings. This aligns with evidence-based recommendations including Benson et al. (2013) and Vale (1997) that gastric lavage should not be routine and, if considered at all, is reserved for selected life-threatening ingestions within a narrow time window and with airway protection, given lack of proven outcome benefit and procedure-related risks.(12, 30) Likewise, activated charcoal is not recommended routinely, has greatest potential benefit early after ingestion, and requires an intact/protected airway to avoid aspiration; importantly, it is specifically contraindicated for hydrocarbon ingestions because binding is poor and aspiration risk may increase.(31) Downstream outcomes paralleled initial severity. Intentional/suicidal cases had longer hospital stays (3.1 vs 1.6 days), higher PICU admissions (25.0% vs 2.4%), and worse discharge outcomes (recovery without complications 75.0% vs 95.2%), including one death. These findings reinforce established observations that intentional ingestions are more likely to involve larger doses, more toxic agents (including pesticides), and require higher-level monitoring and supportive care.(15, 20) Finally, antidotes were administered only in the intentional/suicidal group (37.5%), which is clinically plausible because antidote use often tracks with specific high-toxicity exposures (e.g., organophosphates requiring atropine/pralidoxime protocols), whereas kerosene and many household chemical exposures are predominantly managed with supportive care and targeted complication management.(11, 21)

This study has certain limitations inherent to its single-centre, retrospective, record-based design. Because information was abstracted from emergency/inpatient case records, toxicology registers, and discharge summaries, several variables (e.g., intent classification, ‘agile/very active’ behaviour, supervision at the time of exposure, storage/decanting practices, first-aid measures, time-to-care, and cost estimates) may have been incompletely documented or variably recorded, introducing information and misclassification bias. The hospital-based sample may also reflect referral and severity patterns (including higher-risk intentional/suicidal cases) and therefore may not represent the true community distribution of exposures, limiting generalizability beyond similar settings. As toxicology confirmation was not uniformly available for all agents, categorization relied partly on caregiver history and clinical assessment, and we could not consistently quantify dose ingested or verify all exposures analytically. The modest sample size – particularly for the intentional/suicidal subgroup – reduced power for detecting differences in some comparisons and limited detailed stratified analyses by agent or age band. Finally, as outcomes were assessed at discharge, longer-term sequelae and recurrence after counselling could not be evaluated.

Conclusion

In this hospital-based cohort of 100 pediatric and adolescent household poisoning events, accidental exposures predominated, occurring mainly in children <5 years and most often involving kerosene and other household agents, frequently linked to unsafe storage in non-original/unlabelled containers and occurring during routine daytime household activity. In contrast, intentional/suicidal poisonings were concentrated in older adolescents (13–17 years), more commonly involved medicines and pesticides, occurred more often at night and in private spaces (bedrooms), and were associated with more severe clinical presentation, greater need for decontamination/antidotes, higher PICU admission, longer hospital stay, and poorer outcomes, including

mortality. These findings underscore two complementary prevention priorities: strengthening home-safety measures (safe storage, avoidance of decanting, child-resistant practices, caregiver education) to reduce unintentional poisonings in young children, and implementing robust adolescent-focused mental health screening, crisis support, and restriction of access to high-lethality agents to mitigate intentional self-poisoning and its adverse outcomes.

