TRENDS IN HOSPITALIZED ACCIDENTAL POISONING

BY

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Accidental poisoning has emerged in the last 20 years as a well-recognized public health problem. Mortality statistics (Registrar General's "Annual Statistical Reviews") have shown until very recently a steadily increasing toll from this cause; and hospital admissions for poisoning, accidental and deliberate, have shown a steep upward trend (Ministry of Health and General Register Office "Reports on Hospital In-patient Enquiry"). The matter has been considered one of urgency in relation to medical care (Dooley, 1962; Graham, 1962; Goulding and Watkin, 1965), to domestic accidents as a whole (MacQueen, 1960; Backett, 1965), and to industrial hazard (Chief Inspector of Factories, "Annual Reports"). Recognition of the problem is not confined to Great Britain (Dooley, 1962; Jacobziner, 1966).

Both in the United Kingdom (MacQueen, 1960) and elsewhere (Backett, 1965), domestic poisoning accidents have been shown in hospital and community practice to be especially a problem of young children. The present study confirms the belief that poisoning is far commoner in the home than in industry. The Registrar General's Mortality Statistics for England and Wales ("Annual Statistical Reviews") shows similarly that most fatal accidental poisonings occur in the home. But, in contrast with morbidity, fatal episodes are mainly a problem of the elderly. One reason for the last fact is the special hazard to the elderly of coal gas, a form of poisoning which often proves lethal before sufferers can be taken to hospital. A second reason is the steeply rising case fatality with age in hospitalized patients ("Hospital In-patient Enquiry"), and a third is the solitary habit of many old people which precludes discovery and rescue.

Although epidemiologically hospitalized poisoning cases form a truncated group, which includes neither the majority of fatalities nor most minor episodes, trends and characteristics of hospital cases

nevertheless draw attention to changing problems which lead to dangerous situations.

The main purpose of the present communication is to draw attention to recent trends observed during a 16-year period of hospital admissions for accidental poisoning in Cardiff residents.

SOURCES AND NATURE OF THE DATA

These have previously been described (Graham and Hitchens, 1967). The record of all admissions to hospitals in the Cardiff area from 1950-65 were scrutinized and the relevant items abstracted. The episodes were readily classifiable as accidental or suicidal—in only a negligible number was the issue in doubt. The very great majority of Cardiff residents who require in-patient treatment for accidental poisoning are admitted to the hospitals included in the study, and it is on the records of these that the analyses are based.

RESULTS

TREND

The Figure (overleaf) shows that hospital admission rates rose substantially from 1953 until 1957 (from approximately 0·8 to 3·0 per 10,000 of the population). This increase was due largely to poisoning from prescribed medicines and it affected all age groups. Between 1958 and 1962 the rates remained steady at 2·5 to 2·7 per 10,000 but thereafter a sharp rise starting in 1963 continued until 1965 when it reached 5·5 per 10,000.

EPIDEMIOLOGICAL CHARACTERISTICS OF CASES AND EPISODES

Taking the period as a whole, the epidemiological features formed a familiar pattern. Young children under 5 years of age accounted for 67 per cent. of the cases; and there was a preponderance of males in every age group except young adults and the elderly, the male excess being greatest among

FIGURE.—Trend in hospital admission rates for accidental poisoning among Cardiff residents, 1950–65.

children of school age. There were seasonal variations in frequency for young children and for those of school age but not for adults (Table I). There was also a daily variation which, though not formally significant, pointed to Fridays and Saturdays as carrying the highest risk. Both this and the peak months of the year for children—April, July, August, and September—were explicable on the grounds of misapplied leisure or lapse of supervision by parents during holiday periods. The range of substances in episodes was as diverse as that previously reported (Graham, 1962). Prescribed medicines, proprietary medicines, and household substances were the three main groups, accounting for about 85 per cent. of the total, and each contributing about equally to it.

TABLE I
SEASONAL TREND OF HOSPITALIZED ACCIDENTAL POISONING AMONG CARDIFF RESIDENTS, 1950–65, BY AGE GROUP

Age Group (yrs)	Quarters				
	1	2	3	4	
0–4	110	187	197	138	$\chi^2 = 32.1$; $P < 0.01$
5–14	19	22	39	20	$\chi^2 = 10.6$; $0.02 > P > 0.01$
15+	53	47	54	56	$\chi^2 = 0.25$; $0.98 > P > 0.95$

Over 80 per cent. of the episodes were stated to have taken place at home. Solitude was not a factor of importance—only 5 per cent. of adult patients were living alone. There was no evidence of deprivation as a factor. Only three of the 662 child patients were not living with their parents. Physical illness or disability was not infrequent among adults (25 per cent.) but special sense defects were noted

only in four cases. There were only six deaths in the whole series.

CHARACTERISTICS DURING THE RECENT INCREASED INCIDENCE

Table II shows the proportionate distribution of cases at ages under 5 in the three periods 1950–60, 1961–62, and 1963–65. There was a slight rise in 1961–62, but from 1963 onwards, coinciding with the rising trend of poisoning due to all causes, there was a greatly increased proportion of young children.

TABLE II
PERCENTAGE OF EPISODES OF HOSPITALIZED ACCIDENTAL POISONING IN CARDIFF RESIDENTS INVOLVING CHILDREN UNDER 5 YEARS OF AGE

Age (yrs)	Percentage of Total each Year		
	1950–60	1961–62	1963–65
0–4	58	63	81

Table III shows the mean annual number of admissions by age during the two periods 1950–62 and 1963–65. Whereas the mean number of young children admitted annually more than trebled, the number aged 5 years and over showed only a slight rise.

