

Avoiding slips, trips and broken hips



How do older people
use their stairs?



RESEARCH

How do older people use their stairs?

Avoiding slips, trips
and broken hips

Summary

Interviews were conducted with 157 individuals, aged between 65-96 years, and living in their own homes, to investigate how older people use and keep their stairs. Study participants were often able to recognise hazards that increase the chances of falling on stairs, such as leaving items on steps or carrying objects. Despite this, many of those interviewed continued to engage in unsafe acts. Reducing falls on stairs among this age group requires a holistic approach, with attention to both the environment and behaviour. Education has a part to play in this, raising awareness and communicating advice. With 87 per cent of the participants in this research reporting they had never received any information on stair safety, it is important for this issue to be addressed.

Introduction

Falls on steps and stairs in the home are a serious problem among older people aged 65 or over. Figures for the UK, for example, indicate that 57,000 older people experience a fall on steps and stairs in the home each year. Almost 1,000 individuals die as a consequence. A further 22,000 experience serious injury, suffering a fracture, concussion or otherwise requiring admission to hospital for more than a day (DTI, 1999). Although there is general agreement that older users are at increased risk of falling on stairs, the actual extent is difficult to quantify, due to an absence of data on levels of stair use by different age groups (Templer, 1992).

When older people do have the misfortune to fall on stairs, the consequences can be traumatic and seriously disabling. Fracture injuries are more common among fallers in this age group, and these and other injuries often take longer to heal (Pauls, 1985; Nagata, 1993; Dowswell *et al*, 1999). In addition to any physical injury, falls can also have serious psychological and social consequences, affecting confidence, mobility and general well-being. Unfortunately, falls are likely to become an increasing problem, with the changing age profile of the population.

Personal factors involved in fall accidents among older people include decreased balance ability, disturbed gait,

cognitive impairment, reduced strength, impaired vision, illness, and side effects from use of medication (Askham *et al*, 1990). With regard to vision, both depth perception and judgement of distance may be involved in fall accidents (Davis, 1983; Cohn and Lasley, 1985).

It has been suggested that environmental features are a significant factor in all fall accidents in older people in around one third of cases (Smith, 1990). Problems may include poorly designed or absent handrails, stairs that are too steep, stair surface or covering in poor condition, objects left on stairs, and poor lighting (Templer, 1992).

However, it has been suggested that behaviour, especially when coupled with inadequacies of the surroundings or personal frailty, also plays a large part in many falls on stairs (Templer, 1992). This may involve the manner of stair use, or decisions taken which affect the stair environment. Surprisingly little is known, however, about how older people keep and use their stairs (Askham *et al*, 1990). Accident prevention efforts would benefit from increased knowledge of older people's awareness of factors affecting their safety on stairs, and what influences their behaviour. It would also be of benefit to know more about the coping strategies individuals develop to compensate for declining abilities, and how these might be supported through design and other interventions (Smith, 1990).

The aim of the research reported in this paper, therefore, was to improve understanding of how older people use their stairs and why they use them the way they do, and to assess their knowledge of factors that affect risk of falling. The findings of the research are informing the UK Government campaign, Avoiding slips, trips and broken hips, an initiative by the Department of Trade and Industry, to reduce the number of falls in the home by older people each year.

Methods

Semi-structured interviews were conducted with 157 older people living in their own homes, to collect both qualitative and quantitative information. Participants were sampled according to age and gender using estimated population figures for the UK published by the Office for

National Statistics. Likewise, properties were selected based on national estimates of housing stock with respect to age and type of dwelling.

Using a combination of open and closed questions, participants were asked about their behaviour on and around the stairs, awareness of safety factors and any history of falling on stairs. During each visit, information was collected about the design and condition of stairs; design, colour and state of stair coverings; colour and design of wall coverings; number of handrails and their condition; objects/items on and around stairs; lighting provision; and position of windows. Standard anthropometric dimensions of interviewees were recorded, along with other measurements including grip strength in both hands, ability to get up from a stool without using hands (a measure of lower body strength and mobility), and measures of visual acuity and depth perception. The results below summarise the main findings of the research.

Results

Participant characteristics, % (n=157)

age	mean 77 years	(sd 7.1)	(range 65–96)
male	28		
female	72		
living alone	58		
living with others	42		
interviewed as couples	n=14		
eye sight test in last two years	93		
use bifocal spectacles	57		
have a condition that affects vision (e.g. cataracts, glaucoma, macular degeneration etc)	45		
take at least one prescribed medication daily	82		
take four or more prescribed medications daily	26		
fallen on stairs since age 16	44		
experienced two or more falls on stairs	19		

Household characteristics, %

property age	median 41 years	(range 6-400)
detached	37	
semi-detached	27	
terraced	20	
purpose built flat	13	
other types of properties	3	
single toilet, upstairs	33	

GENERAL STAIR DESIGN

A total of 188 flights of stairs were surveyed across the households visited. These included the flight used most frequently within the home, usually positioned between the two main floors; other stairs within the dwelling, such as attic and cellar stairs; and outside steps of three steps or more.

