

## A SEVEN-YEAR REVIEW OF ACCIDENTAL POISONING IN CHILDREN AT A MILITARY HOSPITAL IN HAFR AL BATIN, SAUDI ARABIA

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**Background:** Accidental ingestion of poisons and household products is a potential source of morbidity and mortality in children all over the world. The relative paucity of publications on this subject in Saudi Arabia necessitated our study, to delineate the pattern of acute poisoning in children at the King Khalid Military City Hospital, Hafr Al Batin.

**Patients and Methods:** Case notes of children 12 years and below who were admitted to the pediatric medical ward were retrospectively reviewed for relevant data. Included in the study were children of military and non-military personnel who were seen over a seven-year period (January 1992 to 1998).

**Results:** Of the 9951 single pediatric admissions, 168 (1.7%) were identified as cases of accidental poisoning. There was a male preponderance, even though this was not statistically significant. The age group mostly affected was 1 to 3 years (63%). More than 60% of children were asymptomatic, with 4% presenting with severe symptoms. Unlike in other parts of Saudi Arabia, poisoning due to petroleum products was relatively uncommon.

**Conclusion:** Although no deaths were recorded in this study, continuous education of parents and caregivers of young children is recommended, as this would help to reduce the chances and complications of accidental poisoning. The role of local and regional Drug Information Centers cannot be overemphasized.

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**Key Words:** Accident, poisoning.

Accidental ingestion of poisons and household substances is a potential source of morbidity and mortality in children all over the world.<sup>1,2</sup> Whereas this ingestion can be accidental, non-accidental or iatrogenic in young children, it is usually deliberate among older children, especially in industrialized countries.<sup>3</sup> Most frequently, the ingested substances are taken accidentally. The ingested substances can be classified into drugs (prescribed and non-prescribed), household products and plants. Their degree of toxicity may be low, intermediate, or potentially toxic.

There are only a few publications on accidental poisoning among children in the Kingdom of Saudi Arabia.<sup>4-7</sup> This retrospective review aims to document the pattern of childhood poisoning at the King Khalid Military City Hospital (KKMCH), Hafr Al Batin, and to compare the results with studies from other parts of Saudi Arabia.

### Subjects and Methods

A retrospective review was conducted for children 12 years and below, who were admitted to the pediatric

Accepted for publication 2 January 2001. Received 5 April 2000. medical ward through the Emergency Room (ER). These included children of military and non-military personnel who were resident in Hafr Al Batin, which has modern infrastructural and housing facilities. Except for a very few doubtful cases, all the children seen at the ER were admitted to the ward for care or observation due to lack of space in the ER.

The review of case notes covered the period from January 1992 to December 1998. Information was recorded as to age and sex of the children, type of poisoning, and time of presentation in the ER. As well, the complications, outcome and duration of stay in hospital were documented. The monthly, seasonal and yearly variations in occurrence were also noted.

Management depended essentially on the nature and quantity of ingested poison, the time interval before presentation at the ER, and potential toxic effects. This culminated in the resuscitation of the patient, confirmation of the diagnosis and where indicated, removal of poison and administration of antidote.

### Results

Of the 9951 single admissions in the pediatric ward, 168 (1.7%) were identified as cases of accidental poisoning. There were 90 males and 78 females, giving a

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male to female ratio of 1.2:1. Figure 1 shows the age ranges of children involved. By far, the majority of children were

TABLE 1. Summary of the types of poisons.

Poisoning agent	No. of cases
<b>Drugs</b>	
Analgesics and anti-inflammatories	23
Antiemetics, laxatives	18
Anticholinergics, antitussives	16
Vitamins, appetizers	9
Contraceptives	8
Antibiotics	6
Antiepileptics	5
Cardiovascular	3
Unidentified	20
<b>Subtotal</b>	<b>108 (64.3%)</b>
<b>Household products</b>	
Chlorine bleach (Chlorox)	11
Petroleum products	9
Pesticides	9
Disinfectants	5
Washing lotion	4
Super glue	3
Lubricating lotion	2
Paint thinner	1
Unidentified	16
<b>Subtotal</b>	<b>60 (35.7%)</b>

