

Childhood accidents: a practice survey using general practitioners' records and parental reports

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SUMMARY. A survey of accidents in children under 16 years of age from one general practice (list size 6400) was carried out using a postal questionnaire to parents and an audit of medical records. Incidence rates were estimated by audit of medical records as 97% of accidents 'other than minor cuts and bruises' reported by parents had resulted in a medical consultation, and parental reporting was incomplete. For 1986, these rates were 254 per 1000 patients at the age of four years or less, 218 per 1000 at age five to nine years and 238 per 1000 at age 10 to 15 years. However, parental reports of accidents provided better detail of the circumstances of accidents than the medical records: in the latter, the circumstances of accidents were noted in 75% of records and the location in only 40%. Various options for monitoring accidents and near accidents utilizing parental information which could be administered by general practitioners are proposed, including the use of parent-held child health record cards and a 'yellow card' system analogous to that used for reporting adverse drug reactions.

Introduction

ACCIDENTAL injury, especially to children, has been described as 'the most important epidemic in the western world today'.¹ The medical profession could play an important role in accident prevention by collating information, using it to enhance public awareness of environmental hazards and, in appropriate circumstances, by acting as a pressure group. In primary health care the emphasis has been on health education, particularly by health visitors, to increase parental awareness of safety issues.² Suggestions that general practitioners should adopt a public health role and take responsibility for monitoring and, where possible, preventing environmental hazard have excited little enthusiasm.³ To some extent this must reflect the difficulty of surveillance in general practice: children who have accidents are often taken direct to hospital accident and emergency departments and their general practitioner may not be informed; the circumstances of accidents are not routinely recorded

in medical records; and there is no record of 'near misses' of serious accidents. However, it is possible that many of these difficulties could be overcome if surveillance by primary health care teams were supported by parental reporting.

In 1986, as a result of another research initiative, the opportunity arose to conduct a parental survey of childhood accidents in one general practice in south Oxfordshire. The practice, based at Berinsfield, lies 10 miles south of Oxford and is somewhat unusual in that it serves two quite different populations. Half of the 6400 patients live in Berinsfield itself which was largely developed by the local authority in the early 1960s on the site of a disused airfield; this population consists mainly of social classes 3 and 4, in contrast to the upper middle class bias of the remaining practice population distributed among 10 villages within a four mile radius of Berinsfield.

The health centre at Berinsfield was opened in 1970 and its site was chosen with the aim of providing medical services closest to those with greatest needs. In its early years much emphasis was placed on the development of teamwork and the accessibility of services to patients. Three part-time treatment room sisters (comprising one whole-time equivalent) are employed by the general practitioners and they are available to see patients presenting with accidents and emergencies throughout the working day, noting their findings and treatment in each patient's general medical records. Patients sustaining accidents out of hours are encouraged to contact the general practitioner on call rather than refer themselves to the local accident and emergency department.

The intention of the survey was to identify local environmental hazards to children. However, in combination with an audit of the practice records it was possible to validate the accuracy of parental reporting of accidents and to estimate the incidence of childhood accidents as recorded in a general practice rather than hospital setting. The results of this study are presented here and the implications for surveillance and prevention in general practice are discussed.

Method

A postal questionnaire was sent to every patient aged 16-64 years registered at the Berinsfield health centre at the beginning of 1987. Among a number of other questions relating to lifestyle and social status, the questionnaire asked mothers of children aged under 16 years at the time of the survey to report all accidents 'other than minor cuts and bruises' which had occurred to their children in a park, sports field or playground (including school fields and playgrounds) during the past year (question 1). In addition, they were also asked to record any accident occurring anywhere which had led to a hospital visit and which had occurred within the past five years (question 2). Cases of accidental poisoning were not included in the analysis. In order to avoid excluding children cared for by an adult other than their mother, the reporting of accidents was also elicited from other adults with 'primary responsibility for day-to-day care of the children'. Both manual and computer checks were made to avoid duplicating reports from more than one adult. Respondents were asked to give details of the site and nature of the injury, the place and circumstances of the accident and the sex and age of the child at the time.

The initial sample was 4066 patients of whom 2737 had returned questionnaires at the completion of the third mailing. In

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addition, 170 questionnaires had been returned marked 'gone away' and a further 172 patients had been deleted from the practice register at the time of the third mailing and can also be assumed to have left the practice area. This gave an overall response rate of 73%. Of the 1312 children aged under 16 years registered with the practice, 292 (22%) lived in households from which at least one accident was reported, 682 (52%) lived in households from which a questionnaire was returned but no accidents were reported and 338 (26%) lived in households in which no adult responded to the questionnaire.

In order to validate parental reports the 111 accidents reported by parents as having occurred either during the past year (question 1) or in 1986-87 (question 2) were sought in the medical records. For 18 accidents the relevant medical records could not be found (mainly because the family had moved). The remaining 93 accidents had occurred to children for whom a medical record existed in the practice and these records were audited to try to validate the parental report.

