

# Sociodemographic Characteristics and Risk Factors for Childhood Poisoning Reported by Parents at a Tertiary Care Teaching Hospital

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## Abstract

### Background

Childhood poisoning is a major health problem. Mostly, it is accidental and associated with low morbidity and mortality. The association between sociodemographic factors and childhood injury rates could be used for improvement to prevent and reduce such injuries. Childhood poisoning is preventable through appropriate education and judicious storage of drugs and household chemicals that might help in reducing and eliminating the accidental ingestion of toxic materials at home.

### Objectives

To recognize the potential risk factors that might be associated with childhood home poisoning in Riyadh City, Kingdom of Saudi Arabia.

### Design

A survey-based questionnaire study.

### Setting

A tertiary care teaching hospital in Riyadh City.

### Patients and methods

A structured questionnaire was created, which included questions on the poisoning incidence, home medication history, and possible risk factors for poisoning and the sociodemographic characteristics, and was disseminated to individuals who visited the King Khalid University Hospital.

### Main outcome measures

Demographic characteristics of participants and risk factors related to childhood poisoning.

### Results

The study included 152 randomly selected participants, 62 men (40.79%) and 90 women (59.21%). Self-ingestion was reported to be the most common mode of poisoning 28/44 (63.6%). The appearance of clinical manifestations suggesting poisoning was reported to be the most frequent method of discovery of children poisoning 20/44 (45.5%). Thirty-six out of the 44 respondents (81.8%) with a positive history of childhood poisoning in their family transferred their children to a hospital immediately. Drugs were the most common causative agent reported for poisoning among the respondents 21/44 (47.7%).

### Conclusion

Accidental and non-intentional self-ingestion still presents as a major mode of childhood home poisoning. Despite the significant advancement in the lifestyle among the majority of Saudi Arabian regions, especially the capital city Riyadh, childhood poisoning remains a significant cause of morbidity and possible mortality. Creating health education and prevention programs might help to prevent such serious preventable problems.

### Limitations

The limited number of participants may not reflect the whole population living in Riyadh City, hence, interpretation of the study results might be taken cautiously.

### Conflict of interest

There was no conflict of interest.

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**Keywords:** childhood injury, childhood poisoning, household chemicals, ingestion of toxic materials, cleaning materials, petrochemical materials, acute poisoning, drug intoxication, hydrocarbon ingestion, poisonous materials

## Introduction

Childhood poisoning still presents as a major health problem worldwide, which is mostly accidental and, fortunately, associated with low morbidity and mortality [1]. It is a significant cause of emergency department visits and hospital admissions [2]. Children aged <6 years are the most commonly affected age group, accounting for up to 60% of all cases of childhood poisoning [3]. The majority of childhood ingestions and poisoning occur at home [4].

The observed association between sociodemographic factors and childhood injury rates could be used for improvement aiming to prevent and/or reduce such injuries in general [5]. Many factors have been considered risk factors for childhood poisoning, including family stress, residential circumstances, number of family members, awareness of prevention methods, and socioeconomic status or child caregiver characteristics such as less proximal parental supervision or psychiatric distress [6]. Moreover, the types of poisoning and causative agents vary greatly among different areas worldwide. Recognizing the pattern and different sociodemographic factors implicated in childhood poisoning at the local and/or national levels might help in the strategic planning for children's healthcare services and protection programs to reduce the morbidities and mortalities from such incidents.

Childhood poisoning is preventable through appropriate education and judicious storage of drugs and household chemicals, which can serve to reduce the incidence of or eliminate accidental ingestion of toxic materials at home [7].

Several studies related to accidental childhood poisoning are readily available from different regions of the Kingdom of Saudi Arabia [8-11]. However, there are currently no available data regarding childhood poisoning pattern and prevention awareness in Riyadh City, Kingdom of Saudi Arabia.

This survey aimed to recognize the potential risk factors that might be associated with higher risks of childhood home poisoning in Riyadh City, Kingdom of Saudi Arabia.

