Improvements in child resistant containers

J R SIBERT, A J CLARKE, AND M P MITCHELL

Departments of Paediatrics and Pharmacy, Llandough Hospital, Penarth

SUMMARY The numbers of children under 5 years in South Glamorgan admitted to hospital because of accidental poisoning have been analysed for 1980–4. There has been no significant fall in those taking solid dose, prescribable medications since the voluntary agreement between the government and the pharmaceutical profession in 1981 on child resistant containers. Most children still take these poisons from containers of an ordinary, non-child resistant type. Aspirin poisoning has remained at the same low level since the introduction of regulations on child resistant containers in 1976, but there has been a rise in paracetamol liquid poisoning largely due to one preparation.

The advent of 'original pack' dispensing in 1987–8 provides an ideal opportunity to ensure that child resistant containers are used for all medications that are toxic if taken by children.

Accidental child poisoning is an important cause of admission to hospital in the United Kingdom. Although deaths are rare, these poisoning incidents cause a great deal of justified concern, both to parents and doctors, and are clearly worth preventing.

Educational campaigns^{1 2} have not proved successful in reducing accidental child poisonings, probably because many of these incidents are associated with psychosocial stress in the family.³ On the other hand, the preventive solution of child resistant containers has reduced accidental child poisoning in a pilot study in an American community,⁴ when introduced in the United States as a whole,⁵ and when introduced for solid dose aspirin preparations in the United Kingdom.^{6 7} After these successes there was pressure in Britain to extend their use to other medications, and in March 1981 the government and the pharmaceutical profession agreed voluntarily to place all solid dose, prescribable medications in child resistant containers or blister packs, with exceptions for the elderly and the infirm or others who specifically request them.

We have evaluated the effectiveness of this agreement by examining the numbers of children aged under 5 years admitted to hospitals in South Glamorgan because of poisoning, and by estimating the pattern of dispensing in the county by examining the containers of drugs brought into hospital on admission by patients of all ages.

Methods

We examined the medical records of children under 5 years admitted to hospital in South Glamorgan after the accidental ingestion of medicines. The small number of South Glamorgan children admitted to Bridgend Hospital (which is outside this health authority) for accidental child poisoning was also considered. The period of study was from 1980–4 (inclusive). Since 1974 it has been the policy of paediatricians and the accident and emergency department in the authority to admit all cases of poisoning with potentially toxic medications but to exclude from admission children taking such things as antibiotics and the contraceptive pill.

We have categorised the admissions due to poisoning into the following groups:

- (1) Prescribable, solid dose medications (excluding paracetamol and aspirin);
- (2) Aspirin preparations;
- (3) Solid dose paracetamol preparations;
- (4) Liquid dose paracetamol preparations;
- (5) Prescribable, liquid medications other than paracetamol.

We have analysed the type of container in which prescribable, solid dose medications taken accidentally by children has been dispensed for the years 1983 and 1984. We have also attempted to estimate the pattern of dispensing in South Glamorgan generally. We have analysed the type of containers

used for solid dose medication brought in by patients when they were admitted to Llandough Hospital over a four week period beginning 21 November 1984, and over a further period of one week beginning 4 March 1985. During this second period, the type of container was related to the age of the patient and the medication that had been prescribed.

All patients admitted to Llandough Hospital are always asked to bring drugs in current use with them and we have analysed the containers they were dispensed in.

Results

The number of children aged under 5 years who accidentally ingested medications and were admitted to hospital in South Glamorgan is shown in Table 1. There has been no significant fall in admissions to hospital because of accidental poisoning with solid dose medications since the voluntary agreement was started in March 1981—47 children being admitted in 1980, and 45 in 1984. There has been a steady increase in poisonings with paracetamol liquid since this time, which has been almost entirely due to the preparation Calpol, which until very recently was not packed in a child resistant container. Ingestion of aspirin and paracetamol tablets, which are packed by regulation in child resistant containers or blister packs, remained constant during the study period. The admissions due to the ingestion of potentially toxic liquid preparations, which are not dispensed in child resistant containers, have also remained constant.

The types of container in which the prescribable, solid dose medications taken by the children were dispensed are shown in Table 2. Most children admitted with accidental poisoning had taken the medicine from ordinary, non-child resistant containers.

From examining the containers of medications handed in to our pharmacy on admission to hospital, we have estimated the pattern of dispensing of prescribable, solid dose medications in South

Glamorgan. Seventy eight preparations (10%) had been dispensed in blister packs, 256 (32%) in child resistant containers, and 469 (58%) in non-child resistant containers.

