Clinical Problems

Stress in Families of Children who have Ingested Poisons

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Summary

One hundred families of children under 5 years admitted to Cardiff Hospitals after accidentally ingesting poisons were compared with 100 control families matched for socioeconomic class and age and sex of the child. Questioning about five major stress factors (serious family illness, pregnancy, recent family moves, one parent away from home, anxiety or depression in one or both parents) disclosed significantly more stress in the affected families than in the controls. Thirty of the affected families had more than one major stress factor compared with four of the controls, while 63 of the controls had no major stress factor compared with 24 of the affected families ($P < 0.001$). In only four of the affected families was there no stress factor. Fifteen children took poisons in homes other than their own.

Unemployment was significantly more prevalent in the affected families than in the general population, though apart from this the socioeconomic backgrounds were similar. There were significantly more accidents and childhood poisonings in the parents and siblings of affected children than in the control families. In 25% of the cases poisoning was with Angiers Junior Aspirin.

Introduction

Accidental ingestion of poisons is an important cause of mortality and morbidity in children under 5 years in Great Britain. In 1972, 25 children died and 16 700 were admitted to hospitals in England and Wales after taking poisonous substances.¹ Understanding the aetiology of such poisonings will help in their prevention. Most studies on the ingestion of poisons in childhood have concentrated on the incident itself. Perhaps the most attractive aetiological theory is that poisoning occurs in families in which poisons are readily accessible. At least two studies, however,^{2,3} have shown that this is not the case. Family stress is an important factor in road accidents in children,^{4,5} and it is a clinical impression that this is also true of childhood poisoning.

The important role of family stress in the aetiology of childhood poisoning was hinted at by Sobel⁶ in a large retrospective psychiatric survey in the U.S.A. It has not, however, previously been studied in Great Britain. The present study was a prospective investigation of the role of family stress in childhood poisoning in a British community.

Subjects and Methods

In a period of five months during May to October 1974, 105 children under 5 years were admitted to hospitals in Cardiff after ingesting poisons. They were drawn from 100 families, five pairs of siblings being involved. The admitting hospitals were the Cardiff Royal Infirmary, Llandough Hospital, and the University Hospital of Wales. Most of the children came from the City of Cardiff, and the remainder from contiguous areas.

One or both of the parents (usually the mother) were interviewed as soon as possible after the incident. In 85% of the cases this was before the child was discharged from hospital, the remaining parents being visited at home within a week afterwards. All but four of these interviews were conducted by me and all were in private. The parents were asked standard questions about the poisoning incident (such as the type and amount of poison ingested, the exact time it was taken, and whether any other children were involved) followed by questions on the occupation and health of the father and mother, their housing conditions, and whether there was a family history of childhood accidents or poisoning. They were then asked the following specific questions on family stress.

(1) Had there been serious illness or bereavement in parent, grandparent, or sibling in the month before the poisoning incident? (Serious illness was defined as being severe enough either to be potentially life-threatening or to require hospital admission.)

(2) Is the child's mother pregnant?

(3) Have you moved home in the past three months?

(4) Is one parent away from home? (This included unmarried and divorced parents and also more temporary absences.)

(5) Is the child's father unemployed?

(6) Have you or your spouse been anxious or depressed enough to see your doctor about this within the past three months?

(7) Has there been any other stress in your family recently?

They were then asked where they kept medicines and if they had a childproof medicine cabinet.

The parent then gave information about the child's developmental history and its personality. The results of that study will be reported separately.

The parents of 105 control children (100 families) were also interviewed. They were matched for age, sex, and socioeconomic class with each poisoned child. Names and addresses were obtained from the Cardiff Birth Survey, where birth data on each child born in Cardiff are stored. Initially an outpatient interview was arranged for the mothers of the controls, the non-attenders being visited at home. Because of poor attendance, however, the initial interview invitations were soon abandoned and the homes visited. The parents of the controls were interviewed within two months of the corresponding poisoned child being admitted to hospital. Every effort was made by local inquiry and with use of the family practitioner committee and housing department records to trace the controls if they had moved. Of the 105 control children, however, 17 proved untraceable, seven were unsuitable because they themselves had been involved in poisoning incidents, and one had died. New matched controls were found for these cases through the Cardiff Birth Survey. It was thought that the control families that were untraceable had moved from the Cardiff area as there was no record of them on the family practice committee's files. Thus the controls represented the same population of children residing in the Cardiff area as those in the survey. No parent refused to co-operate. The parents of the controls were asked the same questions as the parents of the poisoned children apart from those referring to the poisoning incident. In the case of pairs of siblings a control corresponding to the older sibling was taken when comparing family stress. It was unit policy to admit children only if the substance

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ingested was potentially toxic and to admit every child that had taken a toxic substance. Children were treated with ipecacuanha (except those having taken hydrocarbons) rather than gastric lavage.