## Materials And Methods

This questionnaire study was conducted at King Khalid University Hospital, King Saud University, Riyadh City, Kingdom of Saudi Arabia.

A questionnaire sheet was structured in Arabic language including the following queries: 1) sociodemographic data, including parents' age, educational status, and work; residential area; home type; number of family members; children caregiver; presence of a housemaid; economic status; marital status; social problems; and availability of a family physician; 2) home medication history, including presence of medications at home, medication type, storage place, secure closure, and accessibility for children; 3) other materials that are potential hazards for childhood poisoning; 4) awareness on preventing or managing childhood poisoning; and 5) incidence and possible risk factors for childhood home poisoning, mode of incidence, mode of discovery, and actions taken.

The study included 152 participants who visited the Pediatric Emergency and Outpatient Departments at King Khalid University Hospital, King Saud University Medical City, Riyadh City, Kingdom of Saudi Arabia for different reasons. The study objectives and confidentiality of the collected data were explained to participants, after which, a consent was obtained from those who agreed to participate.

## Statistical analysis

The collected questionnaire data were analyzed using the Statistical Package for the Social Sciences version 12.0 (SPSS Inc., Chicago, USA). Frequencies were calculated for qualitative data and means (Standard Deviations [SDs]) and medians for quantitative data. Paired t-test for quantitative data and Chi-squared test for qualitative data were used to assess the significances in the comparison of the different variables.

## Results

Table 1 shows the sociodemographic characteristics, home medication history, poisoning incidence, and possible risk factors among the respondents.

| Sociodemographic characteristics | Number | Percentage |
|----------------------------------|--------|------------|
| Total number of participants     | 152    |            |

|                               |             |        |
|-------------------------------|-------------|--------|
| Informant                     |             |        |
| Man                           | 62          | 40.79% |
| Woman                         | 90          | 59.21% |
| Marital status                |             |        |
| Married                       | 134         | 88.20% |
| Divorced                      | 4           | 2.60%  |
| Second wife                   | 14          | 9.20%  |
| Father's educational status   |             |        |
| Educated                      | 141         | 92.20% |
| Non-educated                  | 11          | 7.20%  |
| Father's work                 |             |        |
| Not working                   | 7           | 4.60%  |
| Employee                      | 134         | 87.60% |
| Free work                     | 11          | 7.20%  |
| Caregiver                     |             |        |
| Mother                        | 105         | 69.10% |
| Others*                       | 47          | 30.90% |
| Mother's educational status   |             |        |
| Educated                      | 84          | 54.60% |
| Non-educated                  | 68          | 44.40% |
| Housemaid                     |             |        |
| Yes                           | 69          | 45.40% |
| No                            | 83          | 54.60% |
| Mother's work                 |             |        |
| Housewife                     | 109         | 71.20% |
| Employee                      | 43          | 28.80% |
| Number of family members      |             |        |
| mean (SD)                     | 7.46 (3.45) |        |
| Residence                     |             |        |
| Urban                         | 139         | 91.40% |
| Rural                         | 13          | 8.60%  |
| Number of children per family |             |        |
| mean (SD)                     | 4.33 (2.88) |        |
| Home type                     |             |        |
| Apartment                     | 76          | 50%    |
| Villa                         | 64          | 42.10% |
| Popular                       | 12          | 7.90%  |
| Economic status               |             |        |
| Poor                          | 15          | 9.90%  |

