

ACCIDENTAL POISONING IN CHILDREN IN JAMAICA AND BELFAST: A COMPARATIVE STUDY

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IN EUROPEAN cities accidental poisoning has been a matter of increasing concern. The incidence has been steadily rising in recent years, and from figures supplied by the Medical Officer of Health for Belfast, accidental poisoning accounts for 15 per cent of all home accidents, and there has been an increase of approximately 300 per cent in the years 1963-66. Perhaps of more importance is that accidental poisoning accounts for 43 per cent of paediatric hospital admissions (Dodge 1966), and it is the child of the toddler age group that is the victim in the vast majority of instances. Fortunately death due to such poisoning is rare. The Royal Society for the Prevention of Accident reports that of 724 children accidentally poisoned in Northern Ireland, between 1960-63, only seven died.

In this report the children admitted to the Royal Belfast Hospital for Sick Children (R.B.H.S.C.) due to accidental poisoning are compared with children admitted to the observation ward of the University College Hospital (U.C.H.), Kingston, Jamaica. The observation ward in U.C.H. has 16 out of a total of 466 beds, while the R.B.H.S.C. has about 80 medical beds available out of some 230 beds.

METHODS

In Jamaica information on 113 children admitted to U.C.H. on account of accidental poisoning between September 1st 1963, and December 31st 1966, was obtained, either from the Casualty Observation Ward report books, or the admission records. The records of 293 children admitted to the R.B.H.S.C. as a result of accidental poisoning over the same period of time were examined for comparison. The age and sex of each child, date of admission, cause of poisoning, treatment and complications were recorded.

RESULTS

Age

In Kingston no child younger than 9 months was admitted and the oldest was 9½ years. The highest incidence fell between 1 and 2 years (69 per cent). In Belfast the youngest child admitted was 2 months old and the oldest, 12 years. The commonest ages were between 16 months and 3 years (59 per cent of total). In Figs. 1 and 2 each column represents intervals of three months of age from birth to 12 years of age. The figures show that the commonest age for accidental poisoning is a few months older in Belfast than in Kingston.

Sex

In Kingston there was a remarkable equality in the total poisonings for males and females (57:56), while in Belfast males appeared to be more prone to the taking of poison than females (180:116). (Table I).

Fig 1 Incidence of Poisoning With Age

Kingston - 113 Patients

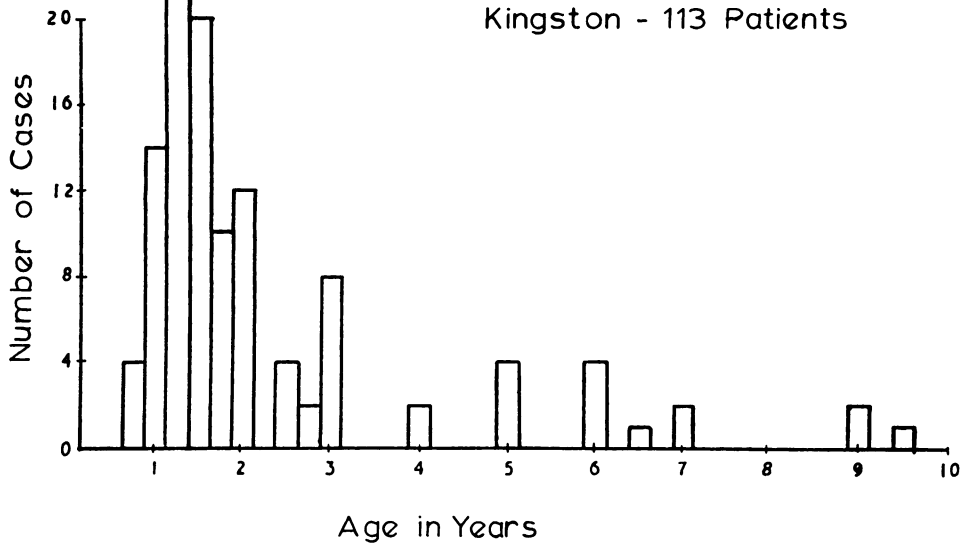


Fig 2 Incidence of Poisoning With Age

Belfast - 293 Patients



TABLE I

<i>Sex and Poisoning</i>					
<i>Kingston – U.C.H.</i>	1963	1964	1965	1966	<i>Total</i>
Male	7	15	20	15	57
Female	7	27	12	10	56
TOTAL					113
<i>Belfast–R.B.H.S.C.</i>	1963	1964	1965	1966	<i>Total</i>
Male	19	46	60	56	181
Female	20	38	24	30	112
TOTAL					293

Seasonal fluctuations

In both Kingston and Belfast there is a higher incidence of poisoning during the summer. In Kingston the greatest numbers fell between August and September and in Belfast between May and August (Fig. 3 and 4).