The 115 preparations collected in one week in 1985 were further analysed as shown in Table 3. The use of child resistant containers was not significantly influenced by the patient's age, and nor was a group of drugs of great potential toxicity to children (iron, tricyclic antidepressants, digoxin, aminophylline, salbutamol, aspirin, and paracetamol) dispensed in a manner significantly different from drugs that are usually relatively harmless when ingested accidentally, (antibiotics, allopurinol, vitamins, and prednisolone).

Table 2 Packaging for prescribable, solid dose medication taken by children admitted to hospital in South Glamorgan for accidental poisoning in 1983 and 1984 (excluding aspirin and paracetamol)

	1983	1984
Child resistant containers	2	5
Blister packs	7	8
Non-child resistant containers	28	26
Unknown	1	6

Table 3 Containers used for medications handed in to hospital in one week in 1985

Container	Classified by patient's age		Classified by toxicity of medication	
	Age ≤64 No (%)	Age ≥65 No (%)	Harmless No (%)	Toxic No (%)
Blister pack	6 (15)	9 (12)	2 (9)	2 (9)
Child resistant containers	13 (32)	23 (31)	7 (30)	9 (41)
Non-child resistant containers	22 (53)	42 (57)	14 (61)	11 (50)
Total	41	74	23	22

χ^2 test shows no significant difference in containers used for patients of different ages or for medications of different toxicity.

Table 1 Children under 5 years admitted to South Glamorgan hospitals for accidental poisoning between 1980 and 1984

Medications	Year				
	1980	1981	1982	1983	1984
Prescribable, solid dose preparations (excluding paracetamol and aspirin)	47	40	42	38	45
Aspirin	13	9	9	13	9
Paracetamol tablets	2	3	5	4	2
Paracetamol liquid preparation	6	3	12	17	20
Prescribable liquid preparations	18	18	11	16	18

Discussion

The results of our study show that there has been only a small, non-significant fall in accidental child poisonings from solid dose, prescribable medications other than aspirin and paracetamol since 1981 and the start of the voluntary agreement on child resistant containers and safety packaging. Analysis of the results suggests that this is not due to widespread failure of child resistant containers, although some children undoubtedly do open these closures, often with the help of an older sibling. Aspirin poisoning incidents have remained at a fairly constant low level of 9 to 13 cases per year in South Glamorgan since the full effect of the introduction of child resistant containers by regulation in 1976 became evident. Before 1976 approximately 80 children a year were admitted to hospital in South Glamorgan with aspirin poisoning. Nor do our results show large scale failure for blister packaging. By contrast, our study indicates that the reason for most children being admitted with poisoning from solid dose medication in this area, is that they take poisons from ordinary, non-child resistant containers. Our results of usage of child resistant containers by pharmacists are in keeping with the results from the Scottish drug testing scheme⁸ which found that only 37% of prescribed medications were dispensed in these containers. It is disappointing, however, that the potential toxicity of drugs when accidentally ingested by children, has little discernable influence on the pattern of dispensing. There does not seem to be any greater demand for the use of non-child resistant containers by older people in South Glamorgan, and this cannot account for our findings.

Our results are in keeping with other experiences in accident and disease prevention. Car seat belts for instance, were not used by most until they were required by law. It is not the aim of this paper to criticise pharmacists, as there are important reasons why some of them have found the voluntary agreement difficult to keep to. These include cost and public acceptability, particularly among the elderly and handicapped. Nor are we seeking to criticise the Pharmaceutical Society, who introduced the voluntary agreement in good faith, and have done their best to ensure that it is adhered to.

A practical approach to the problem of preventing

accidental child poisoning would be to take advantage of the advent of original pack dispensing which should be fully introduced by 1988. This would mean that all medications would be dispensed in a pack issued by the manufacturer, which would have to be licenced by the Department of Health and Social Security (DHSS). This method of dispensing is being introduced for reasons unrelated to child safety, which include improvement of patient compliance, product liability, easy recall, and product integrity.

Licensing of these original packs could be conditional upon the use of child resistant containers, in appropriate cases. This would mean that enforcement problems in regulations aimed at pharmacists would be avoided. Indeed, this would be a very similar approach to that which was successful in 1976, when child resistant containers were used for children's aspirin preparations.

We urge that the DHSS, in licensing these original packs, takes full account of child safety considerations and ensures that all products which are toxic to children are packed in a child resistant way. It would be possible to allow pharmacists to repackage products for infirm patients using traditional screw top bottles.

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Correspondence to Dr J R Sibert, Department of Paediatrics, Llandough Hospital, Penarth, South Glamorgan CF6 1XX.

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