Commentary

Assessing the Risk of Falls in Hospitals: Time for a Rethink?

David Oliver

In this issue, Janice Morse discusses the process by which the Morse Fall Scale was derived, then validated across a range of institutional settings (Morse, 2006). Using this scale to illustrate the discussion, she describes with real clarity the pitfalls in developing such scales and the misunderstandings that can lead to their misapplication — which, in turn, can compromise patient safety by giving false reassurance that "something is being done" to prevent falls or that most patients "at risk" have been identified. It is important to reflect on the evidence for our clinical practice before we rush headlong to implement solutions. H. L. Mencken (1917) said, "For every complex problem there is a an answer that is clear, simple, and wrong," and John Salak, "Failures are divided into two classes — those who thought and never did, and those who did and never thought."[1] My question is simply, Is there really an assessment tool that can *consistently* and *accurately* classify patients as being at either "high" risk or "low" risk of falling and that is an e*ssential* part of falls prevention in any institution?

Falls in hospital (especially in settings where most patients are older) are common, with rates reported at 5 to 18 falls per 1,000 bed days — translating at the higher end to 15 or so falls per month on a 25-bed ward (Australian Council for Quality and Safety in Health Care, 2005; Registered Nurses' Association of Ontario, 2005). They are the commonest adverse incidents in hospital practice. A recent analysis by the National Patient Safety Agency found that of 560,000 recorded incidents in UK hospitals in 2004–05, 270,000 were fall-related (Healey & Oliver, in press). Falls lead to fractures and head, facial, or soft tissue injuries. These are, in turn, associated with increased mortality, morbidity, length of stay, and discharge to institutional care. Even a "minor" injury can significantly impair mobility and rehabilitation in an older person at the

---

[1] Retrieved May 2, 2006, from http://quotableonline.com/JohnCharlesSalak.html

margins of physical independence. Falls also lead to complaints, anxiety, and litigation from patients' relatives, who often feel that they "should not have been allowed to happen" in an apparent "place of safety" and that staff or institutions are at fault (Oliver, 2002; Oliver & Healey, in press). This, in turn, leads to guilt and anxiety among staff. The occurrence of a fall is also a marker of underlying frailty or illness, which should (but usually does not) prompt further investigation. Unsurprisingly, hospitals feel under great pressure to develop policies to prevent such falls. But what to do?

All that glitters is not gold. When hospital staff are seeking a solution, the idea of a "falls risk assessment tool" comprising a small number of risk factors on a checklist is very attractive. It could be either an "off the shelf" model that can be imported to their unit or, to use Morse's phrase, a "homemade" one (Morse, 2006). Either way, staff can now relax, secure in the knowledge that at last "something is being done" about the problem. But is it?

To be truly useful in practice, a prognostic tool needs to have certain characteristics (Oliver, Daly, Martin, & McMurdo, 2004; Wyatt & Altman, 1995). It should have transparent and easy scoring with a small number of items — the selection and weighting of which should be based on research evidence (comparing risk factors in fallers and non-fallers, with multivariate analysis) and not someone's "best guess." It should be "user-friendly" and consistently applied — that is, with a high degree of adherence by staff, a short completion time, and good interrater reliability. Most importantly, it should work! And it should work in the setting in which it is to be used! However well a tool may have worked in a high-quality original study *(internal validity),* your own patient population may be very different and the tool needs to be validated in a similar one *(external validity).*

The operational properties of an effective tool *(predictive validity)* need to be subjected to prospective validation on a sufficiently large group of patients for results to enter statistical significance. And, of course, any tool should perform better than the professional judgement of staff about which patients are at risk — if it is to be a substitute for that judgement. The key operational properties are *sensitivity* (i.e., what percentage of patients who fall had been scored at "high risk"?); *specificity* (i.e., what percentage of patients who did not fall had been scored at "low risk"?); *positive predictive value* (PPV) (i.e., what percentage of patients scored at "high risk" go on to fall?); and *negative predictive value* (NPV) (i.e., what percentage of patients scored at "low risk" go on *not* to fall?). PPV and NPV are dependent on the prevalence of falls in the population (which does not influence *sensitivity* and *specificity*). The best cut-off score will differ between populations and settings, and picking the definition of

"high risk" entails a trade-off between sensitivity and specificity. Hence *receiver operating curves* (ROC) is often used to select the optimum cut-off (Bowers, House, & Owens, 2003). Here, sensitivity is plotted against 1–specificity, with the best cut-off being the point on the curve lying closest to the top left-hand corner. This point will correctly classify or discriminate the highest number of fallers and non-fallers. And it is on this point, above all, that falls risk assessment tools fall down. Their ability to correctly classify fallers and non-fallers is not good enough, if we compare it to that of predictive tests for other medical conditions. This ability tends to diminish the more dissimilar the population from the one used in the original validation cohort. And especially for hospital patients, risk changes as quickly as clinical status, mobility, or cognition. Yet staff may be tempted to import a risk tool and then, without ever validating it in their own unit, apply it to patients on their admission to hospital only.