The estimation of accident incidence was based on medical record audit only. Unvalidated parental reports were discounted. Households which had or had not reported accidents or had not responded to the questionnaire were identified and the medical records of all children from random samples of these households were audited. The total number of children whose medical records were examined was 327, comprising 145 from 74 households in the 'accident reported' group, 87 from 52 households in the 'no accident reported' group and 95 from 46 households in the 'non-respondent' group. In order to calculate the estimated population incidence rates, accident rates for each household group — accident reported, no accident reported and non-respondent — were weighted according to the number of children in each group.

The audit of the medical records of children from households which had reported accidents allowed an estimation of the extent of under-reporting, although the information available was not always sufficient to determine whether the accident in question merited reporting according to our original criteria, that is, by virtue of severity or location.

The description of accidents according to location and sex was based on all accidents for which the relevant information was available, irrespective of the source of this information — parental report, medical audit or both. Confidence limits and significance levels were calculated on the basis of the standard error of a proportion.

Results

Reliability of parental reporting

Ninety three accidents to children whose medical record could be traced at the time of the audit were reported by their parents as having occurred in 1986 or 1987; two of these accidents were known not to have led to a surgery or hospital consultation and one accident had occurred abroad. Of the remaining 90 accidents, 64 were readily identified from the medical records: 41 were completely identical in detail whereas 23 contained minor inconsistencies as to the type of injury (for example laceration or abrasion) or the age of the child. A further 16 of the accidents reported had occurred before 1986 (12 in 1985 and four in 1984) but were essentially correct in detail. Two accidents were inaccurately reported (the possibility of non-accidental injury was noted in both cases) and eight reported accidents could not be traced. Parental reports of accidents were thus accurate in terms of type of injury in 80 out of 82 instances and in terms of type and timing of injury in 64 out of 82 instances.

During the audit of the medical records of the 145 children from households which reported accidents, an additional seven

accidents (no fractures) were identified as having occurred in 1986 which had not been reported although they were known to have resulted in hospital admission or to have happened in a local park or playground. Similarly, five accidents (no fractures) were identified in the 87 children from the sample of households reporting no accidents and a further 12 accidents (one fracture) were identified in the 95 children from the non-responding households.

Only two of the 60 accidents (3%) reported in response to question 1 had not led to a medical consultation, and the majority (56/58, 97%) were recorded in the medical notes.

Circumstances of accidents

A full description of each accident was seldom recorded in the medical record. A review of the records of the 190 accidents occurring in 1986 and 1987 showed that the circumstances of each accident were recorded in 75% of cases on average and the location was noted in 40% (Table 1). Documentation did not vary with the age of the child. Different injuries were, however, recorded in varying detail. The location in Berinsfield at which fractures had been sustained (22%) was poorly recorded.

Table 1. Recording of circumstances and location of accidents in the medical record according to the type of injury and the age of the child.

	Total number of accidents	% with circumstances recorded (95% CI)	% with location recorded (95% CI)
<i>Type of injury</i>			
Fracture	27	70 (53-87)	22 (6-38)
Laceration	48	65 (51-78)	35 (22-49)
Contusion/abrasion	79	81 (72-90)	47 (36-58)
Other	36	78 (64-92)	50 (34-66)
<i>Age of child (years)</i>			
0-4	55	76 (65-87)	38 (25-51)
5-9	50	78 (67-90)	40 (24-57)
10-15	85	72 (62-82)	44 (33-55)
<i>All ages/types</i>	190	75 (69-81)	41 (33-47)

CI = confidence interval.

Table 2 reports the cause of accidents according to the location in Berinsfield at which the injury had been sustained — all accidents for which data were available (either from parental report or from the medical record) were included. By far the largest single cause of accidents (except in parks and playgrounds) was a simple fall. At home, cooking was the next most frequent cause resulting in scalds and burns, followed by accidents involving window glass. At school, games were an obvious hazard, and in school playgrounds and local authority parks and play areas, swings and other play equipment were an important cause of accidents. Elsewhere, the main problem (after falls) was cycling and traffic accidents on public roads. The number of horse riding accidents reported seemed high but may reflect the rural nature of the practice. Other potential causes of concern were the number of dog bites and injuries owing to assault.

Incidence of accidents

Estimated annual incidence rates, based only on accidents recorded in the medical records, are shown in Table 3. These

Table 2. Most common causes of accidents occurring in different locations.

	Number of accidents
<i>Home (n = 79)</i>	
Falls	46
Cooking	6
Window glass	4
<i>School (n = 71)</i>	
Falls	28
Ball games	19
Swings and other play equipment	7
Other games	7
<i>Park/playground (n = 24)</i>	
Swings and other play equipment	11
Ball games	8
Falls	4
Dog bites	1
<i>Elsewhere (n = 93)</i>	
Falls	24
Cycling	19
Car accident	12
Horses	8
Games	8
Dog bites	5
Fighting/assault	5

n = total number of accidents in location.

Table 3. Estimated annual incidence rate of accidents by age and sex of child for 1986.

