

## Home accidents in older people: role of primary health care team

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### Abstract

**Objectives**—To determine the incidence and nature of unreported and reported home accidents in older people and to investigate associated environmental factors.

**Design**—Postal questionnaire requesting information on home accidents in the preceding month.

**Setting**—Inner London general practice.

**Subjects**—All registered patients aged over 65 years (n=1662), of whom 120 were inappropriately registered and 1293 responded.

**Main outcome measure**—Circumstances and consequences of accidents in the home.

**Results**—108 accidents were recorded in 100 patients, giving a home accident rate of 84/1000 patients, equivalent to an annual rate of 1002/1000. 73 accidents were falls, and 83 were unreported. Of the 25 reported accidents, 19 were reported to general practice and six to accident and emergency departments (5.6% of all events). Rates of home accidents increased with age and were higher in women than men (79/819 v 29/474;  $\chi^2=4.5$ , df=1,  $p<0.05$ ).

**Conclusions**—The incidence of home accidents in people aged over 65 years was high but few events were reported to medical services. General practice provided the main contact for patients who reported home accidents, and primary care workers have important opportunities for advising elderly patients on home accident prevention. Improved publicity on home safety targeted at older people and their carers would support the primary health care team in this role.

### Introduction

Older people have the highest rate of fatal home accidents, and those aged over 75 years suffer the highest mortality.<sup>1</sup> Falls account for most reported home accidents in this age group, and these may be complicated by injury and loss of confidence and functional ability.<sup>2,3</sup> The rising incidence of hip fractures among elderly people<sup>4</sup> and the consequent increased occupancy of orthopaedic beds<sup>5</sup> is a cause for concern. As the proportion of elderly people in the population rises injury rates are expected to increase further.

Most studies of home accidents are based on populations consulting hospitals and general practice.<sup>2,6,8</sup> Little information is available on unreported home accidents. If education on home safety is to be relevant it should be based on all home accidents.<sup>9</sup> We investigated the incidence of unreported and reported home accidents in older people and determined their circumstances and consequences.

### Subjects and methods

The study was undertaken in a group practice of eight principals in south east London. On 31 October

1989 we sent a postal questionnaire to all registered patients aged over 65 years (n=1662), accounting for 9.7% of the 17 140 patients included on the age-sex register on 1 October 1989. The questionnaire invited patients, or carers on their behalf, to describe personal accidents, falls, or injuries which they had experienced in their homes or gardens, or when visiting others in October 1989 and to return the questionnaire within seven days. We limited the request for information to one month to minimise recall bias associated with memory impairment in older people. October was chosen because the weather and daylight hours promote a moderate degree of activity at home but it is not a main holiday period. The questionnaire was based on the World Health Organisation accident classification,<sup>10</sup> and also asked whether patients lived alone; whether they were housebound and used mobility aids; and what type of accommodation they had.

To improve the response rate the primary health care team and wardens of sheltered housing were asked to identify patients who had had home accidents in the study period and to complete a questionnaire on their behalf if they had not responded. Hospital discharge summaries and accident and emergency department reports were screened for events. Patients and carers who had contact with the primary health care team within four weeks of the mailing were reminded to return completed questionnaires. Non-responders were not sent reminders as a delay would have adversely affected recall. The medical records of 100 consecutive non-responders were checked to identify inactive patients and those who had consulted with home accidents during the study.

Patients who indicated that they had had an accident were telephoned by HG for confirmation and, with their consent, were visited at home by one of us within 28 days. We used a standard questionnaire based on the home accident surveillance system<sup>8</sup> to obtain the following information: the type of accident; whether injury occurred; outcome, including source of help if sought and whether referred to medical services; location of the accident in the home; and environmental hazards which may have contributed. The annual home accident rate was estimated.

### Results

We received completed questionnaires from 1293 of the 1662 patients aged over 65 years. After correcting the age-sex register by removing 120 patients known to have died or moved away, 1542 patients were eligible for the study. The response rate was 84% with no significant difference between sexes (474/568 men, 819/974 women).

