Supplementary data
Supplementary data mentioned in the text is available to subscribers in *Age and Ageing* online.

Acknowledgements
We wish to thank the staff of Muramatsu Health Centre for their help in data collection. We also thank the following institutions for providing us with necessary medical data: Igarashi Orthopaedic Clinic, Ishizone Clinic, Ito Clinic, Kaneko Clinic, Kasahara Clinic, Koyama Orthopaedic Clinic, Nanbu General Hospital, Nanbu Kosei Hospital, Murata Clinic, Takeda Clinic, Yamamura Orthopaedic Clinic in Gosen City, Kaetsu Hospital, Kameda-Daiichi Hospital, Nekoyama Miyao Hospital in Niigata City and Tominaga Kusano Hospital in Sanjo City.

Conflicts of interest
None declared.

Funding
This study was supported in part by a grant from the Nakatomi Foundation for scientific research relating to health promotion focusing on physical exercise.

Kazutoshi Nakamura1,*, Rieko Oshiki2, Ryosaku Kobayashi2, Mari Oyama1, Toshiko Saito3, Tomoko Nishiwaki4, Mitsue Nashimoto4, Yasuo Tsuchiya1

1Department of Community Preventive Medicine, Niigata University Graduate School of Medical and Dental Sciences, 1-757 Asahimachi-dori, Chuo-ku, Niigata 951-8510, Japan
Tel: (+81) 25 227 2125; Fax: (+81) 25 227 0764.
Email: kazun@med.niigata-u.ac.jp
2Department of Physical Therapy,
3Department of Health and Nutrition, and
4Department of Nursing, Niigata University of Health and Welfare, 1398 Shimami-cho, Kita-ku, Niigata City 951-3198, Japan

*To whom correspondence should be addressed

References

doi: 10.1093/ageing/afq148
Published electronically 10 November 2010

Exploring the contributory factors for un-witnessed in-patient falls from the National Reporting and Learning System database

SIR—Healey et al. [1, 2] reported an analysis of 12 months data on accidental falls in English and Welsh hospitals reported to the National Reporting and Learning System (NRLS). Their analyses gave important insights into the key issues, including that falls account for the greatest number of reports (33%) to the NRLS and that 94% of all falls in
Research letters

acute hospitals occur in in-patient areas. Very few hospital falls are witnessed by staff so very little is known about the contributory factors as the incident report may contain very little information, or just that the patient was found on the floor [1, 2]. This lack of information may be part of the reason that complex multi-factorial interventions have been used with mixed success [3–9]. In an attempt to learn more about the environmental (extrinsic) factors we have explored the NRLS database to look for associations between the reported contributory factors for un-witnessed falls for patients on care of the elderly wards in acute and community hospitals.

Method

We used the same search (and ethical and consent) criteria as Healey et al. [1, 2] to request data from the NRLS database retrospectively for patient safety incidents reported during the 12 months from 1 September 2006 to 31 August 2007. The data were sorted using the location and specialty levels, resulting in 44,202 reports. A 15% random sample was taken from the included cases using SPSS (version 16), giving a final dataset of 6,577 reports, of which 4,571 (70%) were un-witnessed.

As this was an exploratory exercise we initially coded the free text narratives for all possible contributory factors using Hignett and Masud [10] as the initial conceptual framework. Reports were coded as frail if the free text included a description of the patient as weak, frail or needing a walking aid. There may, of course, be patients who would fit these criteria but are not reported to be frail (e.g. no walking aid was mentioned in the report). Reports giving a description of the patient with any type of dementia, confusion or lack of awareness were coded as confused. As most falls are the result of a combination of factors [2], we were unable to allocate each report exclusively. For example, the following free text report was coded as frail (using a walking aid) and footwear (slippers were too small), ‘heard a crash. I was in side room washing a pt[patient]. Pt lying on her back with Zimmer frame. Pt slippers too small and she must of tripped. No apparent injuries. Ob[observations] stable. Seen by dr[doctor]’. The coding was conducted by one researcher (G.S.), with a sub-sample of 150 reports reviewed by a second researcher (S.H.) with over 70% initial agreement. Differences were discussed and resolved by either creating a new code or expanding a code description. All the reports were re-coded with the final set of codes to ensure inclusivity of the coding process.

Results

Over half of the sample (53%, n = 2,429) had no information on the intrinsic or extrinsic factors or location where the patient was found. Most falls were reported to have occurred at the bed/chair (n = 1,726), with 416 reported to have fallen in the toilet/bathroom. Falls in other locations (e.g. corridor) were not coded (Figure 1).

