

Improving the Assessment and Prevention of Falls and Fractures on a Rehabilitation Ward

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Abstract

Background

The National Steering Group and NICE provide guidelines on medical assessment and prevention of falls and fractures (1)(2). This audit assesses and compares quality of practice on an Age-Related rehabilitation ward against these guidelines.

Methods

A Quality improvement project, including all patients(n=31) on an off-site, Age-Related rehabilitation ward was completed. Data on falls and fractures at emergency department presentation and during admission was obtained through chart review. Following education and implementation of a falls pro-forma, a re-audit was completed at four months including all patients(n=40).

Results

In cycle 1, mean age of patients was 80 years (range 56-94), 39%(n=12) were admitted with a fall of whom 66.7%(n=8) had a resulting fracture. In cycle 2, mean age was 82years(range 63–95), 48%(n=19) were admitted due to a fall, of whom 53%(n=10) had a fracture. A falls assessment and bone health review was completed in 39%(n=12) of all patients in cycle 1, and in 41%(n=3) admitted with a fall. This increased to 83%(n=33) of all patients in cycle 2 and 100%(n=40) of those admitted with a fall. Pre-intervention, 23%(n=7) had an inpatient fall compared to 18%(n=7) post-intervention; of these, 43%(n=3) and 14%(n=1) resulted in fractures respectively.

Conclusion

Compliance with national guidelines for prevention of falls and fractures improved with education and implementation of a falls pro-forma. This resulted in a reduction in falls, particularly injurious falls, on a rehabilitation ward. In future, this pro-forma may be implemented in other hospital wards.

Keywords: Falls, Falls Prevention, Frailty, Ageing, Quality Improvement Project

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Introduction

What is a Fall?

The World Health Organization defines a fall as “an event which results in a person coming to rest inadvertently on the ground or floor or other lower level”. Injuries related to falls could be fatal or non-fatal (World Health Organization, 2021) . Falls can result in the following complications: Injury, hospitalization, disability, reduced self-confidence, institutionalization, and death.

Epidemiology

Fall is a very common cause of unintentional injury deaths globally, with approximately 37.3million falls requiring medical review annually (World Health Organization, 2021). Globally, over 25 percent of individuals aged 65 and older fall annually; these numbers increase to 32-42% among people aged over 70 years (World Health Organization, 2008). Two-thirds of older people will have repeat fall within 6 months. 50% of falls among older individuals results in injury.

Inpatient falls is one the most frequently reported safety incidence reported in geriatric and rehabilitation wards of hospitals. Falls among inpatients can result in a longer length of admission and poor patient outcomes (Ian D Cameron, 2018).

Risk Factors

There is a plethora of factors that can increase the likelihood of an individual falling. These can be classified as intrinsic and extrinsic factors (see Table 1 below), among these intrinsic and extrinsic factors, they could also be classified as modifiable and non-modifiable risk factors.

Intrinsic Risk Factors

1. Advanced age
2. History of Falls
3. Medical Conditions like; orthostatic hypotension, depression, diabetes
4. Abnormalities of gait and mobility
5. Lower limb weakness
6. Visual Impairment
7. Cognitive Impairment

Extrinsic Risk Factors

1. Environmental factors, which include poor lightning and slippery floors among others.
2. Type of footwear
3. Medications

INTRINSIC FACTORS	EXTRINSIC FACTORS
Lower limb weakness	Medications
Gait and balance impairment	Environmental factors
Orthostatic hypotension	Foot wear
Previous History of falls	
Previous Stroke	
Visual Impairment	
Cognitive impairment	
Chronic diseases	
Advanced age	

Table 1: Risk factors of falls

Guidelines

The National Institute for health and care excellence (NICE) make evidence-based recommendations on a wide range of topics. These include preventing and managing specific conditions. NICE provided clinical guidelines for assessing the risk and prevention of falls in older people. The aim of this clinical guideline is to reduce the risk and incidence of falls with its associated complications. It was intended for healthcare professionals caring for older individuals aged 65 and over in the community and inpatients. It also applies to Inpatients aged 50-64 who are at a higher risk of falling.

Some of the recommendations include that all older people who make contact with the healthcare system should be screen for falls by taking a detailed history of all previous falls. In patients that this screening identifies recurrent falls in the last year or have presented on account of a fall should have a multifactorial risk assessment performed by a skilled healthcare professional. These assessments help to individualise a multifactorial intervention (National Intitute of Health and Care Excellence, 2013). Elements of the multifactorial risk assessment include:

- Identification of falls history
- Assessment of gait, balance and mobility, and muscle weakness
- Assessment of osteoporosis risk
- Assessment of the older person's perceived functional ability and fear relating to falling
- Assessment of visual impairment
- Assessment of cognitive impairment and neurological examination
- Assessment of urinary incontinence
- Assessment of home hazards
- Cardiovascular examination and medication review