|   |              |        |
|---|--------------|--------|
| Good  | 119          | 78.30% |
| Excellent                                   | 18           | 11.80% |
| Father's age (years)                        |              |        |
| mean (SD)                                   | 39.16 (9.56) |        |
| Mother's age (years)                        |              |        |
| mean (SD)                                   | 32.11 (7.55) |        |
| Awareness of first aid measures             |              |        |
| Yes   | 7            | 4.60%  |
| No  | 145          | 95.40% |
| Poisoning incidence                         |              |        |
| Occurrence                                  |              |        |
| Yes   | 44/152       | 28.90% |
| No  | 108/152      | 71.10% |
| Children age (years) at poisoning incidence |              |        |
| mean (SD)                                   | 3.29 (2.22)  |        |
| Mode of ingestion                           |              |        |
| Self-ingestion                              | 28/44        | 63.60% |
| Accidental ingestion                        | 13/44        | 29.60% |
| Non-accidental ingestion                    | 3/44         | 6.80%  |
| Discovery                                   |              |        |
| Manifested                                  | 20/44        | 45.50% |
| Witnessed                                   | 5/22         | 22.70% |
| Informed                                    | 10/44        | 20.50% |
| Accidental                                  | 5/44         | 11.40% |
| Action taken                                |              |        |
| Hospital transfer                           | 36/44        | 81.80% |
| First aid measures                          | 7/44         | 15.90% |
| No action                                   | 1/44         | 2.30%  |
| Home medication history                     |              |        |
| Presence                                    |              |        |
| Yes   | 130          | 85.50% |
| No  | 22           | 14.50% |
| Forms**                                     |              |        |
| Pills                                       | 82           | 53.90% |
| Syrups                                      | 68           | 44.70% |
| Capsules                                    | 2            | 1.30%  |
| Storage place                               |              |        |
| Refrigerator                                | 65           | 42.50% |
| Pharmacy                                    | 64           | 41.80% |
| Other place                                 | 22           | 14.40% |

|  |     |        |
|--|-----|--------|
| Accessibility to kids                    |     |        |
| Yes                                      | 76  | 50%    |
| No                                       | 76  | 50%    |
| Secure closure                           |     |        |
| Yes                                      | 67  | 43.80% |
| No                                       | 85  | 55.60% |
| Possible risk factors                    |     |        |
| Social problems                          |     |        |
| Yes                                      | 24  | 15.70% |
| No                                       | 128 | 83.70% |
| Large number of family members***        |     |        |
| Yes                                      | 22  | 14.40% |
| No                                       | 130 | 85.52% |
| Children cared for by the in-house Nanny |     |        |
| Yes                                      | 15  | 9.80%  |
| No                                       | 137 | 89.50% |
| Is your child hyperactive?               |     |        |
| Yes                                      | 31  | 20.30% |
| No                                       | 121 | 79.10% |

**TABLE 1: Sociodemographic and studied characteristics of respondents**

\* Grandmother or father; \*\* More than one form of medicine might be present at the same time; \*\*\* More than five members

The study included 152 participants who responded to the questionnaire and provided their consent, 62 men (40.79%) and 90 women (59.21%). Among the respondents, the fathers' mean (SD) age was 39.16 (9.56) years, while the mothers' mean (SD) age was 32.11 (7.55) years. 28.90% reported the occurrence of poisoning among their children. Furthermore, self-ingestion was reported to be the most common mode of poisoning 28/44 (63.6%), followed by accidental ingestion 3/44 (29.6%) and non-accidental ingestion 3/44 (6.8%). Discovery of children poisoning was reported to be through the appearance of clinical manifestations suggesting poisoning 20/44 (45.5%), followed by witnessed ingestion 10/44 (22.7%), informed ingestion either by the child or another individual 9/44 (20.5%), and accidental discovery 5/44 (11.4%). Further, 36/44 (81.8%) of the respondents with a positive history of children's poisoning in their family transferred their poisoned child to a hospital; 7/44 (15.9%) performed first aid measures at home; and only 1/44 (2.3%) did not take any action.

Table 2 shows the comparison of the different studied variables in relation to the incidence of poisoning. Family history of childhood poisoning was positive in 44/152 (28.9%) of the respondents. Housewives (mothers) reported a significantly higher incidence of children poisoning than the employees: 33.9% vs. 16.3% respectively; P = .02. Moreover, respondents with a positive family history of children poisoning significantly reported a large number of family members, hyperactive children, and mouthing habits, as a claimed risk factors for poisoning (65.9%), (23.6%), and (65.9%) respectively; P was .000 for all. No significant differences were found regarding the other studied variables.