References

1. Hemmati M, Tohidi MR, Mohammadi A, Jahanpour F, Andayeshgar B, Fallah S. Poisoning in children and adolescents in Kermanshah city, Iran. BMC Pediatr. 2024;24(1):135.
2. World Health Organization. Poison control and unintentional poisoning 2023 [Available from: https://www.who.int/data/gho/data/themes/topics/indicator-groups/poison-control-and-unintentional-poisoning?utm.
3. Grandjean P, Bellanger M. Calculation of the disease burden associated with environmental chemical exposures: application of toxicological information in health economic estimation. Environmental Health. 2017;16(1):123.
4. Prüss-Ustün A, Vickers C, Haefliger P, Bertollini R. Knowns and unknowns on burden of disease due to chemicals: a systematic review. Environmental health. 2011;10(1):9.
5. Hauptman M, Woolf AD. Childhood Ingestions of Environmental Toxins: What Are the Risks? Pediatr Ann. 2017;46(12):e466-e71.
6. Moya J, Bearer CF, Etzel RA. Children's Behavior and Physiology and How It Affects Exposure to Environmental Contaminants. Pediatrics. 2004;113(Supplement_3):996-1006.
7. Mottla ME, Bowler ME, Asgary R. Epidemiology, risk factors, and strategies to prevent and manage poisonings due to pharmaceuticals in children in low income and low-middle income countries: A systematic review. J Glob Health. 2023;13:04173.
8. Thilakavathi K, Elangovan H. Clinical profile and outcome of children with kerosene poisoning in a tertiary care centre: a study from South India. International Journal of Contemporary Pediatrics. 2018;5.
9. Babu TA. Curious Case of Accidental Kerosene Aspiration in an Adolescent Girl and Blue Colored Carbonated Soft Drinks. Indian Journal of Community Medicine. 2015;40(2).
10. Gunnell D, Eddleston M. Suicide by intentional ingestion of pesticides: a continuing tragedy in developing countries. Int J Epidemiol. 2003;32(6):902-9.
11. Chowdhary AN, Banerjee S, Brahma A, Biswas MK. Pesticide poisoning in nonfatal, deliberate self-harm: A public health issue. Indian J Psychiatry. 2007;49(2):117-20.
12. Benson BE, Hoppu K, Troutman WG, Bedry R, Erdman A, Höjer J, et al. Position paper update: gastric lavage for gastrointestinal decontamination. Clin Toxicol (Phila). 2013;51(3):140-6.
13. Singh S, Singhi S, Sood N, Kumar L, Walia B. Changing pattern of childhood poisoning (1970-1989): experience of a large north Indian hospital. Indian pediatrics. 1995;32:331-.
14. Sminkey L. World report on child injury prevention. Injury prevention. 2008;14(1):69-.
15. McGregor T, Parkar M, Rao S. Evaluation and management of common childhood poisonings. Am Fam Physician. 2009;79(5):397-403.
16. Kesapli M, Celik A, Isik I. Characteristic Features of Childhood and Adolescent Poisonings, in the Mediterranean Region over 6 Years. Iran J Public Health. 2018;47(11):1667-74.
17. Renaud J, MacNeil SL, Vijayakumar L, Spodenkiewicz M, Daniels S, Brent DA, et al. Suicidal ideation and behavior in youth in low- and middle-income countries: A brief review of risk factors and implications for prevention. Front Psychiatry. 2022;13:1044354.
18. Zhang Y-Y, Yang X-F, Liu X, Jia C-X. Longitudinal association of family conflict and suicidal behaviors among Chinese adolescents: The mediation effect of internalizing and externalizing problems. Journal of Affective Disorders. 2023;321:96-101.
19. Arun P, Garg R, Chavan BS. Stress and suicidal ideation among adolescents having academic difficulty. Ind Psychiatry J. 2017;26(1):64-70.
20. Bonvoisin T, Utyasheva L, Knipe D, Gunnell D, Eddleston M. Suicide by pesticide poisoning in India: a review of pesticide regulations and their impact on suicide trends. BMC Public Health. 2020;20(1):251.
21. Kumar S, Kavitha TK, Angurana SK. Kerosene, Camphor, and Naphthalene Poisoning in Children. Indian J Crit Care Med. 2019;23(Suppl 4):S278-s81.
22. Peden M. World report on child injury prevention appeals to 'Keep Kids Safe'. Injury prevention. 2008;14(6):413-4.
23. Litovitz TL, Flagler SL, Manoguerra AS, Veltri JC, Wright L. Recurrent poisonings among paediatric poisoning victims. Med Toxicol Adverse Drug Exp. 1989;4(5):381-6.
24. Dayasiri M, Jayamanne SF, Jayasinghe CY. Risk Factors for Acute Unintentional Poisoning among Children Aged 1-5 Years in the Rural Community of Sri Lanka. Int J Pediatr. 2017;2017:4375987.
25. Mittal C, Singh S, Kumar-M P, Varthya SB. Toxicoepidemiology of poisoning exhibited in Indian population from 2010 to 2020: a systematic review and meta-analysis. BMJ Open. 2021;11(5):e045182.