Nature of the poison

In Jamaica, Kerosene was the cause of 65 per cent of all accidental poisoning, medicines and tablets of 19 per cent, and household materials, such as caustic soda and bleach, of 9 per cent. In Belfast the commonest cause of accidental poisoning was medicines and tablets, which accounted for 53 per cent of the total; household materials and petroleum products were each responsible for slightly over 20 per cent of the total. These difference are due to the widespread use of kerosene in Jamaica for lighting, for most of the poorer homes have no electricity supply. By itself kerosene is a less common cause of poisoning in Belfast, but when considered with other petroleum derivatives, turpentine and petrol, is more common than might be expected, the three causing some 21 per cent of all child poisonings in Belfast.

Table II shows that overt bronchopneumonia occurred in approximately 27 per cent of children after accidental poisoning with kerosene in Jamaica during the period 1963–65. In 1966 no cases of bronchopneumonia were reported, and this was thought to be due to the coinciding abandonment of stomach washout, which had hitherto been part of the routine treatment of such cases. In Belfast signs of pulmonary complications following poisoning by petroleum derivatives occurred in 64 per cent of patients. In Kingston only those children with clinical signs of bronchopneumonia were reported as such, while in Belfast, where there was more time for investigations, lung infiltrations were often found by chest radiography when the chest had been clinically clear. Behrer (1951) found by routine chest X-rays after kerosene poisoning that as many as 75 per cent of patients had lung infiltrations. Of the 38 Belfast patients who did have pulmonary complications 81 per cent had either vomited or had stomach washouts. Of the 31 children whose treatment included stomach washout, 20 developed complications, while of the 25 who vomited 17 developed pulmonary complications.