Furthermore, The National Steering Group- a joint initiative between the Health Service Executive (HSE), Department of Health and Children and National Council on Ageing and Older people jointly prepared a strategy to “Prevent Falls and Fractures in Ireland’s Ageing Population. Some of the recommendations include that if any individual presents with a fall; with an unexplained fall or history of recurrent falls, they will require a multifactorial risk assessment but if they present with one explained fall, they would need to initially have a gait

and balance assessment before considering the need for further multifactorial risk assessment (The National Steering Group, 2008). This multifactorial risk assessment includes:

- Identification of falls history
- Review of medication(s) and their dose(s)
- Assessment of gait, balance and mobility and lower extremity joint function
- Assessment of endurance
- Assessment of osteoporosis risk
- Assessment of vision
- Examination of neurological function, muscle strength, proprioception, reflexes and tests of cortical, extrapyramidal and cerebellar function
- Assessment of cognitive function
- Screening for depression
- Assessment of postural blood pressure
- Assessment of heart rate and rhythm and evidence of structural heart disease
- Assessment of heart rate and blood pressure responses to carotid sinus stimulation if appropriate
- Assessment of home hazards
- Assessment of the older person's perceived functional ability and fear relating to falling
- Assessment of urinary incontinence
- Assessment of Vitamin D deficiency
- Assessment of foot problems and footwear

Methods

This is a quality improvement project Including all patients admitted on a medical gerontology ward at time of data collection. This project assesses and compares the quality of practice on an Age-Related rehabilitation ward against the guideline provided by N I C E and Strategy to Prevent Falls and Fractures in Ireland's Ageing Population reported by the National Steering Group.

Data was gathered retrospectively. A chart review was performed to obtain data on investigations and management of falls and fractures, both at ED presentation and during admission. After the first audit cycle, an Education and implementation of a falls proforma was performed. The falls proforma was completed for all newly admitted patients by the admitting doctor. A Re-audit was completed at four months.

This project was carried out on a medical gerontology ward of a tertiary university teaching hospital where Patients are transferred for ongoing medical treatment, rehabilitation and to await home care/long-term care. The ward is staffed with a full multidisciplinary team (nursing, medical, physiotherapy, occupational therapy, speech and language therapy, dietetics, medical social work, therapy and health care assistants).

- i.) Falls assessment to be carried out in all patients
- ii.) Likely cause of falls documented – this may be multifactorial, but contributing factors should be identified

1. History Taking

- ☐ Detailed history - nature of each individual fall
- ☐ Obtain a collateral history of falls, mobility status and any changes in gait

2. Cardiovascular assessment

- ☐ Lying-standing blood pressure
- ☐ Review ECG
- ☐ Cardiovascular examination
- ☐ Previous echo?

3. Medication review

- ☐ Particularly sedatives, opioids, anti-hypertensives

4. Bone health assessment

- ☐ Consider checking vitamin D level
- ☐ Consider starting all older patients on vitamin D supplementation
- ☐ Anti-resorptive treatment for those with fragility fractures
- ☐ Consider DXA for all others (Suggest to GP in discharge letter)

5. Lower limb examination

- ☐ Neurological including gait
- ☐ Rheumatological

4. Bone health assessment

- ☐ Consider checking vitamin D level
- ☐ Consider starting all older patients on vitamin D supplementation
- ☐ Anti-resorptive treatment for those with fragility fractures
- ☐ Consider DXA for all others (Suggest to GP in discharge letter)

5. Lower limb examination

- ☐ Neurological including gait
- ☐ Rheumatological

6. Cognitive assessment

- ☐ MMSE or MOCA if no cognitive assessment done prior to transfer

7. Continence status

- ☐ Documentation of continence status in the medical notes
- ☐ History taken
- ☐ Likely cause of incontinence documented
- ☐ Medication / care plan initiated where necessary

8. Visual Assessment

- ☐ Documentation of any conditions affecting vision and if glasses normally worn / available for use on the ward

9. Multi-disciplinary assessments

- ☐ Send OT and physio referrals for all
- ☐ Consider dietician referral, particularly if there is a risk of fractures

10. Assess for foot problems and appropriate footwear available for use on the ward

- ☐ Assess for foot problems and appropriate footwear available for use on the ward

Figure 1: Admission Falls proforma

Results

Audit Cycle 1

The first audit cycle included a total of 31 patients, 17 of which were female and 14 male. The mean age of these patients was 80 years (age range 56-94). 38.7% [n=12] of these patients were admitted with a fall. 67% of those admitted with a fall had a fracture on admission. Among the patients included, they had an average of 3 falls in the last 6 months.

During the period of admission, 7 of these patients had a fall on the ward and 43% of these resulted in a fracture. This includes at least 1 incidence of hip fracture. 38.7% of all patients had a fully completed multifactorial risk assessment completed while this was fully completed for 41.7% of patients admitted with a fall.