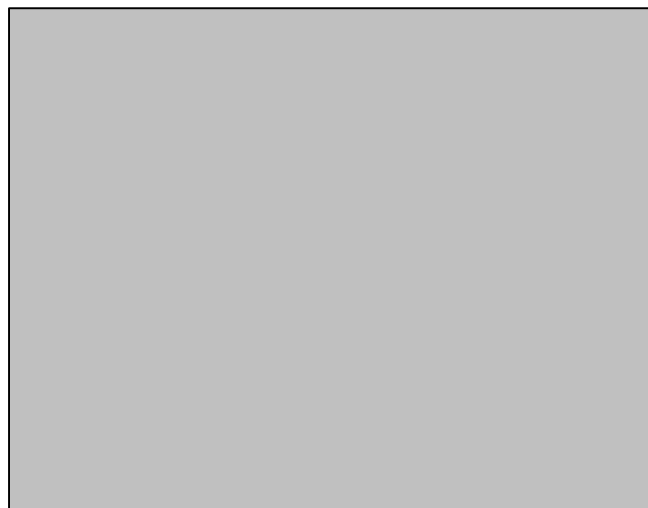


FIGURE 1. Age distribution of children with accidental poisoning.

between 1 to 3 years (106 or 63%), with only 16 (10%) below 1 year and 46 (27%) above the age of 3 years. Table 1 gives a summary of the types of poisons ingested. Drugs accounted for 108 cases (64.3%) and other household substances accounted for 60 (35.7%). There was no case of plant poisoning.

More than 60% of the children were asymptomatic or not documented as having any severe symptoms. The most common symptoms and signs included drowsiness, abdominal pain, irritability, jitteriness, hypotension, tachycardia and tachypnea. More serious complications were observed in children with lipid pneumonia following

kerosene ingestion. Others included six children with marked extrapyramidal reactions or convulsions after ingestion of antiemetics and a case with severe convulsions and coma, following accidental ingestion of organophosphates. No deaths were recorded.

Regarding the time of presentation at the ER or admission to the ward, 86 of the children (51.2%) were admitted between 6 pm and midnight, and 52 (30.9%) between noon and 6 pm. Only 30 children (17.9%) were admitted between midnight and 6 am and in the late morning hours.

Of the children admitted to the ward, 112 (66.7%) were discharged within 24 hours of admission, 35 (20.8%) within two days and 17 (10.1%) after three days. One of the four children whose hospital stay lasted beyond 4 days had organic phosphate poisoning, and the other three had ingested kerosene.

There were some variations in the seasonal totals in cases of acute poisoning over the seven-year period. More admissions were made during the summer and autumn months (100 or 59.5%) than in winter and spring (68 or 40.5%). Similarly, there were some differences in the annual totals over the period of review. There was a relatively higher incidence of 45 (26.7%) in the immediate post-Gulf War period (1992) when compared to the following six years. In 1998, the relative incidence was just 25% of the 1992 value.

## Discussion

The present retrospective study shows that accidental poisoning in children is an important health problem, constituting about 1.7% of the total number of admissions to the pediatric ward over a 7-year period. This value is lower than those obtained from four previous hospital-based studies,<sup>4-7</sup> although the few doubtful and asymptomatic cases discharged from our ER were not included in the study. Despite the limitations on the issue of incidence and severity of problems in the general population, a trend appears to have emerged from the present study.

The preponderance of male to female patients in the ratio of 1.2:1 is in line with most studies,<sup>4,6,7</sup> although this is not statistically significant. Similarly, the involvement of children in the age groups 1 to 3 years agrees with findings worldwide.<sup>3-7</sup> In this age range, children are curious and often explorative in behavior. In some older children, hyperactivity predisposes to poisoning at home, whereas among toddlers, almost every substance, e.g., tablets, is thrown into the mouth. In some cases, it is not unlikely that parents or caregivers may have administered these medications in error, although there was no supporting information in our cases. Also, there was no case of deliberate poisoning in our study in view of the age ranges involved, and also due to the rarity of this behavioral pattern in this part of the world.

Unlike in some developing countries, where ingestion of household products and assorted toxic plants constitutes the major cause of accidental poisoning,<sup>8,12</sup> drugs were a major problem in this review, similar to findings in other studies in Saudi Arabia.<sup>4,5,7</sup> Some of the reasons this would be so in this locality include the dispensing of drugs in envelopes, instead of child-resistant containers, increased affluence, free medical treatment and easy access to drugs. However, it must always be stressed that careless storage of drugs is a very important factor.

With regard to poisoning due to household products, Chlorox<sup>®</sup> (Chlorine bleach) was the most commonly incriminated product in 18% of the cases. Others are pesticides (15%), and petroleum products (15%). The low incidence of petroleum poisoning in KKMCH is in sharp contrast to other studies in Saudi Arabia, where the incidence varied from 41%-57%.<sup>4,6,7</sup> This may be essentially due to the excellent infrastructure and housing facilities in the Military City, which makes the use of kerosene heaters and burners unnecessary.