Results

Of the 105 poisoned children 54 were boys and 51 girls. Their ages ranged from 8 months to 4 years 11 months (mean 31.8 months). Altogether 27 of the children were poisoned with salicylates (all but two of which were Angiers Junior Aspirin; 55 with other drugs (five with iron preparations, four with diazepam, two with paracetamol, and the remainder with various other medications); 14 with domestic poisons (rat poison, bleach, etc.); 6 with hydrocarbons (paraffin, white spirit, etc.); and 2 with berries (laburnum).

The distribution of stress factors in the poisoned and control groups is shown in table I. With all five factors there was a highly significant difference between the two groups. In addition, in 15 of the families of poisoned children the father was unemployed (six temporarily). The mean male unemployment rate in the Cardiff area during May to October 1974 was 4.3% ($P < 0.001$). Other stress factors identified were as follows: living in other people's houses (grandmother's etc.) (15 cases); mentally retarded child (2, none in controls); mother in bed at time of incident (9); recent mild illness in family (15); row between parents preceding incident (4); husband on night work (3); new sibling (within 2 months) (2); mother at work (2); left alone with older children in house (2); other factors, including baby falling out of pram, illness in pet cat, etc. (10).

TABLE I—Distribution of Stress Factors in Poisoned and Control Groups

Stress Factor	Families of Children Taking Poison (n = 100)	Control Families (n = 100)	χ^2	P
Serious family illness in last month	27	9	9.79	<0.002
Pregnancy	10	2	4.34	<0.004
Family move within 3 months	12	1	8.23	<0.005
One parent away from home	18	5	7.07	<0.008
Anxiety or depression in parents	36	10	18.80	<0.002

When major stress factors were taken as serious illness, maternal pregnancy, a recent move, one parent being away from home, anxiety or depression in parent, unemployment, and a mentally retarded child, 30 of the poisoned children had more than one major factor operating compared with four of the controls. Sixty-three control families had no major stress factor compared with 24 of the affected families ($P < 0.001$). When all stress factors were taken into consideration 57 of the affected families had more than one operating. In only four of the affected families was there no obvious factor; these children had taken a herbal pill, Setlers, paraffin, and phenobarbitone, two of which were innocuous. Despite unit policy seven children were admitted after taking a relatively innocuous substance. There were reasons for giving ipecacuanha to five of these. Thus only two admissions were definitely unnecessary. None of the 105 children died and only one caused concern (a 3-year-old girl who took her grandfather's digoxin tablets during his rare visit to the family home).

The role of stress is illustrated by the following cases.

Case 14—A 21-month-old boy whose father had Hodgkin's disease took turpentine. The family had moved the day before.

Case 19—A 31-month-old girl took Angiers Junior Aspirin when her depressed divorced mother was in bed.

Case 32—A 22-month-old boy took Triogesic tablets in his aunt's house. His depressed, unmarried, unemployed mother had recently taken an overdose herself.

Case 34—A boy aged 4 years 11 months took Angiers Junior Aspirin. His parents, though remaining together in the same house, had not lived as man and wife for three years. His mother was depressed.

Case 44—A girl aged 4 years 5 months whose father had died three years previously took ferrous sulphate tablets; her depressed mother had found out that the man she hoped to marry was already married.

Case 52—An 8-month-old girl took an amitriptyline hydrochloride (Lentizol) tablet that had been left beside the bed by her severely depressed mother. The family had moved recently and there were marital problems.

Cases 64 and 65—Two Greek Cypriot brothers aged 2 years 4 months and 3 years 3 months took Angiers Junior Aspirin at the time of the Turkish invasion of Cyprus. Their father was worried about this and had had a recent psychiatric illness.

Cases 76 and 77—Two brothers aged 18 and 31 months took an iron

preparation. Their family had moved one week previously into single-room bed and breakfast social services accommodation. Their father was unemployed and both parents were depressed.

Case 79—A girl aged 4 years 11 months with Down's syndrome took a tricyclic antidepressant in the morning while her mother was in bed.

Case 95—A girl aged 2 years 10 months sprayed hair lacquer into her mouth and became sleepy at her grandmother's house. Her other grandmother had died one week previously. Her mother was pregnant and her father unemployed and depressed.

Table II shows that the distribution of social classes among the poisoned children's families followed closely that for the population of the Cardiff areas as a whole (the social class of fathers and children born in Cardiff from January to December 1973 being taken from the Cardiff Birth Survey). The fathers of six children who ingested poison who were only temporarily unemployed were put in their appropriate social class for table II. It appears that apart from unemployment the socioeconomic class of the father has no bearing on whether a child takes poison or not.