All patients admitted due to a fall were on calcium/vitamin D replacement. However only 66.7% of them were on a bisphosphonate or denosumab.

Audit 1		
	All patients (%)	Admitted with fall (%)
Admitted with fracture	25.80%	67%
Fall Since admission	22.58%	25%
Fracture since admission	9.67%	16%
ECG	74.19%	58.33%
Lying-standing BP checked since admission	38.70%	66.67%
Lower limb neurological examination	77.41%	83%
Gait examination	77.41%	75%
Lower limb joint examination	41.93%	100%
Continence status	100%	100%
Cognitive assessment	51.60%	41.67%
Have physio reviewed?	100%	100%
Have OT reviewed?	93.54%	91.67%
Past medical history documented	100%	100%
Detailed history of falls	38.70%	100%
Collateral history	51.60%	42%
1. Vit D level checked	80.64%	91.67%
2. Calcium / vit D supplement	90.32%	100%
3. Denosumab / bisphosphonates	35.48%	66.67%

Table 2: Results of Audit cycle 1

Audit Cycle 2

The second cycle was performed 4months after the implementation of the falls proforma as illustrated above (Figure 1). The total number of patients included was 40, which included 23 females and 17 males with a mean age of 82 (age range 63-95). 48%(n=19) of these patients were admitted with a fall and of those admitted with a fall, 53% also had a fracture on admission. In comparison to the first cycle, although this is a higher proportion of all patients admitted with a fall, cycle 2 had a smaller percentage of fracture admissions. Patients in cycle 2 had an average of 2 falls in the last 6 months.

During the period of admission 18% (n=7) had a subsequent fall on the ward and only 1 of these patients had a resulting fracture. In this cycle, 83% of all patients included had a fully completed multifactorial risk assessment and it was fully completed in 89% of those admitted with a fall.

Although all patients admitted with a fall were on calcium/vitamin D replacement, the number of patients on bisphosphonate and denosumab remained 66.7%. See detailed breakdown of comparison of results from cycle 1 and 2 below in table 4 and 5.

Audit 2			
	All Patients (%)		Admitted with falls (%)
Admitted with fracture	25%		52%
Fall Since admission	18%		21%
Fracture since admission	3%		5%
ECG	100%		100%
Lying-standing BP	83%		100%
Lower limb neurological examination	100%		100%
Gait examination	100%		100%
Lower limb joint examination	100%		100%
Continence status	100%		100%
Cognitive assessment	93%		89%
Have physio reviewed?	100%		100%
Have OT reviewed?	100%		100%
Past medical history documented	100%		100%
Detailed history of falls	100%		100%
Collateral history	100%		100%
1. Vit D level checked	95%		100%
2. Calcium / vit D supplement	83%		100%
3. Denosumab / bisphosphonates	38%		68%