One hundred patients (6.5% of the population at risk; 7.7% of respondents) reported 108 home accidents in October 1989. Of these, 102 occurred in patients' own homes and six in other homes. Six patients reported two accidents; one reported three; and one

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demented patient with frequent undifferentiated falls was classified as having had one accident. One patient agreed to a telephone interview but refused a visit.

The incidence of home accidents increased with age: 43 of 686 (6.3%) patients aged 65-74, 44 of 510 (8.6%) aged 75-84, and 13 of 97 (13.4%) aged over 85 had accidents. Women, who made up 63% of the study population, had a higher incidence of accidents than men; there were 79 accidents in 819 women compared with 29 accidents in 474 men ( $\chi^2=4.5$ ,  $df=1$ ,  $p<0.05$ ).

Of a sample of 100 consecutive non-responders, 47 may have been inaccurately registered as they either

TABLE I—Management and outcome of home accidents in elderly people

| Source of help                    | Total No of accidents (n=108) | No injured (n=83) |
|-----------------------------------|-------------------------------|-------------------|
| Unreported to medical care        | 83                            | 60                |
| Coped alone                       | 64                            | 48                |
| Help from relative or neighbour   | 17                            | 10                |
| Advice from community pharmacist  | 2                             | 2                 |
| Reported to medical care          | 25                            | 23                |
| General practice                  | 19                            | 17                |
| Accident and emergency department | 3                             | 3                 |
| Admission to hospital             | 3                             | 3                 |

TABLE II—Classification of home accidents in elderly people, whether injury occurred, and whether reported to medical services

| Type of accident                        | No of accidents (n=108) | No injured (n=83) | No reported to medical services (n=25)                              |
|---|-------------------------|-------------------|---|
| Falls                                   | 73                      | 49                | 19  |
| Trip                                    | 27                      | 20                | 11 (General practitioner 8, accident and emergency 2, inpatient* 1) |
| Slip                                    | 17                      | 13                | 2 (General practitioner 2)  |
| Unsteadiness                            | 13                      | 7                 | 3 (General practitioner 1, accident and emergency 1, inpatient* 1)  |
| Blackout or syncope                     | 8                       | 5                 | 2 (General practitioner 2)  |
| Fall from height                        | 4                       | 2                 |   |
| Unexplained                             | 4                       | 2                 | 1 (Inpatient* 1)  |
| Other accidents:                        | 35                      | 34                | 6   |
| Cuts from utensils, tools, or obstacles | 13                      | 13                | 1 (General practitioner 1)  |
| Knocks against stationary objects       | 7                       | 7                 | 1 (General practitioner 1)  |
| Struck by moving objects                | 5                       | 5                 | 1 (General practitioner 1)  |
| Insect or animal bite                   | 5                       | 5                 | 2 (General practitioner 2)  |
| Burn or scald                           | 4                       | 4                 | 1 (General practitioner 1)  |
| Choking                                 | 1                       |                   |   |

\*Admitted after reporting to accident and emergency department.

TABLE III—Reported and unreported home accidents which resulted in injury

| Injury                      | Unreported (n=60) | Reported (n=23) |
|-----------------------------|-------------------|-----------------|
| Contusion, swelling, sprain | 38                | 11              |
| Laceration or other wound   | 16                | 5               |
| Burn or scald               | 4                 | 1               |
| Fracture                    |                   | 5               |
| Choking                     | 1                 |                 |
| Concussion                  | 1                 | 1               |

had not consulted for five years or had no medical records. No accidents were recorded in the study period for the remaining non-responders.

#### CONSEQUENCES OF HOME ACCIDENTS

Most home accidents (83/108) were not reported to medical services (table I). Eighty three patients were injured as a result of the accident, of whom 23 reported to medical services (tables II and III). In addition two uninjured patients consulted to discuss the cause of their fall. Of the 25 reported home accidents, 19 were reported to general practice, and six to accident and emergency departments.