Despite the small number of cases in this study and the relatively low prevalence when compared with other centers in Saudi Arabia, the pattern of accidental poisoning here appears similar in many respects. With regard to severity, most of the poisoning in children in this study required mainly observation and noninvasive treatment, similar to results in an Australian study.<sup>13</sup> However, the potential dangers of accidental poisoning in childhood cannot be underestimated.

Prompt and effective countermeasures, e.g., gastric lavage, induction of emesis, *in situ* adsorption of the poison, antidosis and catharsis, can prevent mortality. The most effective emergency treatment options are induction of emesis and adsorption of the poison. For emesis, ipecac syrup is the most reliable and safest drug of choice. It contains emetine, which induces emesis by a combined local irritant effect on the gastrointestinal tract and central medullary stimulation of the chemoreceptor trigger zone. However, emesis is not recommended for children under six months of age, or for patients who ingested poisons that can lower the level of consciousness (e.g., calcium channel blockers,  $\beta$ -blockers, and digoxin). Adsorbents, e.g., charcoal, are useful to bind toxic substances and hinder their absorption. This intervention must be done within one hour to prevent up to 75% of the toxin from being absorbed. The recommended standard dose is 1 g/kg body weight, given as slurry with water and flavored with chocolate or orange syrup. In a recent US study,<sup>14</sup> the recommended sole agent for intervention in accidental poisoning in children was activated charcoal. Ipecac syrup should not be used simultaneously with activated charcoal, as it may impair the efficacy of activated charcoal and other oral antidotes.

Alternatively, osmotic agents such as magnesium citrate or sorbitol can be used to induce catharsis in children

who are more than one year old. In specific cases of acute poisoning where the toxin is known, it is imperative to contact the Drug and Poison Information Center (DPIC), which can aid the identification of the ingested poisons and thus facilitate physician intervention.

On the whole, there appears to have been a downward trend in the incidence of poisoning over the 7-year study period. Whether this was due to routine health education at the various primary health centers (PHC) in the city or due to resumption of more regulated family life after the Gulf War cannot be ascertained. Although no deaths were documented in this study, continuing education of parents and caregivers is recommended to help reduce the chances and complications of accidental poisoning. With regard to management, the importance of local and regional Drug and Poison Information Centers cannot be overemphasized.

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### References

1. Walton WW. An evaluation of poisoning prevention packing. *Acta Paed* 1982;69:363-70.
2. Lawson GR, Craft AW, Jackson RH. Changing patterns of poisoning in children in Newcastle, 1974-1981. *BMJ* 1983;37:291-5.
3. Sibert J, Davies PA. Poisoning, accidents and sudden infant death syndrome. In: Campbell AGM, McIntosh M, editors. *Forfar and Arneil's Textbook of Paediatrics*. 4th edition. London: Churchill Livingstone, 1992:1777-1800.
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.
5. Al Karim Khalil MA. Accidental poisoning in Saudi children seen in Riyadh Al-Kharj Military Hospital. *Saudi Med J* 1986;7:613-7.
6. El-Mouzan MI, Elageb A, Ali NK. Accidental poisoning of children in the Eastern Province. *Saudi Med J* 1986;7:231-6.
7. Al-Sekait MA. Epidemiology of accidental poisoning of children in Riyadh, Saudi Arabia. *Ann Saudi Med* 1990;10:276-9.
8. Basavaraj DS, Forster DP. Accidental poisoning in young children. *J Epidemiol Community Health* 1982;36:31-4.
9. Fagbule D, Ojuawo A. Accidental childhood poisoning in Ilorin, Nigeria. *J Paed* 1986;13:21-5.
10. Fraser NC. Accidental poisoning in British children. *BMJ* 1980;284:1595-8.
11. Deeths TM, Breeden JT. Poisoning in children: a statistical study of 1057 cases. *J Pediatr* 1978;2:299-305.
12. Al Sadoon I, Yacoub A, Abdul-Karim M. Accidental poisoning among children in Basrah. *J Fac Med (Baghdad)* 1988;30:105-12.
13. Proimos J, Barnett P, Tibballs J. Poisoning in childhood. *Mod Med (Middle East)* 1997;12:58-66.
14. Liebelt EL, De Angelis CD. Evolving trends and treatment advances in pediatric poisoning. *JAMA* 1999;282:1113-5.