

Does flooring type affect risk of injury in older in-patients?

KEY WORDS

Patient accidents, care of older people

ABSTRACT

This paper looks at the role of carpeted and vinyl floors in relation to the injuries older patients receive when falling in hospital. A random sample of 225 accident forms were analysed retrospectively and separated into two patient groups. Out of a group of patients falling on carpet, only 17% sustained injuries. In the group of patients who fell on vinyl, 46% sustained injuries. Statistical analysis indicated that there was a less than 1% probability that the reduced rate of injury for those patients who fell on carpets was owing to chance. The implications of these findings on the type of flooring provided in hospital wards for older people are discussed, and suggestions are made for further research.

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MOST PEOPLE'S HOMES are now floored with carpet rather than vinyl, and there is a trend towards carpeting some clinical areas in hospitals. Providing carpets instead of vinyl in wards for elderly people may improve the appearance of the area. But also results in greater maintenance and replacement costs. Floor covering is said to be irrelevant to infection control¹ but spills may make carpets look and smell less clean than vinyl. Since recent research indicates carpets may be harmful to some asthmatic patients¹, it is important to find out whether there are any benefits in carpets that outweigh this risk.

Any ward for older people is likely to have some patients who fall. A number of falls can be prevented by careful treatment of intrinsic risk factors, which range from blocked ear canals to cardiac arrhythmias.² Attention should also be given to extrinsic factors that increase the likelihood of falls, such as poor lighting, clutter and unsuitable footwear. However, any ward trying to improve the independent living skills of its patients accepts risk-taking as part of rehabilitation, and some falls cannot be prevented.³

The fact that some falls are inevitable does not mean the consequences of falls are unimportant. Even minor injury to a frail older person who is just managing to care for him or herself can lead to institutional care.⁴ A serious injury such as a fractured hip can have devastating consequences for the individual; one study found 29% of elderly patients died within six months of fracture and only 50% returned to their previous home.⁵ The financial cost can also be high: a poor recovery from hip replacement can block an acute bed for eight weeks and cost 26 000.⁶

The *Health of the Nation* guidelines, issued by the Department of Health, set a target of reducing the death rate from accidents among people aged over 65 by 33% over the next 11 years.⁷ If this target is to be achieved, nurses must examine ways in which they can reduce the number of accidents occurring within hospitals and care homes, as well as outside them.

METHOD

This investigation retrospectively analysed a sample of 225 accident forms selected at random from all accident forms completed in a care of the elderly unit over four years. Unit policy stated that nursing staff should complete a form whenever a patient fell, whether or not the patient was injured, and for any incident when a patient was injured. The unit was made up of three acute admission wards and five rehabilitation wards (which were floored mainly with vinyl but had carpeted sitting rooms) and one acute admission ward for patients in need of joint assessment (which was carpeted

with the exception of two single bedrooms and all toilets). The type of carpeting varied from area to area but all were washable with single, rather than looped, fibres and a thin underlay.

For the purpose of this study injury was defined as any graze, bruise, laceration or fracture, and also any fall that resulted in the patient complaining of pain, even if there was no visible lesion.

RESULTS

Four accident forms had to be excluded as they did not contain enough information on where the fall occurred. Another eight forms were excluded because they recorded injuries unrelated to the type of flooring (for example, scalds). The remaining 213 forms were separated into those involving falls on carpet, and those involving falls on vinyl, and the incidence of injury for each of these groups was obtained. The age and sex of each patient who fell was also recorded, so that any difference in the composition of the two experimental groups could be seen.

Out of the group of 27 patients who fell on carpet, four received injuries. Out of the group of 186 patients who fell on vinyl flooring, 91% received injuries.

These results were analysed using the chi-squared test.⁸ Since the degree of freedom equaled one, Yates' correction was incorporated.⁸ The value for the chi-squared test indicated that there was a less than 1% probability that the reduced rate of injury observed for those elderly people who fell on carpet was owing to chance.

The group falling on carpet contained 16 females and 11 males and had a median age of 84 years. The group falling on vinyl contained 86 females and 100 males and had a median age of 86 years.

DISCUSSION

The results obtained in this study appear to support the hypothesis that patients who fall on carpet are less likely to be injured than those who fall on vinyl flooring. Since this study was retrospective, it is particularly important to examine whether there are any possible factors that could have confounded the result.

