

## Editorial

# Accidental childhood poisoning and the environment

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Accidental poisoning of a child is a complex interaction between the child, a hazardous substance and certain environmental situations<sup>1</sup>.

### **The child**

In all societies where statistics have been compiled, the 2 and 3 year old children account for over half of all reported poisonings, 80-90% of them being under the age of 5 years<sup>2,3,4,5</sup>.

Characteristically children who are poisoned are more likely to be impulsive and overactive and are discipline problems for their parents. Not infrequently the parent-child relationship is disturbed<sup>1</sup>. Children are particularly prone to accidental poisoning when the usual family patterns are interrupted, during such episodes as moving, pregnancy, illness, death, marital problems or visiting another home<sup>1</sup>.

More than half the time, the child ingests a toxic agent that is in his clear view. A child tends to react to his environment impulsively, seeking what he wants when he wants it<sup>1</sup>. A toddler may not be innocent or ignorant when he secretively gobbles down a bottle of paracetamol syrup or samples granules of caustic detergent; however he is certainly ignorant of the consequences<sup>1</sup>.

In many instances the possibility of poisoning is related to the developmental patterns of the child<sup>1</sup>. The 6 month old will put anything in his mouth. A 1-2 year old will empty cupboards, particularly low ones, and experimentally taste most things. The 3 year old child is adventurous and has virtual access to any unlocked drawer or cupboard in the home. All challenges are accepted in impulsive or ingenious ways<sup>1</sup>. Towards the end of the third year of life and by the age of 4, the number of accidental ingestions start to decline despite an increase in motor ability. The 4 year old child tends to be more selective in what he ingests, preferring those things that taste good including flavoured children's paracetamol, vitamins and candy coated tablets<sup>1</sup>.

To prevent poisoning, programmes must be developed that will completely protect the child aged 3 and under. When he is approaching age 4 he will, if he is taught, understand simple safety rules and have

enough good sense not to eat or sample everything that he comes across in the home. From the age of 4 on, self-control through education is the primary deterrent to poisoning<sup>1</sup>.

Parents should strive for complete and instant obedience to rules of safety early in the child's life. Rules of obedience offer a form of guidance that a child must have to grow up free from serious injury. It is much better to go through life with a questionably scarred ego than a very real scarred oesophagus which will require a lifetime of repeated dilatations<sup>1</sup>.

### **The hazardous substance**

Most poisonings in children are from ingestion of toxic substances in the home, stored in accessible places<sup>2,3,4,5</sup>. In industrialized countries such as Germany, France, Italy, United States, England and Canada the average home contains over 30 containers of medications<sup>6</sup>. Thus, it is not surprising that in those countries the most common substances reported in accidental poisonings are medications. In New Zealand, agricultural chemicals are a prominent cause of accidental poisoning<sup>1</sup>. In India and Sri Lanka kerosene is a principal toxin<sup>2,3</sup>. In one study in India kerosene accounted for 60% of poisoning<sup>2</sup>.

Kerosene oil ingestion was the leading cause of poisoning in Sri Lankan children, accounting for 35% of the total<sup>3,7</sup>. The frequency of kerosene oil poisoning can be attributed to several factors<sup>7</sup>. Firstly, kerosene oil is stored in almost every home. It is stored in bottle lamps, plastic cans, miscellaneous bottles, barrels, tins, cups and coconut shells. Secondly, kerosene oil containers are often kept in easily accessible places such as the kitchen floor, a low table or a low shelf. Thirdly, kerosene containers are hardly ever stoppered. Fourthly, due to its blue colour, children often mistake kerosene oil for bottled soft drinks<sup>7</sup>.

In addition to kerosene oil there is a plethora of potential toxins in the home which are a ready source of potentially toxic material for ingestion by young children<sup>2,3,4</sup>. Agrochemicals especially, are either stored within the house or in garages and are easily accessible to children<sup>2,3</sup>.