26. Abu-Ekteish F. Kerosene poisoning in children: a report from northern Jordan. Trop Doct. 2002;32(1):27-9.
27. Ahmed B, Fatmi Z, Siddiqui AR. Population Attributable Risk of Unintentional Childhood Poisoning in Karachi Pakistan. PLOS ONE. 2011;6(10):e26881.
28. Poison treatment in the home. American Academy of Pediatrics Committee on Injury, Violence, and Poison Prevention. Pediatrics. 2003;112(5):1182-5.
29. Shannon M. The Demise of Ipecac. Pediatrics. 2003;112(5):1180-1.
30. Vale JA. Position statement: gastric lavage. American Academy of Clinical Toxicology; European Association of Poisons Centres and Clinical Toxicologists. J Toxicol Clin Toxicol. 1997;35(7):711-9.
31. Chyka PA, Seger D, Krenzelok EP, Vale JA. Position paper: Single-dose activated charcoal. Clin Toxicol (Phila). 2005;43(2):61-87.

Table 1: Sociodemographic Characteristics by Exposure Intent (Accidental vs Intentional/Suicidal), N = 100

		Accidental	**Intentional/suicidal**	**Total**	**P value**
		N = 84	**N = 16**	**N = 100**	
		n (%)	**n (%)**	**n (%)**	
Age (years), Mean (SD)		3.8 (2.2)	13.8 (2.1)	5.4 (4.3)	<0.001*
Age (years)	<5 years	70 (83.3)	0 (0.0)	70 (70.0)	<0.001*
	5–12 years	8 (9.5)	2 (12.5)	10 (10.0)	
	13–17 years	6 (7.1)	14 (87.5)	20 (20.0)	
Father's age (years), Mean (SD)		34.7 (6.0)	39.8 (6.5)	35.5 (6.4)	0.009*
Mother's age (years), Mean (SD)		29.9 (5.0)	35.2 (5.8)	30.7 (5.4)	0.003*
Residence	Rural	30 (35.7)	2 (12.5)	32 (32.0)	0.026*
	Urban	54 (64.3)	14 (87.5)	68 (68.0)	
Fathers' highest education	No formal	10 (11.9)	0 (0.0)	10 (10.0)	0.050
	Primary	19 (22.6)	1 (6.2)	20 (20.0)	
	Secondary	43 (51.2)	9 (56.2)	52 (52.0)	
	Graduate+	12 (14.3)	6 (37.5)	18 (18.0)	
Mothers' highest education	No formal	16 (19.0)	2 (12.5)	18 (18.0)	0.032*
	Primary	21 (25.0)	3 (18.8)	24 (24.0)	
	Secondary	39 (46.4)	7 (43.8)	46 (46.0)	
	Graduate+	8 (9.5)	4 (25.0)	12 (12.0)	
Fathers' occupation	Unemployed	5 (6.0)	1 (6.2)	6 (6.0)	0.707
	Skilled	17 (20.2)	5 (31.2)	22 (22.0)	
	Semiskilled	30 (35.7)	6 (37.5)	36 (36.0)	
	Unskilled	32 (38.1)	4 (25.0)	36 (36.0)	
Mothers' occupation	Unemployed	10 (11.9)	12 (75.0)	22 (22.0)	<0.001*