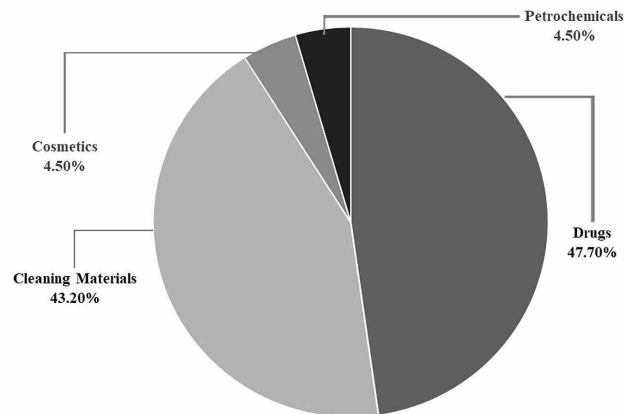
| Studied variables           | Incidence of poisoning |            |              |            | P-value † |
|-----------------------------|------------------------|------------|--------------|------------|-----------|
|                             | No (n = 108)           |            | Yes (n = 44) |            |           |
|                             | Number                 | Percentage | Number       | Percentage |           |
| Mother's educational status |                        |            |              |            |           |

|                                    |     |       |    |       |       |
|------------------------------------|-----|-------|----|-------|-------|
| Educated                           | 48  | 70.6% | 20 | 29.4% | 0.52  |
| Not educated                       | 60  | 71.4% | 24 | 28.6% |       |
| Mother's work                      |     |       |    |       |       |
| Housewife                          | 72  | 66.1% | 37 | 33.9% | 0.022 |
| Employee                           | 36  | 83.7% | 7  | 16.3% |       |
| Housemaid:                         |     |       |    |       |       |
| Yes                                | 47  | 68.1% | 22 | 31.9% | 0.291 |
| No                                 | 61  | 73.5% | 22 | 26.5% |       |
| Caregiver:                         |     |       |    |       |       |
| Mother                             | 78  | 74.3% | 27 | 25.7% | 0.132 |
| Others                             | 30  | 63.8% | 17 | 36.2% |       |
| Home area:                         |     |       |    |       |       |
| Urban                              | 98  | 70.5% | 41 | 29.5% | 0.449 |
| Rural                              | 10  | 76.9% | 3  | 23.1% |       |
| Having a family physician          |     |       |    |       |       |
| Yes                                | 27  | 79.4% | 7  | 20.6% | 0.157 |
| No                                 | 81  | 68.6% | 37 | 31.4% |       |
| Economic status                    |     |       |    |       |       |
| Poor                               | 11  | 73.3% | 4  | 26.7% | 0.111 |
| Fair                               | 88  | 73.9% | 31 | 26.1% |       |
| Excellent                          | 9   | 50.0% | 9  | 50.0% |       |
| Marital status                     |     |       |    |       |       |
| Married                            | 96  | 71.6% | 38 | 28.4% | 0.833 |
| Divorced                           | 3   | 75.0% | 1  | 25.0% |       |
| Second wife                        | 9   | 64.3% | 5  | 35.7% |       |
| Claimed risk factors for poisoning |     |       |    |       |       |
| Large number of family members**   |     |       |    |       |       |
| Yes                                | 6   | 5.5%  | 29 | 65.9% | 0.000 |
| No                                 | 102 | 94.5% | 15 | 34.1% |       |
| Hyperactive child                  |     |       |    |       |       |
| Yes                                | 14  | 12.9% | 28 | 63.6% | 0.000 |
| No                                 | 94  | 87.1% | 16 | 36.4% |       |
| Mouthing                           |     |       |    |       |       |
| Yes                                | 10  | 9.3%  | 29 | 65.9% | 0.000 |
| No                                 | 98  | 90.7% | 15 | 34.1% |       |