TABLE III
INCREASE IN THE MEAN ANNUAL NUMBERS OF ADMISSIONS AT AGES BELOW 5 AND 5 AND OVER, COMPARING 1950–62 WITH 1963–65

Age (yrs)	Mean Annual No. of Admissions		Percentage Increase
	1950–62	1963–65	
0–4	27.9	89.6	321
5+	18.9	21.3	113

Table IV compares the sex distribution in two age groups for the two periods. While in the later period the male excess at ages 5 years and over was unchanged, at ages under 5 years it was replaced by equal sex representation. The marked seasonal variation previously noted was no longer so pronounced, the excess in the second and third quarters not being formally significant, while in relation to the day of the week there was no systematic variation.

TABLE IV

DISTRIBUTION BY SEX AT AGES BELOW 5 AND 5 AND OVER, COMPARING 1950-62 WITH 1963-65

Age (yrs)	1950-62			1963-65		
	Male	Female	Sex Ratio	Male	Female	Sex Ratio
			Male:Female			Male:Female
0-4	217	146	1.49:1	137	132	1.04:1
5+	141	105	1.34:1	36	28	1.29:1

Table V compares in the same two periods the average annual number of admissions according to the type of agent involved. While there was a general increase in all types, that in relation to the patient's own proprietary medicine was much greater than in the remainder. Poisoning by all forms of medicine, own or other peoples', prescribed or proprietary, accounted for nearly three-quarters of the increase in admission rate.

Table VI shows the average annual number of admissions in relation to the three main lethal agents. While salicylate poisoning increased five-fold, admissions for barbiturate and carbon monoxide poisoning remained about the same. Those for all other agents more than doubled. Salicylates, previously accounting for 16 per cent. of the total, latterly accounted for 32 per cent. and the increase from 1963 onwards accounted for 45 per cent. of the overall rise in the admission rate.

TABLE VI

AVERAGE ANNUAL NUMBER OF CASES IN CARDIFF RESIDENTS HOSPITALIZED FOR ACCIDENTAL POISONING BY THREE SPECIFIED AGENTS, COMPARING 1950-62 WITH 1963-65

Period	Specified Agent			All Other
	Barbiturates	Salicylates	Carbon Monoxide	
1950-62	8.9	7.5	2.0	29.3
1963-65	7.3	34.0	2.0	64.3
Excess of 1963-65	-1.6	26.5	0.0	35.0

DISCUSSION

It is unlikely that the reasons for the sharp increase in 1961 are other than complex but, because so many epidemiological characteristics of cases and episodes suddenly altered, a single factor of major importance is suggested. The disproportionate increase in medicinal poisonings does not support a simple administrative explanation on the basis of changed referral or admission policies to hospitals, though either or both of these may have played a part; and so it seems more likely that a change in behavioural pattern within the home took place. This may be a growing carelessness with drugs, and clearly is so to some extent since the frequency of admissions as a result of poisoning with other peoples' prescribed medicine has almost trebled (Table VI). However, the disappearance of the male excess suggests that a passive rather than an active role in early childhood has become important. If this were so, one possibility is increasing medication by parents, a suggestion supported by the very pronounced rise in aspirin poisoning. While this hypothesis does not fit all the facts (poisoning with household substances also showed a substantial rise), it could account not only for the changed sex ratio but also for the alterations in seasonal and daily patterns.

TABLE V

AVERAGE ANNUAL NUMBER OF CASES ACCORDING TO NATURE OF POISONING AGENT IN CARDIFF RESIDENTS HOSPITALIZED FOR ACCIDENTAL POISONING, COMPARING 1950-62 WITH 1963-65

Period	Nature of Substance					
	Prescribed Medicine		Proprietary Medicine		Household Substance	All Other
	Own	Other Persons'	Own	Other Persons'		
1950-62	6.2	7.6	5.6	3.0	12.0	11.4
1963-65	11.0	21.3	30.7	9.0	26.7	18.5
Excess of 1963-65	4.8	13.7	25.0	6.0	14.7	7.1

The present data are insufficient to establish this explanation beyond doubt and indeed the recent rise in frequency and its accompaniments may be a purely local phenomenon. But the hypothesis seems sufficiently likely to suggest that in preventive programmes attention should be directed not only to the physical safe-keeping of drugs and other substances in the home but also to wider publicity concerning the dangers of giving to young children the medicines which lie readily to hand—in particular, aspirins. Such a campaign might draw attention to safer household remedies, and urge the limitation of dosing with any drug until medical advice has been sought.

SUMMARY

The trend in hospital admission rates for accidental poisoning among Cardiff residents during the period 1950–65 is described. The rates have been rising substantially since 1963.

The main findings are:

- (1) Over the whole period the problem especially involved young children under the age of 5 years.
- (2) From 1950–62 there was a male excess in most age groups, including the youngest. There was also a well-marked seasonal pattern with, additionally, an excess of cases at weekends. Numerous agents were involved. Prescribed medicines, proprietary drugs, and household substances accounted for about 85 per cent. of episodes and each contributed about equally to this proportion.
- (3) During the period 1963–65, when the rate was rising rapidly, these epidemiological characteristics were modified. The increase

affected mainly young children under 5 years of age, amongst whom the mean annual number of admissions more than trebled, while at all other ages the number increased by only about 20 per cent. The male excess at ages under 5 disappeared as did the week-end excess, and the seasonal pattern became less marked. The rise was largely attributable to poisoning by drugs, especially the patients' own proprietary medicines. Poisoning with aspirin accounted for 45 per cent. of the overall increase.

The findings are discussed from a preventive viewpoint.

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