Stair coverings, %

households with worn, frayed, or poorly fitted coverings	29
households with loose rugs or mats positioned at top of stairs	11

Handrails, %

flights of stairs with two handrails	34
flights of stairs where handrail observed to be in need of repair	10

Lighting, %

low energy bulbs used at top of stairs	24
ambient illumination level at night, with lights switched off	mean 0.04 lux

A large proportion of participants (85 per cent) said they would not consider using brighter light bulbs around the stair area, usually because they considered the bulbs currently installed to be adequate. Choice of lampshade can lead to substantially reduced illumination from a light, a consequence, for example, of the solid plastic design shown in figure 1.

Figure 1. Lampshades can substantially reduce illumination.



A number of interviewees (18 per cent) reported not switching the stair lights on when going downstairs during the night, with various reasons given for this. One person reported that 'it depends what I'm wearing, if naked I will not put the lights on, if I have a dressing gown on I might put the light on'. Another example 'I have a glass front door so plenty of light comes in from outside. If there is too much light it will wake me up and I will not get back to sleep'.

PATTERNS OF USE

When asked when they might use their stairs most frequently, 50 per cent of participants reported that there was no particular time of day they used them more than any other. Other responses included morning (38 per cent) and afternoon (11 per cent). A notable proportion (32 per cent) reported avoiding using stairs where possible.

CARRYING OBJECTS

Interviewees generally thought that carrying objects down stairs was more hazardous than when taking things up. Participants mentioned various strategies that they employed to improve their safety in these circumstances. These included throwing laundry downstairs; coming down the stairs backwards, moving an item being carried down a step at a time; and only carrying objects manageable with one hand, leaving a hand free for the handrail. Some 29 per cent of participants reported that when needing to carry an object up or down the stairs that may cause them a problem, they would not ask for help but 'have a go anyway'.

LEAVING OBJECTS ON STAIRS

In just under one third of households visited (29 per cent), objects were found on the stairs. These included both temporary items (e.g. clothing) and permanent objects (e.g. furniture on half-landings), figure 2. When asked about factors that might affect the risk of falling, 89 per cent mentioned objects on stairs. This is at odds with the 71 per cent of participants reporting that they do place objects on steps, albeit with the intention of taking them up at a later time.

HURRYING

When asked about factors that might affect the risks of a fall occurring on stairs, 89 per cent answered that hurrying on the stairs would increase the risk. However, 63 per cent stated that they do hurry on occasions, giving various reasons for this. Common responses included needing to use an upstairs toilet, answering the

telephone or someone being at the door. A sizeable proportion of participants (37 per cent) said they made a point of not hurrying for any reason.

CLEANING

When asked about cleaning the stairs, 34 per cent reported they either do not clean the stairs at all, employ a cleaner, or rely on a carer or relative to clean the stairs. Of the 66 per cent who clean the stairs themselves, 26 per cent use small hand held vacuums. Some 35 per cent of the group who do their own cleaning identified various aspects of vacuum cleaner use as problems they thought would increase risk of falling.

OTHER FACTORS

When participants were questioned about changes they might consider making to the stairs to make them safer, 38 per cent suggested a second handrail and 30 per cent suggested having a stair lift fitted. A large proportion of participants (87 per cent) reported that they had not received any advice about stair safety.



Figure 2. Objects on stairs.

Discussion

AWARENESS OF RISKS

This research suggests that the knowledge older people have about stair safety does not necessarily dictate how they behave. There are two aspects to this. In some cases a risk may not be known or appreciated. In others, a risk may be recognised, but without behaviour making corresponding allowance for this.

A lack of awareness of risk may lead to a dangerous situation. For example, when leaving objects on stairs, participants frequently said that the objects were usually small and placed to one side, not in the middle where they walk, and in acting in this way they could not foresee any problems. However, objects might cause difficulties for another member of the household, unaware that they are there. Also, in some circumstances, it may not be possible for someone descending the stairs to see objects, where they are small and obscured from vision by the step above. Another example of this may be seen where furniture, such as bookcases and other large items, have been situated on half-landings or at the bottom of stairs. Often this reduces the useable width of stairs and presents an object to fall into.