All of this may seem to be an abstract and hypothetical "turn-off" to practical clinicians who want to prevent falls. But it matters. For instance, if the PPV is low for your population, then you will target your falls interventions very poorly. If the NPV is low, you will potentially gain false reassurance that patients are at "low risk" of falls. If specificity is high but sensitivity low, then you have a good way of reassuring staff that patients are at low risk but a poor tool for picking out potential fallers. And if a tool does not perform well, then staff time may be wasted in completing it — time that could have been better directed elsewhere. So potentially we have false reassurance, poorly targeted interventions, and opportunity costs.

Systematic reviews (Myers & Nikoletti, 2003; Oliver et al., 2004) have revealed numerous examples of falls risk assessment tools that have been literally "made up," with no validation and no rationale to the weighting of items, or that have been validated in only one cohort of patients, or where staff had added items to existing scales on the grounds of *face validity* (i.e., the items made sense to them in their daily dealings with patients). This is the result of a serious misunderstanding. The risk factors that *cause* falls are not necessarily synonymous with those that *predict* them — nor with those that can be reversed or modified to prevent them. So a *risk factor checklist* — prompting staff to look for common reversible risk factors and then to do something about them — is different from a risk assessment tool. And when it comes to risk assessment tools, only two — the Morse Fall Scale (Morse, Morse, & Tylko, 1989) and the STRATIFY score (Oliver, Britton, Seed, Martin, & Hopper, 1997) — have been repeatedly validated in a variety of settings using sensitivity/specificity analysis. As the original author of one of these tools, I am repeatedly asked for advice on its use, and my general advice

on a good day is "consider its limitations…beware false friends…how well will it work in *your* unit?" and on a bad day "don't bother; I don't believe in it any more." Year by year, my view is evolving towards this stance. The diagnostic accuracy and operational properties of these tools are simply not good enough to make them the main plank of a falls prevention strategy. Yet time and time again I have people telling me how useful they find STRATIFY or the Morse Fall Scale. If people value them, they must have something in them, my guess being that they are a useful way of focusing the minds of staff on the problem — an important part of total quality improvement in falls prevention.

So what is the way forward? Well, we need to remember, firstly, that about 50% of all falls in hospital occur in people who have already fallen once, and, secondly, that a small number of falls risk factors have emerged consistently from the literature on falls in hospital (Myers & Nikoletti, 2003; Oliver et al., 2004; Perell et al., 2001). These are, in essence, (i) a recent fall; (ii) gait instability and lower-limb weakness; (iii) delirium, agitation, or behavioural disturbance; (iv) urinary frequency/incontinence; (v) postural hypotension/cardiac syncope; (vi) prescription of "culprit" drugs; and (vii) hazards/suboptimal equipment in the physical environment. Rather than rely on a risk assessment tool, much better to look at common reversible risk factors for *all* patients, then repeat the full assessment and management plan after they have fallen once — instead of simply filling out a form to exclude injury. If we are going to use tools to raise awareness, to prompt good practice, to formulate a plan once someone has fallen, let us attend to these risk *factors* rather than simplistic risk *prediction*, which may be inaccurate and does not of itself do anything to stop patients falling.

There have been any number (Oliver et al., in press) of poor-quality falls prevention trials in hospital of "before and after" design — inadequately powered, uncontrolled for confounding variables such as case mix, length of stay, staffing, or underlying trends in the falls rate and with no thought to the *Hawthorne effect* (Mayer, 2004), whereby falls recording may be altered by the very act of observation. This poor quality is partly due to the difficulties of performing research in a group of patients with high turnover and a high prevalence of dementia, delirium, frailty, and acute illness. It also epitomizes the problems discussed by Morse (2006). Enthusiastic practitioners have often instigated a laudable change in practice — designed to improve quality of care, yet not planned as a research trial. These trials have then been presented as quasi science — simply by reporting reported falls rates before and during interventions, but rendering the significance or generalizability of the results doubtful.

In a recent systematic review (Oliver et al., in press), three better-controlled, higher-quality in-hospital falls prevention trials were identi-

fied. None of these relied on the use of a falls risk assessment tool to classify patients as "high" or "low" risk. Rather, they relied on risk factor assessment (Fonda, Cook, Sandler, & Bailey, 2006; Haines, Bennell, Osborne, & Hill, 2005) or on the targeting of patients who had already fallen or had had a "near miss" (Healey, Monro, Cockram, Adams, & Heseltine, 2004).

If the original purpose of falls risk assessment research is to use the assessment in falls prevention programs, then this finding, above all others, casts doubt on their usefulness. I would argue that the quest for the Holy Grail of a risk assessment tool that anyone can use and does its job sufficiently well is one that should now cease.