The risk of being injured when falling is known to increase with age. This is mainly because of osteoporosis, which leads to an increased risk of fracture.⁹ Skin is also less elastic and composed of fewer cell layers as a person ages, and so is more likely to be grazed or lacerated on falling. If the group of patients falling on carpet were much younger, on average, than those falling on vinyl, their reduced rate of injury might be caused by their age rather than the floor covering. However, as the median age of both groups was only two

The role of carpets in relation to injury and falls

There is little direct research on the role of carpets in relation to injury and falls but there is a small amount with an indirect bearing. Wilmott found that elderly people walked faster on a carpeted than on a vinyl-covered floor.¹² This could be explained in relation to Vellas' finding that falls and fear of falling led to older people restricting their activity.¹³ Speechley and Tinetti found that the risk of injury was higher for elderly people who fell away from home, despite the fact that they were generally younger and fitter than those who fell at home.¹⁴ A possible explanation for this finding is that they fell on hard surfaces, for example, pavements.

Good practice to reduce falls

FOOTWEAR

Shoes should fit and have no trailing laces. Shoes which have been used only on carpet may slip on vinyl. If a patient gets out of bed at night and doesn't put on slippers, going to bed in socks with a rubber pattern on the sole may prevent accidents

CLOTHING

Ensure patients do not wear trousers without a belt or braces or knickers that have lost their elastic as they can slip to the ankles and trip a patient over

FLOORING

Mop up any spillages on vinyl promptly

CLUTTER

Clear away any item not being used on the ward

LIGHTING

Patient areas should never be left in total darkness. Low but even lighting is safer than a mixture of brightness and darkness

EYESIGHT

Ensure patients see an optician if necessary

EARS

Check for any discharge or blockage as this can affect balance. Refer for a hearing test if there appears to be any hearing loss

URINE

A urinary tract infection can cause falls. Ward test urine for leucocytes, nitrates and blood.

OBSERVATIONS

Check lying and standing blood pressure. Check for pyrexia. Check the pulse for irregular beats

years apart, it does not provide alternative explanation for the results of this study.

Being female carries an increased risk of injury when falling because of the increased incidence of osteoporosis.¹⁰ If the group of fallers on carpet had fewer females than the group of fallers on vinyl, this could explain their reduced rates of injury. However, the proportion of females in the group that fell on carpet was actually higher than in the group that fell on vinyl.

Since the carpeted areas included a joint assessment ward, there was a slightly higher likelihood that some patients falling on carpet suffered from dementia. Although patients with dementia are more likely to fall,¹⁴ there is no evidence that they are any more or less likely to be injured when they fall than any other patient.

The interpretation of the results depended on nursing staff filling in the accident forms in a similar way across different flooring areas. The results supported the belief that very few falls had gone unrecorded, since they reflected previous research which suggests about half of falls in older people result in some injury.¹¹

Many of the falls included in this study were not witnessed and it is possible that some injuries were caused by the patient falling onto furniture, rather than onto the flooring itself. This was as likely to happen on carpeted as on vinyl areas and so would not have any direct bearing on the results.

Because it was not possible to determine how long each patient spent in carpeted rather than vinyl-floored areas, this study could not determine whether patients were less likely to fall when walking on carpet but could only examine their risk of injury, having fallen. A reduced risk of injury when falling on carpet would not be of benefit to patients if it was paired with an increased likelihood of falls. Closer examination of the accident forms used for this study did not indicate that more falls occurred when patients were on carpet. The ward that was carpeted was the source of seven accident forms: only one ward out of the nine wards in the unit submitted fewer forms than this. Also, 17 of the forms recording falls on vinyl mentioned that the floor had been made slippery by urinary incontinence. It seems reasonable to suppose most of these 17 falls would not have occurred on a carpeted floor.

Although this study appears to indicate that carpets are a safer form of flooring for elderly wards for older people, it should be recognized that other factors need to be considered as well as risk of injury. Problems in keeping carpets smelling and looking clean when patients are incontinent can be overcome if the ward has access to carpet shampooing on request. Enzymatic cleaners are very effective at reducing odour, as are ozone-producing air fresheners.

To build on from the results of this study, it is hoped that a further study can be carried out to compare rates of falling as well as rates of injury. This could be achieved by carpeting one of a pair of wards which were matched for type and num-

bers of patients, staffing levels and so on. It would also be possible to examine the effectiveness of different types of underlay by involving a third ward.

This study provides support for the hypothesis that older patients falling on carpeted floors are less likely to be injured than those who fall on vinyl, although further research is required to determine if carpets are also associated with a reduced risk of falling. If the results of this study are confirmed by further research, carpeting would become the flooring of choice for wards that cater for older patients. **NT**

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Nursing Times is holding a conference on July 13-14 on care of the elderly. A series on patient accidents will start on August 17 in NT