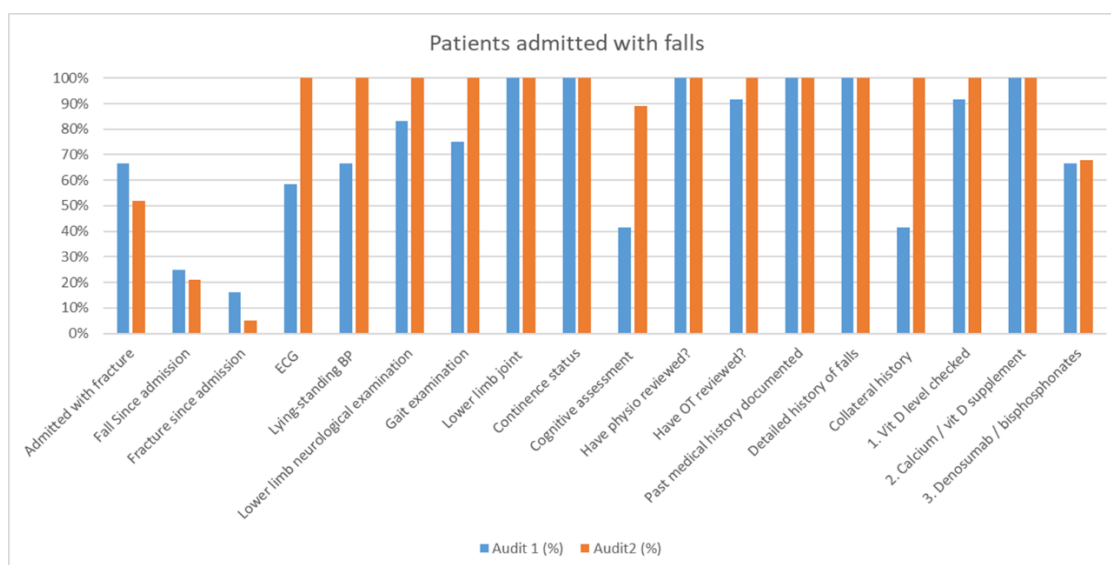
Table 3: Results of Audit cycle 2

Patients Admitted with falls		
	Audit 1 (%)	Audit2 (%)
Admitted with fracture	67%	52%
Fall Since admission	25%	21%
Fracture since admission	16%	5%
ECG	58.33%	100%
Lying-standing BP	66.67%	100%
Lower limb neurological examination	83%	100%
Gait examination	75%	100%
Lower limb joint	100%	100%
Continence status	100%	100%
Cognitive assessment	41.67%	89%
Have physio reviewed?	100%	100%
Have OT reviewed?	91.67%	100%
Past medical history documented	100%	100%
Detailed history of falls	100%	100%
Collateral history	42%	100%
1. Vit D level checked	91.67%	100%
2. Calcium / vit D supplement	100%	100%
3. Denosumab / bisphosphonates	66.67%	68%

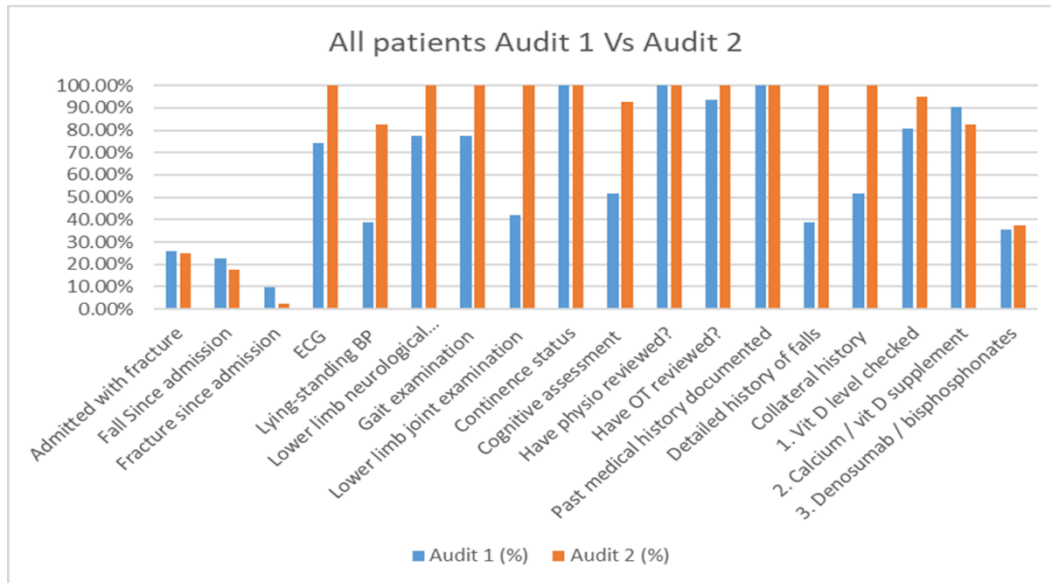
Table 4: Comparisons of results from cycle 1 and 2 among patients admitted with a fall

Comparison of audit 1 and 2 for all patients		
	Audit 1 (%)	Audit 2 (%)
Admitted with fracture	25.80%	25%
Fall Since admission	22.58%	18%
Fracture since admission	9.67%	3%
ECG	74.19%	100%
Lying-standing BP	38.70%	83%
Lower limb neurological examination	77.41%	100%
Gait examination	77.41%	100%
Lower limb joint examination	41.93%	100%
Continence status	100%	100%
Cognitive assessment	51.60%	93%
Have physio reviewed?	100%	100%
Have OT reviewed?	93.54%	100%
Past medical history documented	100%	100%
Detailed history of falls	38.70%	100%
Collateral history	51.60%	100%
1. Vit D level checked	80.64%	95%
2. Calcium / vit D supplement	90.32%	83%
3. Denosumab / bisphosphonates	35.48%	38%

Table 5: Comparison of results from cycle 1 and 2 among all patients included



Graph 1: Graphical representation of result comparison among patients admitted with a fall



Graph 2: Graphical representation of result comparison among all patients included

Conclusions

In Conclusion, falls become more common with advanced age. The guidelines provided by NICE and HSE recommend evaluating falls risk in all older individuals presenting with a fall and the HSE recommends annual screening. A Proforma can act as a prompt to aid in compliance with multifactorial falls risk assessments.

Following the education and implementation of the falls proforma, Compliance with national guidelines for prevention of falls and fractures improved. There was a reduction in falls, particularly injurious falls, on the ward. However, this cannot be concluded to be because of the intervention as this project included a small sample size.

In future, this pro-forma may be implemented in other hospital wards and reaudited. Additionally, in future projects, bone health could be evaluated more specifically as the results of this project didn't yield much improvement in that area.

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