Fig 3 Seasonal Fluctuation

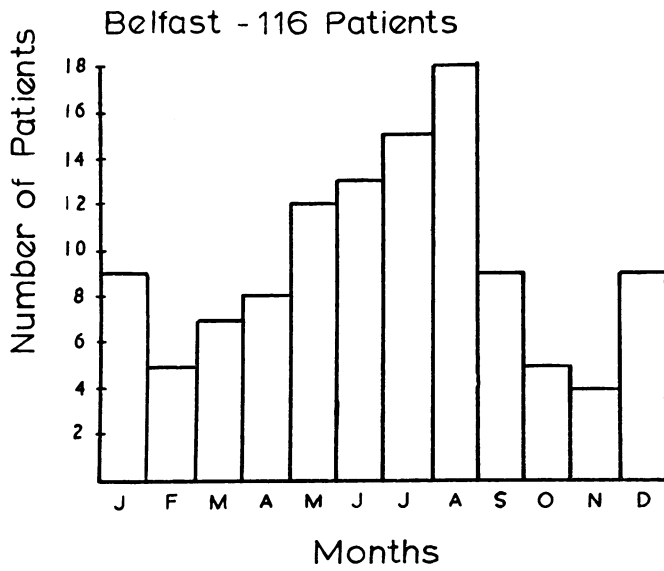


Fig 4. Seasonal Fluctuation

Kingston - 99 Patients

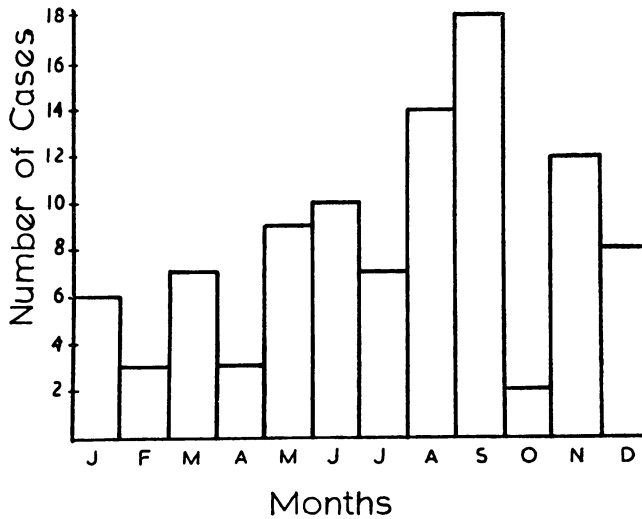


TABLE II

<i>Type of Poison</i>						
<i>Kingston-U.C.H.</i>						
	1963*	1964	1965	1966	<i>Totals</i>	<i>Per cent</i>
Medicines and tablets	1	9	3	8	21	19
Kerosene	9	26	24	15	74	65
No. developing broncho- pneumonia	2	6	4	0	12	—
Household materials	3	3	3	1	10	9
Plants	0	2	1	0	3	—
Others	1	2	1	1	5	—
TOTALS	14	42	32	25	113	100
<i>Belfast-R.B.H.S.C.</i>						
	1963*	1964	1965	1966	<i>Totals</i>	<i>Per cent</i>
Medicines and tablets	22	36	51	45	154	53
Petroleum distillates	6	24	15	17	62	21
No. developing broncho- pneumonia	4	15	8	11	38	—
Household materials	10	18	16	21	65	22
Plants	—	1	2	3	6	—
Others	1	5	—	—	6	—
TOTALS	39	84	84	86	293	100
*Only September-December inclusive considered						

DISCUSSION

Age

It is well known that accidental poisoning is most common in the 1-3 year age group. At this age the child explores its surroundings with his mouth as well as his hands, and has not yet learnt to distinguish between 'good' and 'bad' food and drink. The American Pediatric Association (1962) reported 83 per cent of kerosene poisonings occurred in children between 1 and 3 years old. Why the Kingston children should tend to poison themselves at an earlier age than those in Belfast is uncertain; possibly it is due to maturity occurring at an earlier age in the Caribbean, so that the child learns to toddle earlier than his Irish counterpart, who is still pram-borne but safe.

Sex

Male and female were equally liable to accidental poisoning in Kingston, in contradiction not only to the Belfast figures, but also to findings elsewhere. The Register General's reports for England and Wales (1962, 1963, 1964) indicate that accidental poisoning in the home in the 0-5 age group is more than 1½ times as common in males as in females. However, the Kingston ratio may be distorted by the 1964 figures (Table I).

Seasonal Fluctuations

The higher summer incidence is probably due to these months being the hottest, so that the thirsty child is more likely to reach for the lemonade bottle unwisely filled with some other material. Older children being at home due to the summer holidays from school may result in mother being less able to give adequate supervision to the young ones. The findings are in accordance with other reports. An American study found 47 per cent of its cases of kerosene poisoning occurred in the three months, June, July and August, and blamed the hot weather (1964). In Figs. 3 and 4 household materials and petroleum distillates only were considered.

Type of poisoning

The reason for the prevalence of kerosene in Kingston has already been mentioned, and a great reduction in the overall number of poisonings could therefore be achieved by the provision of electric lighting in the poorer homes. However, medicines and drugs might be a higher percentage of the total poisonings than 19 per cent if Jamaicans obtained their drugs free, for cash payment prevents the uncontrolled hypochondriac drug deluge that occurs in this country. The frightening number (53 per cent) of accidental poisoning due to medicines and drugs in Northern Ireland is probably an indication of the greater affluence of the community and of the readier availability of drugs due to the National Health Service. The incidence will continue to rise if these drugs continue to be left lying about in the home, instead of being locked in proper cupboards. Too often the unused drugs are not destroyed. As for household materials such as caustic cleaners and petroleum distillates, these will remain a major cause of poisoning while the common practice of leaving dangerous liquids in inviting lemonade or other bottles, persists.

Incidence of bronchopneumonia in kerosene poisoning

It is tempting to put too much significance on the fall in the incidence of bronchopneumonia in Kingston following the abandonment of gastric lavage; a continuation of the survey is needed to confirm these results. In Belfast, stomach washout has been given at the discretion of the House Officer attending the patient, and the findings would suggest that vomiting and gastric lavage are equally implicated in the development of any subsequent lung infiltrations. As there is some controversy as to the correct treatment of hydrocarbon poisoning it is useful to review the literature on this subject.