Older people recognise that carrying objects up or down stairs can increase the risk of falling. However, it is noteworthy that almost a third of interviewees said they would still try, even though they might have to struggle. Respondents mentioned a number of strategies adopted in this situation but, unfortunately, it is possible that some of these generate alternative hazards. For example, a number of participants said that when carrying something they descend the stairs backwards, moving down one step at a time, placing the object being carried on the step in front of them, moving it down gradually. The trouble with this method is that it can pose the risk of the person misjudging when they are at the bottom of the stairs. Among the sample were instances of people who had reached the second to bottom step, stepped back thinking they were at the bottom and fallen backwards.

Safe use of stairs by older people requires that they recognise their limitations and adjust their behaviour accordingly. A positive example of this arises from methods that some interviewees reported using to clean their stairs. Some do not attempt to clean them at all, while others choose to use a small hand-held vacuum cleaner, thus reducing the risks that may arise from use of normal sized equipment.

Lighting is another important issue, with poor lighting having been suggested as a contributory factor in many fall accidents (Templer, 1992). Again, respondents were sometimes aware of the problems and risks of low light

levels, but other criteria took precedence. In well over half of households visited, bulbs of less than 100W were in use at the top of the stairs. Combined with this, some households also had lampshades of a design further restricting levels of illumination. Most interviewees agreed that not using lights at night would increase the risk of a fall occurring but, even so, almost a quarter reported not putting the light on should they come downstairs after going to bed. A variety of explanations were given for this, including light coming in from outside; eyes already adapted to the dark; and familiarity with their own stairs. When night illumination readings were taken in a selection of households, levels found were very low with lights switched off. In the dark, people seem to use the small amount of illumination available to detect clues in the environment. Together with use of touch, they believe they can tell where they are on the stairs. However, this may lead to problems in the event of unforeseen circumstances, such as stepping on an object or perhaps encountering a pet.

FALL PREVENTION

Tackling the problem of older people falling on stairs requires a holistic approach that addresses design as well as behavioural issues. Over the longer term, the effects from improving building regulations and standards will lead to improvements to housing and the stair environment. There is also scope to look at the design of aids and equipment.

Meanwhile, it is desirable that older people should be encouraged to use their stairs with greater attention to safety. Many of the participants in this study reported behaviour that has been identified by other researchers as increasing the risk of falling on stairs. Interviewees often had good recognition of hazards in this respect but a less accurate appreciation of the likelihood (or risk) that these might lead to a fall.

This suggests an important role for education. However, as knowledge regarding safety does not necessarily lead to compliance, it is important to identify and address obstacles that may prevent older people changing their behaviour. Educational interventions need to highlight ways for older people to do things differently that are intuitive, easily implemented and convenient.

Conclusions

The experience of this research is that many older people are interested in their safety on stairs and receptive to advice. With a large majority of participants in this investigation reporting never having received any advice regarding stair safety, the DTI's campaign to prevent falls in older people, with a forthcoming focus on stair safety, is a welcome initiative in addressing this need.

Acknowledgements

This research was funded by the UK Department of Trade and Industry (DTI). The authors particularly wish to thank Geoff Dessent, Deputy Director Consumer Safety and Trading Standards, for his valuable input to the project.

References

- Askham J, Glucksman E, Owens P, Swift C, Tinker A and Yu G, 1990, *A review of research on falls among elderly people* (Department of Trade and Industry: London).
- Cohn T E and Lasley D J, 1985, Visual depth illusion and falls in the elderly, *Clinics in geriatric medicine*, **1**: 601– 20.
- Davis P R, 1983, Human factors contributing to slips, trips and falls, *Ergonomics*, **26**: 51–9.
- Department of Trade and Industry (DTI), 1999, *Home accident surveillance system including leisure activities: 21st annual report 1997 data* (Department of Trade and Industry: London).
- Dowswell T, Towner E, Cryer C, Jarvis S, Edwards P and Lowe P, 1999, *Accidental falls: fatalities and injuries – an examination of the data sources and review of the literature on preventative strategies* (University of Newcastle upon Tyne).
- Nagata H, 1993, Fatal and non-fatal falls – a review of earlier articles and their developments, *Safety Science*: **16**: 379–90.
- Pauls J L, 1985, Review of stair-safety research with an emphasis on Canadian studies, *Ergonomics*, **28**: 999–1010.
- Smith D B D, 1990, Human factors and ageing: an overview of research needs and application opportunities, *Human Factors*, **32**: 509–26.
- Templer J, 1992, *The Staircase* (MIT Press: Massachusetts).