Falls accounted for 73 of the 108 accidents (table II). Falls were more often reported to medical care (19/73, 26%) than other accidents (6/35, 17%). The six patients who reported to hospital and 13 of the 19 who reported to general practice had fallen. Three patients died after

TABLE V—Activity of elderly patients at time of accident

| Activity                  | Total (n=108) | Falls (n=73) | Other accidents (n=35) |
|---------------------------|---------------|--------------|------------------------|
| Household duties          | 36            | 18           | 18                     |
| Moving about house        | 27            | 24           | 3                      |
| Self care                 | 12            | 8            | 4                      |
| Gardening                 | 12            | 8            | 4                      |
| Walking in garden         | 10            | 10           |                        |
| Do it yourself or hobbies | 6             | 1            | 5                      |
| Unclassified              | 5             | 4            | 1                      |

immobilisation from the injury (two of broncho-pneumonia, one of cardiac failure), and five patients had fractures (three ribs, one scaphoid, and one tibia).

The home accident rate for one month for 1293 patients aged over 65 years in the corrected population at risk was 84/1000 patients. Unreported home accidents accounted for 64/1000 and accidents reported to medical services for 19/1000 (15/1000 to general practice; 5/1000 to hospital). The estimated annual home accident rate based on these figures was 1002/1000 patients, with 770/1000 unreported and 232/1000 reported to medical services (176/1000 to general practice; 56/1000 to hospital). The incidence of falls in one month was 56/1000 with an estimated annual rate of 677/1000.

#### HOME ENVIRONMENT

Fifty eight accidents occurred in houses, 41 in flats, two in bungalows, and seven in sheltered housing units. Of the 100 patients who had accidents, 54 lived alone, 20 were housebound, and 33 used mobility aids. Accidents were more common in high activity areas such as the kitchen in which 24 (22%) accidents occurred often during meal preparation (tables IV and V).

#### Discussion

Our estimated annual home accident rate of 1002/1000 patients, of which falls accounted for 677/1000, suggests that most people aged over 65 can expect to have a home accident each year, and over half will experience a fall. Most home accidents and falls were not reported to medical services, and of those that were, most were reported to general practice rather than to accident and emergency departments. Although our figures include multiple events in accident prone patients they indicate a serious and widespread community problem in older people, and a consequent heavy burden for health care workers.

Previous studies have reported wide variations in home accident rates in elderly people. The home accident surveillance system estimated an annual rate treated at hospital of 20/1000 patients at age 65 years increasing to 90/1000 with advancing age.<sup>11</sup> The general household survey found that 8% of older people had reported a home accident to general practice or hospital in the preceding three months, equivalent to an annual rate of 320/1000.<sup>7</sup> A general practice study undertaken 25 years ago on pensioners identified numerous unreported accidents and estimated the annual home accident rate at 196/1000, of which 17/1000 were reported to general practice and 8/1000 to hospital. Our higher rate (1002/1000 patients, of which 176/1000 were reported to general practice and 56/1000 to hospital) may be explained by more sensitive patient recall in a shorter study period, the use of a larger and more accurate population sample, and a recent increase in the numbers of very elderly people.

Surprisingly few serious injuries were recorded, with fracture and mortality rates of 5% and 3% respectively. Only a quarter of the patients who described an injury as a result of their accident sought

TABLE IV—Location of home accident in elderly people

| Place                         | No of accidents (n=108) |
|-------------------------------|-------------------------|
| Indoors                       | 80                      |
| Kitchen                       | 24                      |
| Living or dining room         | 19                      |
| Stairs                        | 11                      |
| Entrance, threshold, or porch | 8                       |
| Bedroom                       | 7                       |
| Hall or lobby                 | 7                       |
| Bathroom, toilet              | 4                       |
| Outdoors                      | 24                      |
| Garden, patio, or yard        | 17                      |
| Garage, garden shed           | 4                       |
| Steps                         | 3                       |
| Unclassified                  | 4                       |

medical care. Indeed, accident and emergency departments managed only six patients. Although most injuries were minor, many disrupted everyday activities, causing reduced mobility, loss of self confidence, and increased dependency on carers.