	Skilled	12 (14.3)	2 (12.5)	14 (14.0)	
	Semiskilled	30 (35.7)	1 (6.2)	31 (31.0)	
	Unskilled	32 (38.1)	1 (6.2)	33 (33.0)	
Parents' current living status	Together	72 (85.7)	14 (87.5)	86 (86.0)	1.000
	Single parent/ Separated/ Widowed	12 (14.3)	2 (12.5)	14 (14.0)	
Type of family	Nuclear	50 (59.5)	14 (87.5)	64 (64.0)	0.091
	Joint	26 (31.0)	2 (12.5)	28 (28.0)	
	Three-generation	8 (9.5)	0 (0.0)	8 (8.0)	
Number of family members, Mean (SD)		4.8 (1.3)	4.2 (1.2)	4.7 (1.3)	0.084
Socioeconomic status	Upper	3 (3.6)	2 (12.5)	5 (5.0)	0.305
	Middle	56 (66.7)	9 (56.2)	65 (65.0)	
	Lower	25 (29.8)	5 (31.2)	30 (30.0)	
Parents' type of employment	Both working	45 (53.6)	6 (37.5)	51 (51.0)	0.534
	Father only working	28 (33.3)	7 (43.8)	35 (35.0)	
	Mother only working	3 (3.6)	1 (6.2)	4 (4.0)	
	Neither working	8 (9.5)	2 (12.5)	10 (10.0)	
*Statistically significant at p<0.05					

Table 2: Event Circumstances and Household Risk Factors (CRF Items 17–26) by Exposure Intent, N = 100

		Accidental	**Intentional/suicidal**	**Total**	**P value**
		N = 84	**N = 16**	**N = 100**	
		n (%)	**n (%)**	**n (%)**	
Child described as 'agile/ very active'	Yes	60 (71.4)	6 (37.5)	66 (66.0)	0.019*
	No	24 (28.6)	10 (62.5)	34 (34.0)	
Previous poisoning episode in the child	Yes	20 (23.8)	1 (6.2)	21 (21.0)	0.181
	No	64 (76.2)	15 (93.8)	79 (79.0)	
Previous poisoning episode in sibling(s)	Yes	6 (7.1)	0 (0.0)	6 (6.0)	0.597
	No	78 (92.9)	16 (100.0)	94 (94.0)	
Type of poisoning	Kerosene	44 (52.4)	0 (0.0)	44 (44.0)	<0.001*
	Medicine	18 (21.4)	8 (50.0)	26 (26.0)	

	Household chemical	16 (19.0)	2 (12.5)	18 (18.0)	
	Insecticide/pesticide	3 (3.6)	5 (31.2)	8 (8.0)	
	Others	3 (3.6)	1 (6.2)	4 (4.0)	
Place of incident within the home	Kitchen	38 (45.2)	2 (12.5)	40 (40.0)	0.043*
	Bedroom	18 (21.4)	8 (50.0)	26 (26.0)	
	Drawing/Dining	12 (14.3)	2 (12.5)	14 (14.0)	
	Store/Godown	9 (10.7)	3 (18.8)	12 (12.0)	
	House-yard	6 (7.1)	0 (0.0)	6 (6.0)	
	Others	1 (1.2)	1 (6.2)	2 (2.0)	
Place of incident (whose home/school)	Parents' home	74 (88.1)	12 (75.0)	86 (86.0)	0.139
	Grandparents' home	7 (8.3)	1 (6.2)	8 (8.0)	
	School	2 (2.4)	2 (12.5)	4 (4.0)	
	Others	1 (1.2)	1 (6.2)	2 (2.0)	
Time of day of incident	Morning	41 (48.8)	1 (6.2)	42 (42.0)	<0.001*
	Noon	19 (22.6)	1 (6.2)	20 (20.0)	
	Afternoon	20 (23.8)	5 (31.2)	25 (25.0)	
	Night	4 (4.8)	9 (56.2)	13 (13.0)	
Time to first medical consultation	<2 hours	44 (52.4)	4 (25.0)	48 (48.0)	0.084
	2–4 hours	25 (29.8)	5 (31.2)	30 (30.0)	
	4–6 hours	9 (10.7)	5 (31.2)	14 (14.0)	
	>6 hours	6 (7.1)	2 (12.5)	8 (8.0)	
Primary supervising person at time of incident	Mother	52 (61.9)	6 (37.5)	58 (58.0)	0.232
	Father	10 (11.9)	2 (12.5)	12 (12.0)	
	Elder sibling	8 (9.5)	2 (12.5)	10 (10.0)	
	Younger sibling	4 (4.8)	0 (0.0)	4 (4.0)	
	Relative	5 (6.0)	3 (18.8)	8 (8.0)	
	House-help	4 (4.8)	2 (12.5)	6 (6.0)	
	Others	1 (1.2)	1 (6.2)	2 (2.0)	
Type of container of the	Some other container (non-original/	52 (61.9)	4 (25.0)	56 (56.0)	0.019*