	No. of accidents	No. per 1000 children	(95% CI)
<i>Boys aged:</i>			
0-4 yrs	21	320	(183-457)
5-9 yrs	22	196	(116-276)
10-15 yrs	24	243	(153-333)
All ages	67	276	(211-341)
<i>Girls aged:</i>			
0-4 yrs	9	145	(40-250)
5-9 yrs	11	116	(16-216)
10-15 yrs	17	233	(112-354)
All ages	37	175	(113-237)
<i>All children aged:</i>			
0-4 yrs	30	254	(160-348)
5-9 yrs	33	218	(159-277)
10-15 yrs	41	238	(164-312)
All ages	104	230	(184-276)

CI = confidence interval.

suggest that more than one in five children in this age group suffers an accident meriting medical attention each year, although the probability that these accidents are not evenly distributed between children must be remembered. Boys suffer significantly more accidents than girls ($P < 0.05$), particularly in the younger age group. The estimated contribution of fractures to the annual incidence of accidents in 1986 was 5.5%.

Discussion

There appears to be no other published study from general practice with which we can compare our overall incidence rates. A search of the data held by the Child Accident Prevention Trust

resource centre demonstrated that most of the information available is based on hospital surveys and focuses on accidents occurring at home. The home accident rate for children aged under 16 years is estimated (on the basis of hospital surveillance) as about 50 per 1000 children.⁴ However, Sibert and colleagues reported in 1981 that only about one in five accidents presenting to hospital had occurred at home.⁵ They estimated (using the catchment population of their hospital as a denominator), that the casualty attendance rate for all accidents during the six month study period was 8.7%, 9.1% and 11.7% for up to four year olds, five to nine year olds and 10 to 14 year olds, respectively.

The child health and education study is of comparative interest as it collected data on under five year olds, using a parental interview conducted when the child was five years old.⁶ The reported five year incidence of accidents 'severe enough to merit medical attention' was 600 per 1000 children, of which 9% involved fractures. The difference between this and the Berinsfield estimate may well reflect recall bias (recent accidents are more likely to be remembered) and the difficulty of achieving comparable measures of severity.

Our initial reason for eliciting parental reports was to avoid underestimating accident rates by ignoring accidents not reported by doctors. As so few accidents reported by parents in response to question 1 had not led to a recorded medical consultation, it appears that incidence can be reliably measured without significant underestimation (in a practice such as Berinsfield) from a random sample of children's general practice medical records. Because of non-response and forgetfulness, underestimation is more likely if incidence is estimated on parental reports alone. But parental observations have important advantages. First, they provide circumstantial details of accidents and secondly, they involve active parental participation in prevention. Publications on risk management stress the importance of public perception of risk and emphasize the need for community participation if accident prevention is to succeed. Thirdly, parental observations create a framework within which to record risks before accidents happen, either in general terms or by giving details of events which 'could have been more serious under slightly different circumstances' as was done in the thousand family study in Newcastle.⁷ The Royal Society report on risk management stresses the need to manage actively annual mortality risks greater than one in a million,⁸ but short-term local surveillance based only on accidents that have occurred is unlikely to detect risks even 100 times greater than this.

We therefore suggest that general practice recording supplemented by parental observations has the potential to provide a comprehensive view of the nature and incidence of childhood accidents. All members of the primary health care team should be aware of the relevance of their notetaking in the context of childhood accidents, and the importance of full and clear records should be emphasized. These data could be extracted from the medical records at predefined intervals by external auditors, as described in relation to other preventive strategies in primary care.⁹ Alternatively, those practices which are fully computerized and which record encounter data routinely could deliver the relevant information once appropriate measures had been taken to ensure confidentiality.

Parental observations may be recorded in one of two ways. For those parents whose children are under five years of age, parent-held child health records could be used and parents asked to record incidents which could, as well as did, lead to injury. Data could be collated at predetermined intervals, perhaps most easily at child health clinics at the time of immunizations or developmental checks. Another possibility, especially for older children, would be to use a 'yellow card' scheme similar to that

used for adverse drug reactions. This could be made available in doctors' surgeries, schools and other places where parents and children congregate and could be returned to and collated by a member of the primary health care team. As a relatively large proportion of childhood accidents occur at school, it may be appropriate that the school nurse should play an extended role in organizing the collection of data.

Experience suggests that the medical staff should play a supportive rather than an executive role for any such system to work efficiently. Cooperation between primary health care teams, other professionals in the community and parents could provide a more precise knowledge of the nature, incidence and site of childhood accidents strengthened by statistical support from local departments of community medicine. Linking accidents to localities by means of postcode mapping could enhance the usefulness of any information gathered both for parents and health professionals alike — so improving still further the prospects for accident prevention.

Increasing parental knowledge and responsibility for accident prevention may define environmental hazards more accurately so that in relevant cases the attention of local authorities can be focused upon them. Such a public health role would clearly augment the health education which many primary health care teams already undertake.

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