**TABLE 2: Bivariate analysis of the respondents' characteristics in relation to incidence of poisoning**

\* P-value significant <0.05; \*\* More than five family members

Figure 1 shows the causative materials for poisoning among the studied participants. Medications were the most common causative agent reported for poisoning 21/44 (47.7%), followed by cleaning materials 19/44 (43.2%), and cosmetics 2/44 (4.5%), and lastly petrochemical materials 2/44 (4.5%).



**FIGURE 1: Causative materials for poisoning among the studied participants**

## Discussion

Acute poisoning is one of the preventable causes of morbidity and mortality in children and still presents as a worldwide health problem considering the variability in the nature and type of poison consumed owing to variable accessibility and sociodemographic characteristics [12].

The current study showed that 44/152 (28.9%) of the respondents reported childhood poisoning in their family. This finding is comparable to those of another study in which admissions for accidental children home poisoning in a main hospital in Riyadh City accounted for 5.6% of the total annual admissions [8]. Moreover, Al Hazmi also reported an incidence of childhood drug intoxication of 7.4% in the pediatric medical ward and intensive care unit of a healthcare facility at Jeddah, Kingdom of Saudi Arabia during a period of two years (1994-1996) [13]. Furthermore, another study reported that the incidence of accidental childhood poisoning over a period of seven years (1992-1998) was 1.7% in Hafr Al Batin City, Kingdom of Saudi Arabia [14].

Our findings reflect the diversity of populations visiting King Khalid University Hospital and living in Riyadh City. However, such results cannot represent the exact incidence of childhood poisoning among the overall habitants of Riyadh City. Furthermore, there is no data registry for childhood poisoning in Riyadh City, which might highlight the need for regional or national programs for childhood poisoning.

The mean (SD) age of children with a history of poisoning in the current study was 3.29 (2.22) years. Conversely, Al Hazmi reported that the 2-5-year age group (61%) had a higher incidence of poisoning than the 0-2-year (27%), 5-10-year (9%), and 10-12-year age groups (3%) [13]. Moreover, another study from Saudi Arabia reported that 63% of the studied poisoned children were at the age of 1 to 5 years [14]. However, poisoning can occur in children younger than one year when the infants' ability to explore is limited by their mobility or in children older than five years presumably because these children are becoming more discriminative and selective on what they swallow.

The current study found no sex preponderance for poisoning among the respondents who reported a positive family history of children's poisoning. Such findings are similar to those of another study that reported no sex difference regarding childhood poisoning [12]. However, some reports have documented male sex preponderance in childhood poisoning [15,16]. Moreover, a male-to-female sex ratio of 1.4:1 among children younger than 10 years and 3:1 among those aged 10-12 years was reported [13]. It is possible that under the age of five years, both boys and girls tend to have similar characteristics and behavioral patterns. Such variations might be explained by the differences in the sociodemographic characteristics of different communities.

Studies from different regions within the Kingdom of Saudi Arabia have reported variations in the causative agent for childhood poisoning. In the current study, medications were the most frequently reported causative agent for childhood poisoning among the studied respondents (48.8%), followed by cleaning

materials (43.2%) and cosmetics and petrochemicals (each 4.5%). These findings are similar to those of other studies from different regions within the Kingdom of Saudi Arabia [8,11]. Similar studies from other countries have also reported drugs to be the most common causative agent [12,15]. Conversely, other studies have shown that hydrocarbon ingestion accounted for the highest proportion of poisonings (40%), followed by drug (34.3%) and household chemical ingestion (16%) [10,13].

Furthermore, significant variations in the type and nature of consumed poisons among developed and underdeveloped countries exist. Moreover, the availability and accessibility of potential poisonous materials, including pharmaceuticals and medication prescriptions, vary with variations in demography, education, awareness, social beliefs and habits, and socioeconomic status of families [12].