substance	unlabelled)				
	Original container	21 (25.0)	9 (56.2)	30 (30.0)	
	No container	11 (13.1)	3 (18.8)	14 (14.0)	
*Statistically significant at p<0.05					

Table 3: Prehospital Care, Clinical Course, and Outcomes (CRF Items 27–34) by Exposure Intent, N = 100

		Accidental	**Intentional/suicidal**	**Total**	**P value**
		N = 84	**N = 16**	**N = 100**	
		n (%)	**n (%)**	**n (%)**	
Pre-hospital first aid (any)	None	34 (40.5)	11 (68.8)	45 (45.0)	0.154
	Induced vomiting	22 (26.2)	1 (6.2)	23 (23.0)	
	Milk/ Water given	24 (28.6)	3 (18.8)	27 (27.0)	
	Other (home remedy)	4 (4.8)	1 (6.2)	5 (5.0)	
Visited another facility before index hospital	Yes	20 (23.8)	7 (43.8)	27 (27.0)	0.100
	No	64 (76.2)	9 (56.2)	73 (73.0)	
Primary clinical feature at presentation	Asymptomatic	40 (47.6)	0 (0.0)	40 (40.0)	<0.001*
	Vomiting	25 (29.8)	3 (18.8)	28 (28.0)	
	Respiratory symptoms	8 (9.5)	1 (6.2)	9 (9.0)	
	Drowsiness/AMS	9 (10.7)	10 (62.5)	19 (19.0)	
	Seizures	2 (2.4)	2 (12.5)	4 (4.0)	
Decontamination performed at hospital	None	82 (97.6)	10	92 (92.0)	<0.001*
	Gastric lavage	2 (2.4)	2	4 (4.0)	
	Activated charcoal	0 (0.0)	2	2 (2.0)	
	Both	0 (0.0)	2	2 (2.0)	
Length of stay (days), Mean (SD)		1.6 (0.9)	3.1 (1.8)	1.8 (1.2)	0.016*
Disposition/Level of care	Discharged from ED	4 (4.8)	0 (0.0)	4 (4.0)	0.005*
	Admitted to ward	78 (92.9)	12 (75.0)	90 (90.0)	
	Admitted to PICU	2 (2.4)	4 (25.0)	6 (6.0)	
Outcome at discharge	Recovered without complications	80 (95.2)	12 (75.0)	92 (92.0)	0.008*
	Recovered with complications	4 (4.8)	3 (18.8)	7 (7.0)	
	Death	0 (0.0)	1 (6.2)	1 (1.0)	

Antidote administered	Yes	0 (0.0)	6 (37.5)	6 (6.0)	<0.001*
	No	84 (84.0)	10 (62.5)	94 (94.0)	
*Statistically significant at p<0.05					