TABLE II—Distribution of Social Classes in the General Population and in Families of Poisoned Children

	Proportion of the General Population	Proportion of Families of Poisoned Children
Class I	8.3%	8.0%
Class II	12.5%	16.0%
Class III	47.9%	47.0%
Class IV	11.8%	11.0%
Class V	9.4%	9.0%
Unmarried unemployed ..		9.0%
Other, including Forces, students, and not known	10.1%	

The last menstrual period of the mother was noted in 57 cases. Altogether 17 incidents occurred in the week after the last day of the last menstrual period, 18 in the second week, 18 in the third week, and 4 in the fourth week. It seems, therefore, that the menstrual cycle of the mother was not an aetiological factor in this series. Nevertheless, the mothers of two of the children who did not have an obvious aetiological factor were menstruating at the time of the incident.

A family history of childhood accidents and poisoning was sought in siblings and parents of the poisoned children and controls (table III). Accidents were those severe enough to cause a visit to hospital and be remembered.

TABLE III—History of Childhood Poisoning and Accidents in Parents and Siblings

	Families of Poisoned Children	Control Families	χ^2	P
Childhood ingestion of poisons:				
Parents	10	1	5.8	<0.02
Siblings	17	6	4.35	<0.04
Childhood accidents:				
Parents	19	7	4.6	<0.04
Siblings	23	9	5.28	<0.025

The distribution of the childhood poisoning cases throughout the week and throughout the day is shown in figs. 1 and 2. A small peak occurred in the early mornings, and nine of the children took poisons while their mothers were still in bed. In 12 cases the poisons were in an open container, and in 23 cases more than one child was involved. In 30 cases the drug taken was prescribed for the child itself, in 25 cases for a parent, in 12 cases for a sibling, in 6 cases for a grandparent, and in 8 cases for other people. Seven of the families of poisoned children kept medicines in locked containers compared with six of the control families. Most medicines were kept on high shelves or cupboards. No family in either group had a medicine cupboard specifically designed to be childproof.

Discussion

This survey shows clearly that family stress is an important factor in accidental ingestion of poisons in childhood. There are various reasons for this. Family stress may make poisons

FIG. 1—Distribution of cases throughout the week.

FIG. 2—Distribution of cases throughout the day.

readily available to children, either because parents under stress may be less careful or because medicines are being used during an illness. This increased availability is a factor in some cases but does not seem to be the major cause of the problem as a whole.²⁻³ A more likely possibility is that children's behaviour is altered when there is unhappiness in the home with disordered family relationships. In addition, children may wish to medicate themselves, imitating their parents.

The ratio of boys to girls who ingested poisons was almost identical with the Cardiff male to female birth ratio (106:100). Similar findings have been found in other surveys.⁷⁻⁸ Social class findings in most previous surveys have also been similar to those of the present one, with the social class of poisoned children mirroring that of the general population. Interestingly, there was a significant family history of childhood poisoning and accidents in both parents and siblings of the poisoned children as compared with the controls. This may be because of an increased familial instability in both generations; less plausibly, genetic factors may be involved. Fifteen per cent of the children took poisons in homes other than their own, many in their grandparents' home. This was also shown to be an important factor in Newcastle upon Tyne.⁹

The only measure that has been definitely shown to reduce the incidence of childhood poisoning is the use of child-resistant containers. Scherz,¹⁰ in an American study, reduced the number of poisoning episodes in a local community from 149 to 17 by the use of such containers. In the United States legislation has made the childproof packaging of several drugs, including aspirin, compulsory. It is noteworthy that if one British brand of "junior" aspirin (Angiers) were packed in child-resistant containers the number of children admitted to Cardiff Hospitals

for accidental ingestion of poisons would be cut by a quarter. The fact that family stress is an important factor in childhood poisoning reinforces the view that the use of some form of child-resistant packaging is the only measure likely to reduce the mortality and morbidity from this condition. Families under stress are unlikely to remember health education campaigns or remember to put poisons in safe places. Childproof medicine cabinets, though clearly advantageous, are possessed by few (only seven of the control families had locked medicine containers) and are unlikely to be used if the family is under stress.

The Medicines Commission in their report on presentation of medicines in relation to child safety¹¹ recommended for various reasons that unit packaging of medicines should be used rather than child-resistant containers. Dr. David Owen, for the Secretary of State for Social Services, told the House of Commons on 23 April 1975¹¹ that from January 1976 aspirin and paracetamol preparations for children will be sold either in child-resistant reclosable containers or in dark-tinted unit packaging. Moreover, it was proposed to have all aspirin, paracetamol, tricyclic antidepressants, barbiturates, phenothiazines, and iron preparations sold in either child-resistant containers or unit packaging by 1 January 1977. One child in the present study took a unit-packaged salicylate preparation. He took all 16 tablets in the pack and had symptoms from this incident.

It has been suggested that only those children known to have taken toxic amounts of poisonous substances should be admitted to hospital.¹² While nobody would advocate the admission to hospital of children who had taken an innocuous substance, sending children home who have probably taken only a small amount of a poisonous substance would be bound to lead to the occasional disaster. This survey shows clearly that most families are under stress at the time of poisoning incidents and are therefore unlikely to remember accurately the facts concerning the incident.

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