References

Australian Council for Quality and Safety in Health Care. (2005). *Preventing falls and harm from falls in older people: Best practice guidelines for Australian hospitals and residential aged care facilities.* Canberra: Author. Retrieved May 10, 2006, from http://www.safetyandquality.org/fallsguide_sec1_sec4.10.pdf

Bowers, D., House, A., & Owens, D. (2003). Measuring the characteristics of measures. In D. Bowers, A. House, & D. Owens, *Understanding clinical papers* (pp. 81–85). Chichester: John Wiley.

Fonda, D., Cook, J., Sandler, V., & Bailey, M. (2006). Sustained reduction in serious fall-related injuries in older people in hospital. *Medical Journal of Australia, 184*(8), 379–382.

Haines, T. P., Bennell, K. I., Osborne, R. H., & Hill, K. D. (2005). Effectiveness of a targeted falls prevention programme in a subacute hospital setting: Randomised controlled trial. *British Medical Journal, 328*(7441), 676.

Healey, F., Monro, A., Cockram, A., Adams, V., & Heseltine, D. (2004). Using targeted risk factor reduction to prevent falls in older hospital inpatients: A randomised controlled trial. *Age and Ageing, 33,* 390–395.

Healey, F., & Oliver, D. (in press). Preventing accidental falls and injuries in hospitals: Where are efforts best directed? *Health Care Risk Reports.*

Mayer, D. (2004). Instruments and measurements: Precision and validity. In D. Mayer, *Essential evidence-based medicine.* Cambridge: Cambridge University Press.

Mencken, H. L. (1917). The divine afflatus. *New York Evening Mail,* November 16. Republished in *Prejudices: Second series.* New York: Knopf, 1920; *A Mencken chrestomathy.* New York: Knopf, 1949.

Morse, J. M. (2006). The safety of safety research: The case of patient fall research. *CJNR, 38*(2), 74–88.

Morse, J. M., Morse, R. M., & Tylko, S. J. (1989). Development of a scale to identify the fall prone patient. *Canadian Journal on Ageing, 8*(4), 366–377.

Myers, H., & Nikoletti, S. (2003). Fall risk assessment: A prospective investigation of nurses' clinical judgement and risk assessment tools in predicting patient falls. *International Journal of Nursing Practice, 9,* 158–165.

Oliver, D. (2002). Bed falls and bed rails: What should we do? *Age and Ageing, 31,* 415–418.

Oliver, D., Britton, M., Seed, P., Martin, F., & Hopper, A. (1997). Development and evaluation of an evidence based risk assessment tool (STRATIFY) to predict which elderly patients will fall: Case control and cohort studies. *British Medical Journal, 31,* 1049–1053.

Oliver, D., Daly, F., Martin, F. C., & McMurdo, M. E. T. (2004). Risk factors and risk assessment tools for hospital inpatients: A systematic review. *Age and Ageing, 33,* 122–130.

Oliver, D., Gosney, M., Victor, C., Martin, F., Connelly, J., Whitehead, P., Shaw, F., Genk, Y., & Vanoli, A. (in press). *Prevention of accidental falls and injuries in older people in hospital and extended care settings, with an exploration of dementia as an effect modifier.* Systematic review, meta–analysis and economic evaluation. London: Accidental Injury Prevention Programme, Department of Health. (Summary slides retrieved May 2, 2006, from http://www.rsm.ac.uk/falls06/)

Oliver, D., & Healey, F. (in press). Fall prevention in hospital: The evidence. *Health Care Risk Reports.*

Perell, K. L., Nelson, A., Goldman, R. L., Luther, S. L., Prieto-Lewis, N., & Rubenstein, L. Z. (2001). Fall risk assessment measures: An analytic review. *Journal of Gerontology. Series A: Biological Sciences and Medical Sciences, 56A*(12), M761–766.

Registered Nurses' Association of Ontario. (2005). *Prevention of falls and fall injuries in the older adult: Nursing best practice guidelines.* Toronto: Author. Retrieved May 2, 2006, from www.rnao.org/bestpractices/PDF/BPG_Falls_rev05.PDF

Wyatt, J. C., & Altman, D. G. (1995). Prognostic models: Clinically useful or quickly forgotten? *British Medical Journal, 311,* 539–541.

Author's Note

Comments or queries may be directed to Dr. David Oliver, Elderly Care Medicine, University of Reading, Institute of Health Sciences, London Road, Reading RG1 5AQ United Kingdom. Telephone: +44 118 378 6863. Fax: +44 118 378 6862. E-mail: D.Oliver@reading.ac.uk

———————————

David Oliver, MA, MSc, MHM, MD, FRCP, is Senior Lecturer, Elderly Care Medicine, University of Reading, Institute of Health Sciences, Reading, United Kingdom; and Honorary Consultant Physician, Royal Berkshire Hospital, Reading.