Such differences might be attributed to the variations in the commonly used household products, easy availability of medications over the counter in some countries, and differences in the awareness on the proper storage of such potentially risky materials for childhood poisoning among caregivers and families.

Another possible factor is that medications can be easily found inside homes in the Kingdom of Saudi Arabia because drugs can be purchased over the counter, and more medications might be prescribed with the possibility of multiple physician visits for the same illness. This highlights the importance of more regulations and restrictions of medications release by pharmacies, which may reduce children's easy access to medications at home.

In the current study, self-ingestion of poisonous materials was the most predominant method of poisoning, followed by accidental and non-accidental methods. Such findings are comparable to those of another study that reported childhood poisoning as accidental in the majority of their cases with occasional suicidal cases in adolescents [12]. Similarly, non-intentional poisoning was reported to be common among children [17].

The clinical manifestations and consequently the possible discovery of poisoning might depend on many factors, such as the type, nature, amount, and toxic effects of the causative agent. Another factor might be whether the event of ingestion of the child was witnessed or seen by another individual who might inform the caregivers. In the current study, the appearance of clinical manifestations suggesting poisoning was the most frequently reported method of poisoning discovery. These results are comparable to those of a previous study in which the clinical manifestations of poisoning were reported as a predominant key for poisoning recognition [12].

In the current study, the majority of respondents reported transferring their poisoned children to a hospital with the recognition of their poisoning. This finding is similar to those of another study [18]. Conversely, these findings are in contrast to those of another study that reported that only 20% of poisoned children were presented to a health care facility emergency within one hour [12]. The differences might be attributed to the geographic location of the patients and the availability of health care facilities in their areas. Another factor that might be considered is the poisoned child's clinical status and symptomatology of the poison, as the asymptomatic or mild cases might not be inciting factor pushing the caregiver to transfer the child seeking medical advice. More educational campaigns about childhood poisoning and management are warranted, as a research from Saudi Arabia showed that raising awareness among parents could reduce the risks posed to vulnerable children [19].

## Limitations

Our study had a limited number of participants, which may not reflect the whole population living in different regions of Riyadh City. Hence, interpretation of the study results may not represent the different regions of the city. Another fact to observe is that the Arabic survey could have missed some non-Arabic participants presented to this hospital. A potential area for future research is to compare these results after the COVID-19 crisis with home-schooling and quarantine effect on poisoning among children.

## Conclusions

Our questionnaire survey revealed that accidental and non-intentional self-ingestion still presents as a major cause of childhood home poisoning. Despite the significant advancement in the life style among the majority of Saudi Arabian regions, especially the capital city, Riyadh, childhood poisoning is still a significant cause of morbidity and possible mortality. Creating health education and prevention programs might help prevent such a potentially serious preventable problem.

Nationwide studies are highly recommended to clarify more about the current incidence and potential risk factors for childhood poisoning. Furthermore, more utilization for the different channels for education on childhood safety might help reduce the incidence of such serious problems.

## Additional Information

### Disclosures



**Human subjects:** Consent was obtained or waived by all participants in this study. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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## References