Olstad and Lord (1952) and George (1960) recommended gastric lavage irrespective of the amount of kerosene ingested, due to its possible toxic effects. But it has been shown that the oral toxicity of kerosene is low, and Richardson & Pratt-Thomas (1951) have estimated that a 50 lb. child would have to ingest more than a pint of kerosene to develop severe toxic complications. Yet, due to its unappealing taste, the amount swallowed is probably seldom more than 1 or 2 teaspoonfuls (Cachia and Fenech 1964). The American Co-Operative Study of Accidental Poisoning (1962) concluded that while gastric lavage was not harmful, there was no conclusive evidence that it was beneficial. A more definite conclusion was reached by Cachia and Fenech (1964) who showed that complications were more common in patients who had gastric washout. They recommended that gastric

washout should not be given routinely in cases of kerosene poisoning, but should be reserved for patients who had swallowed large amounts of kerosene. It is uncertain whether lung infiltrations result from kerosene circulating in the blood after being absorbed from the gastrointestinal tract, or are due to its inhalation into the respiratory system. It has been shown that pneumonitis can follow gastrointestinal absorption of kerosene (Ashkenazi and Berman, 1961 and Deichmann et al, 1944), but both the American Co-Operative Study (1962) and Coruh and Inal (1966) felt that pulmonary complications were related to vomiting, and the latter reported that of patients who vomited (whether gastric lavage was carried out or not), 45 per cent developed lung complications as opposed to 10 per cent of those who did not vomit. It is thought that small amounts of kerosene are aspirated while vomiting and the ensuing pulmonary complications are due to its low viscosity and surface tension (Gerarde 1963).

To put such poisoning in perspective it is important to appreciate other complications. Lung complications, in one study (Coruh and Inal, 1966) occurred in 45 per cent of cases (Reed 1950, put it as high as 86 per cent), symptoms of damage to the central nervous system in 34 per cent and of damage to the gastrointestinal system in 33 per cent. The cardiovascular system showed signs of involvement, such as tachycardia, in 26 per cent of cases. The neurological symptoms are important, and can vary from drowsiness through coma to convulsions. These complications seem related to the quantity of kerosene ingested, and have been reported as being less frequent when no gastric lavage was performed.

CONCLUSIONS

Accidental poisoning is commonest in the toddler age group, 71 per cent of the combined Kingston and Belfast cases being between 1 and 3 years, with the greatest incidence a few months earlier in Kingston than Belfast. It is during this period that the child may frequently put things in his mouth and early recognition of this by mother, and with warnings from the family doctor, might reduce the likelihood of poisoning in childhood.

In Kingston either sex is equally susceptible to accidental poisoning, but in Belfast and elsewhere males are more at risk.

There is a tendency both in Jamaica and Belfast for liquid poisons to be taken more frequently during the hotter summer months coinciding with the school holidays.

Kerosene is the most common cause of accidental poisoning in Kingston (65 per cent) followed by medicines and drugs (19 per cent). A marked reduction in the total poisonings could therefore be achieved by the provision of electric lighting in the poorer homes.

In Belfast most accidental poisoning is due to medicines and tablets (54 per cent) and this ever increasing problem can only be countered by educating the public of the dangers of a casual attitude towards drugs, and of hoarding unused and unknown past remedies. Petroleum derivatives account for 23 per cent of the total.

Routine stomach lavage is not recommended for patients with hydrocarbon poisoning; it should be reserved for those few who ingest large quantities, and if possible patients should be restrained from vomiting.

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REFERENCES

- ASHKENAZI, A. F. and BERMAN, S. T. (1961). *Pediatrics*, **28**, 642.
BEHRER, M. R. (1951). *J. Pediat.*, **58**, 646.
BELFAST COUNTY BOROUGH HEALTH COMMITTEE (1963-1966). Home Accidents Surveys.
CAHIA, E. A. and FENECH, F. F. (1964). *Arch. Dis. Child Health*, **39**, 502.
CORUH, M. and INAL, H. (1966). *Turk. J. Pediat.*, **8**, 36-42.
DEICHMANN (1944). *Amer. Intern. Med.*, **21**, 803.
DODGE, J. A. (1966). *Ulster med. J.*, **35**, 83.
GEORGE, B. (1960). *Lancet*, **1**, 826.
GERARDE, H. W. (1963). *Arch. Environ. Health (Chicago)* **6**, 329-41.
OSTAD, R. B. and LORD, R. M. Jr. (1952). *Amer. J. Dis. Child.*, **83**, 446.
REED, LEIKIN and KERMAN (1950). *Amer. J. Dis. Child.*, **79**, 623.
REPORT BY SUB-COMMITTEE ON ACCIDENTAL POISONING (1962). *Pediatrics*, **29**, 648.
RICHARDSON, J. A. and PRATT-THOMAS (1951). *Amer. J. Med. Sci.*, **221**, 531.
ROYAL SOCIETY FOR THE PREVENTION OF ACCIDENTS (1964). *The Causes of and Cure for Home Accidents*.
THE REGISTRAR GENERAL'S STATISTICAL REVIEW OF ENGLAND AND WALES (1963, 1964, 1966). Part I: 18A.