Anticonvulsants and psychiatric drugs are usually prescribed on a fortnightly or monthly basis and as a result are available in bulk in the house. Furthermore, children see adults taking these drugs on a regular basis and tend to imitate them. Thus, it is not surprising that these drugs are so frequently ingested by children<sup>3</sup>. People have a habit of throwing unused tablets on to the garden or road. Some children in my series were poisoned due to ingestion of these tablets<sup>3</sup>. It is not certain whether colouring and sugar coating play a decisive role in accidental poisoning. However, it is unwise to add attractions to tablets known to be harmful. For instance, in my series, a toddler had ingested 20 paracetamol tablets of the lozenge type<sup>3</sup>. A sweet taste, in fact, may be more dangerous than colour. Drugs for local application such as surgical spirits, cetrimide lotion, camphor oil, methyl salicylate lotion and calamine lotion were often dispensed at outpatient departments of government hospitals into containers brought by parents and no labelling whatsoever had been done. At home these unlabelled containers were often kept alongside the baby's cough syrup or gripe water bottle on the same shelf or table<sup>3</sup>. It is thus not surprising that these substances were mistakenly administered to the child by an adult.

Although ingestion of poisonous plants accounted for only 10% of childhood poisoning overall, they accounted for 55% of poisoning by school children in my series<sup>3</sup>. Of the poisonous plants ingested the commonest were 'weta endaru' and 'beheth endaru', which together accounted for 43% of cases<sup>8</sup>. These plants along with yellow oleander are commonly found in roadside hedges and are thus freely accessible to children<sup>8</sup>. Plants of the Habarala variety are found in the home garden<sup>8</sup>. The close resemblance of Hondala fruit to passion fruit and the Niyangala tuber to sweet potato (bathala) is responsible for accidental poisoning among children<sup>8</sup>. Poisonous species of mushroom grow wherever edible varieties are to be found and bear some resemblance to each other making mistaken identification common<sup>8</sup>.

Whilst emphasis in most reported accidental childhood poisonings is on ingestion of solids and liquids, inhalation of poisonous gases, fumes and smoke also produces poisoning<sup>9</sup>. The most common offender is carbon monoxide, which may arise from a defective auto exhaust system or a smouldering fire in a confined area. More than one child allowed to sleep on the back seat of an automobile have been poisoned from carbon monoxide seeping into a running automobile from a defective muffler<sup>9</sup>.

## Environmental factors

A number of environmental factors interrelate with the child and the hazardous substance to end up with poisoning; they include such things as time of day, relationship to meals, whether product is in or out of sight, recent experience with substance, family stress and parental attitudes toward the toxin<sup>1</sup>. There is a common belief among the general public and professionals that careless storage is a major factor in the causation of accidental poisoning, yet there is no clear cut evidence that this is true<sup>1</sup>. In a study reported by Sobel<sup>10</sup>, of 400 families (122 families with a history of poisoning and 278 controls) no significance was found (1) in the degree of hazard in poisoned vs. non-poisoned homes; (2) in storage habits between poisoned and non-poisoned groups; or (3) in storage habits 1 year later even though there may have been a poisoning in the interim period.

How careful are physicians having young children with storage of medications in their own homes? One would think that paediatricians in particular would be quite sensitive to safe storage practices. However, a surprise survey carried out in the USA of medications in the homes of 12 paediatricians with young children disclosed that only one paediatrician had all his medications securely locked up<sup>1</sup>. In this sample there was a common disregard in the homes of practicing paediatricians of a basic principle of poison prevention extolled to their patients "Keep all medications out of reach of children". Yet it would seem pure heresy to recommend that parents disregard safe storage principles. In a similar study of 52 poisoned and 52 control families, Baltimore et al<sup>11</sup> found no significant differences in the poisoned and control groups in storage habits or the mother's knowledge regarding toxicity.

In all reported studies the vast majority of toxic substances in the home associated with accidental poisonings were accessible and packaged in containers easily opened by young children<sup>2,3,4,5</sup>. In this hostile home environment the child must develop self control early if he is to survive. However, we are far from achieving the goal of establishing self control in early childhood for all children. The alternative is to increase our protective efforts through elimination of useless toxins in the home, safer packaging and parent education while attempting to find better methods to control undesirable childhood impulses<sup>1</sup>.

Family stress is an important factor in accidental ingestion of poisons in childhood<sup>12</sup>. It may make poisons readily available to children either because parents under stress are less careful or because medicines are being used during an illness. Another

possibility is that the child's behaviour is altered when there is unhappiness in the home with disordered family relationships<sup>12</sup>.

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**G N Lucas**  
*Joint Editor*