- Chien C, Marriott JL, Ashby K, Ozanne-Smith J: Unintentional ingestion of over the counter medications in children less than 5 years old. *J Paediatr Child Health*. 2003, 39:264-9. [10.1046/j.1440-1754.2003.00148.x](https://doi.org/10.1046/j.1440-1754.2003.00148.x)
- Woolf AD, Lovejoy FH Jr: Epidemiology of drug overdose in children. *Drug Saf*. 1993, 9:291-308. [10.2165/00002018-199309040-00007](https://doi.org/10.2165/00002018-199309040-00007)
- Yates KM: Accidental poisoning in New Zealand. *Emerg Med Australas*. 2003, 15:244-9. [10.1046/j.1442-2026.2003.00443.x](https://doi.org/10.1046/j.1442-2026.2003.00443.x)
- Balit CR, Isbister GK, Peat J, Dawson AH, Whyte JM: Paracetamol recall: a natural experiment influencing analgesic poisoning. *Med J Aust*. 2002, 176:162-5. [10.5694/j.1326-5377.2002.tb04346.x](https://doi.org/10.5694/j.1326-5377.2002.tb04346.x)
- Bjarne L, Jeppe WN: Influence of sociodemographic factors on the risk of unintentional childhood home injuries. *Eur J Public Health*. 2008, 18:366-70. [10.1093/eurpub/ckn034](https://doi.org/10.1093/eurpub/ckn034)
- Schmertmann M, Williamson A, Black D, Wilson L: Risk factors for unintentional poisoning in children aged 1-5 years in NSW Australia: a case-control study. *BMC Pediatr*. 2013, 13:10.1186/1471-2431-13-88
- Lovejoy FH Jr, Robertson WO, Wolf AD: Poisoning prevention and the pediatrician. *Pediatrics*. 1994, 94:220-4.
- Mahdi AH, Taha SA, Al-Rifai MR: Epidemiology of accidental home poisoning in Riyadh (Saudi Arabia). *J Epidemiol Community Health*. 1983, 37:291-5. [10.1136/jech.37.4.291](https://doi.org/10.1136/jech.37.4.291)
- Khalil AHA: Accidental poisoning in Saudi children seen at Riyadh Al-Kharj Military Hospitals. *Saudi Med J*. 1986, 7:613-7.
- El Mouzan MI, Elajeb A, Ali NK: Accidental poisoning in children in the Eastern Province. *Saudi Med J*. 1986, 7:231-7.
- Al Hifze IS, Koman P, Talol W: Hospitalization due to acute poisoning in children: Tabouk experience. *J Family Community Med*. 1995, 2:27-30.
- Randev S, Grover N, Sharma R, Sharma H: Acute poisoning in children: seven-year experience at a tertiary care hospital of north India. *Curr Pediatr Res*. 2011, 15:65-8.
- Al Hazmi AM: Patterns of accidental poisoning in children in Jeddah, Saudi Arabia. *Ann Saudi Med*. 1998, 18:5. [10.5144/0256-4947.1998.457](https://doi.org/10.5144/0256-4947.1998.457)
- Izuora GI, Adeoye A: A seven-year review of accidental poisoning in children at a military hospital in Hafr Al Batin, Saudi Arabia. *Ann Saudi Med*. 2011, 21:13-5. [10.5144/0256-4947.2001.13](https://doi.org/10.5144/0256-4947.2001.13)
- Oguche S, Bukbuk DN, Watila IM: Pattern of hospital admissions of children with poisoning in the Sudano-Sahelian North Eastern Nigeria. *Niger J Clin Pract*. 2007, 10:111-5.
- Kohli U, Kuttat VS, Lodha R, Kabra SK: Profile of childhood poisoning at a tertiary care centre in North India. *Indian J Pediatr*. 2008, 75:791-4. [10.1007/s12098-008-0105-7](https://doi.org/10.1007/s12098-008-0105-7)
- Gupta SK, Peshin SS, Srivastava A, Kaleekal T: A study of childhood poisoning at National Poisons Information Centre, All India Institute of Medical Sciences, New Delhi. *J Occup Health*. 2003, 45:191-6. [10.1539/joh.45.191](https://doi.org/10.1539/joh.45.191)
- Bataineh HA, Bataineh AM: Childhood accidental poisoning in Tafila. *Iran J Ped*. 2007 March, 17:1.
- Al-Zahrani MA, Tamsah MH, Al-Sohime F, et al.: Self-reported unintentional injuries in families visiting the 'Childhood Safety Campaign' in Saudi Arabia. *Egypt J Hosp Med*. 2018, 71:2280-6. [10.12816/0045304](https://doi.org/10.12816/0045304)