From the sample of 4,571 reports, 356 were coded as frail, 481 were coded as confused, 80 were coded as both frail and confused and 3,814 (83%) had insufficient information to code these factors. We were surprised that such distinct groups emerged and tentatively proceeded with further analysis. The contributory risk factors for the frail and confused groups were compared with the whole sample and explored with the χ² and Fisher’s exact tests. Those coded as both frail and confused (n = 80) were included in both the confused and frail groups for comparison with the whole sample and exploration of contributory factors. We acknowledge that there is considerable doubt about the validity of the analysis due to both the poor quality of the data and quantity of missing data, but as this is probably the largest source of these data in the world we suggest that the analysis may contribute to new ideas for intervention strategies and may provide a starting point for further research.

The location of falls (Figure 2) indicated that significantly more than the expected number of frail patients fell in the toilet/bathroom (17%, n = 62, expected n = 32.4). Significantly less than the expected number of frail patients fell at the bed/chair (23%, n = 81, expected n = 134.4) and significantly less than the expected number of confused patients fell in the toilet/bathroom (5%, n = 24, expected n = 43.8).

A further finding of possible interest was that raised bed rails were significantly more likely to be described in reports about confused patients who fell (11%, n = 55, expected n = 24.2).

Discussion

The quality of the data has limitations, with many reports giving no information. These limitations have been acknowledged by Healey et al. as ‘the potential reporting bias of all voluntary reporting systems, which is known to include under-reporting of critical incidents, including falls, variability in recording rates between institutions and individuals, as well as recording errors and missing data within incident reports and a wider problem of recording bias in retrospective observational studies’ [1, 2]. It has been previously commented that effect sizes are often small when conducting studies in new areas of research partly due to the lack of experimental information, e.g. not having sophisticated methods or measuring devices [12]. The statistical effect size for all of these associations was
small (results not shown here) and this type of analysis does not allow us to distinguish a causal relationship, so we have indicated the percentages to show the results for the frail and confused patients in terms of clinical rather than statistical difference. We believe this is the first study to identify a difference in the contributory factors for falls for patients with cognitive impairment so feel it may be useful to highlight this information.

The location of the falls suggest that patients described as frail were able to achieve a greater distance from the bed/chair, with a higher than expected number reported to have fallen in the toilet/bathroom. In contrast the confused patients had a higher percentage (not statistically significant) of falls reported at the bed/chair (36%, \( n = 175 \), expected \( n = 181.6 \)) with only 5% (\( n = 24 \), expected \( n = 6 \)) reported to have fallen in the toilet and bathroom.

Fine [13] commented that the ‘3Ms, mobility, mental status and control of micturition are essentials for survival’ with aging and it is likely that many of the un-witnessed falls were associated with elimination issues. As urinary incontinence is more prevalent in confused than non-confused older individuals [14] possible reasons for this difference could be that they use a bedpan or commode at bed/chair [15, 16] or are not left alone in the bathroom (witnessed). Another possible reason could be that confused patients are not finding the toilet facilities. Namazi and Johnson found a significant increase in toilet use for Alzheimer’s Disease patients if the toilet was both clearly visible [17] (e.g. door open and in sight-line) as well as better labelled [18].

A systematic review by Healey et al. concluded that ‘that serious direct injury from bedrails is usually related to use of outmoded designs and incorrect assembly rather than being inherent, and
Research letters

bedrails do not appear to increase the risk of falls or injury from falls'. However, they suggest that bedrails 'are not usually appropriate... for a patient with severe confusion who is mobile enough to climb over them' [19].

Conclusion and clinical implications

Our research may have identified differences in the contributory factors for confused patients in the location of falls, continence management and use of bed rails. The findings from this analysis are only tentative because of the large numbers of cases in the database with insufficient information to code. This means that the results are based on a select and potentially biased group if those coded have different characteristics to those without enough reported information to code. For those who do have enough information to code our findings suggest a need for different design (environmental) requirements to support patient safety initiatives for elderly confused patients. We suggest that future research should attempt to gain more detail about fall events to plan more targeted interventions.

Key points

- Quality of NRLS data has limitations, with many reports giving no information about contributory factors.
- Confused patients may not be finding the toilet/bathroom.
- Raised bed rails were significantly more likely to be described for confused patients.

Conflicts of interest

None declared.

Funding

The data collection and analyses for this paper were carried out as part of a Loughborough University funded Ph.D. studentship.

S. HIGNETT*, G. SANDS, P. GRIFFITHS
Healthcare Ergonomics and Patient Safety research Unit (HEPSU), Loughborough University, Loughborough, Leicestershire LE11 3TU, UK

Email: s.m.hignet@lboro.ac.uk

*To whom correspondence should be addressed

References


doi: 10.1093/ageing/afq149
Published electronically 10 November 2010