#### CAUSES AND PREVENTION

The causes of home accidents and falls in elderly people are complex.<sup>12</sup> We had difficulty attributing an event to any one factor. Most resulted from an interaction of environmental hazards, physical disability, and carelessness or excessive risk taking. The contribution of environmental factors has been emphasised recently.<sup>13</sup> Potential hazards identified in our study included inadequate lighting of kitchen work areas, stairs, half landings, porches, entrances, and cellars; lack of support on stairways and in bathrooms, where handrails were needed; inconspicuous steps and sills which would have been more obvious if accentuated with white edges or reflective strips; excessive clutter and loose rugs in high activity areas such as kitchens and living rooms; chair and bed heights too low for safe transfer; and ill fitting footwear especially slippers.

As we found that general practice rather than hospitals provided most patient contact after home accidents, the primary health care team has a potentially important role in preventing home accidents in older people. The question is whether an education programme for the whole elderly population or specific targeting of selected patients would be more effective in reducing home accidents? Advice on avoiding accidents given in the community by occupational therapists and health visitors did not significantly reduce falls, or injuries resulting from falls, in prospective trials.<sup>14,15</sup> An opportunistic approach could include counselling of patients who report home accidents, disabled people, and very elderly people, whom we found to have the highest incidence of home accidents. General practitioners should evaluate the contributions of medication, poor mobility, and impaired vision in patients who report home accidents and take appropriate action, including referral of patients with unexplained falls.<sup>9</sup> District nurses with training in health education can also help identify high risk patients.

Whatever the potential of the primary health care team in reducing home accidents in older people, prevention is mainly a social responsibility.<sup>13</sup> Public

education on home safety encourages the recognition of personal risk, the modification of behaviour, and the creation of safe environments, and this has been attempted by the media, manufacturers, consumer and voluntary agencies, environmental health departments,<sup>16</sup> local police, and supermarkets. Improved availability of large print leaflets on home accident prevention, with safety checklists based on those developed by the Royal Society for the Prevention of Accidents,<sup>17</sup> would complement advice given in general practice. Older people and their carers would benefit from a greater appreciation of accident prevention in the home, not only by the medical profession but also by all members of society.

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#### *Is there a maximum safe dose of vitamin C (ascorbic acid)?*

The question of safety of high doses of vitamin C remains controversial, as it has been for the past three decades at least. The daily amount needed by normal human adults to prevent or cure the deficiency disease, scurvy, is less than 10 mg a day. Blood and tissue concentrations rise steeply over the range 20-100 mg a day (depending on dose schedules and individual variations in economy), but for most people there are no overt adverse reactions to high doses until these reach at least several grams a day. The commonest adverse reaction at high intakes is bowel intolerance, manifested as acute diarrhoea.

Because of the benefits of vitamin C, mainly as an antioxidant, in combating pro-oxidant damage from free radical and other oxidants in model systems, and in view of the epidemiological evidence linking relatively high intakes of foods rich in vitamin C (fruit and vegetables) to a relatively low risk of certain degenerative diseases in humans, some authorities believe that intakes above the range that is usually provided by the human diet may give protection against occasional destructive events and are therefore, on balance, beneficial. Others argue that these benefits remain unproved and that such high

intakes carry an appreciable risk of toxic side effects—for example, those listed by Flodin<sup>1</sup>—which may outweigh the possible benefits.

In a recent document on dietary supplements and health foods published by the Ministry of Agriculture, Fisheries, and Food and Department of Health a long term daily intake of vitamin C at or above 6 g was considered to be "undesirable."<sup>2</sup> No upper limit was specified in the Department of Health's report *Dietary Reference Values for Food Energy and Nutrients for the United Kingdom*, although some possible risks were noted as being associated with daily intakes of grams.<sup>3</sup> Research interest in this question is undoubtedly increasing, and new techniques of showing subtle tissue damage and the efficacy of protective agents such as vitamin C are being assessed.—C J BATES, *Dunn Nutrition Centre, Cambridge*

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