Preventing falls in older people with dementia

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Falls are common among older people with dementia and often have serious consequences. A number of validated assessment tools are available to help identify fall risk factors. GPs have an important role in screening older patients for dementia and implementing evidence-based management strategies to help reduce falls.

KEY POINTS

- Older people with dementia experience more falls (>60% of those living in the community fall annually) and with more serious consequences than the general older population.
- GPs have a critical role in screening and assessing for dementia and fall risk in older patients, and a number of validated assessment tools are available.
- In community-dwelling older people with mild to moderate dementia, exercise that challenges balance may prevent falls.
- In residents of care facilities, the evidence is inconclusive regarding exercise, but vitamin D supplementation and increasing dietary calcium and protein intake may prevent falls and fractures.
- Some pharmacotherapies, such as centrally acting or psychotropic medications, increase fall risk and should be avoided in older people.
- Fracture risk can also be reduced by assessing bone health and treating osteoporosis.

Falls are common among older people with dementia, with more than 60% of people with dementia living in the community falling annually and more than 40% falling multiple times.[1,2] In residential aged care, 50% of residents with dementia fell over a six-month period.[3] Fall-related injuries, including hip fracture and head injury, are more common in older people with dementia, and this population is less likely to regain their previous level of function and more likely to be placed in residential care and die after a fall than older people without dementia.[4] The cost of falls and fall-related injury is substantial in this population; to the individual, their family and the healthcare system. This article outlines how GPs can screen for cognitive impairment and assess and manage fall risk for this population.

Dementia *vs* cognitive impairment

A diagnosis of dementia, more recently termed major neurocognitive disorder, involves clinical assessment by a trained medical professional and requires an individual to have a cognitive impairment that affects their ability to function independently in daily life. When assessing a person in the context of diagnosing dementia, the clinician needs to exclude other possible causes of cognitive impairment such as depression and delirium, consider the individual's previous level of cognitive function and, when possible, use information from an informant, such as a caregiver or family member who is in regular contact with the person.

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1. VALIDATED TOOLS TO IDENTIFY COGNITIVE IMPAIRMENT

- **Abbreviated Mental Test Score (AMTS):** a tool to determine the presence of cognitive impairment in a patient
  https://oxfordmedicaleducation.com/geriatrics/amts/
- **Addenbrooke's Cognitive Examination – III (ACE-III):** a brief cognitive test that assesses cognitive function and screens for dementia involving assessment of five cognitive domains (attention, memory, verbal fluency, language, and visuospatial abilities)
  https://www.sydney.edu.au/brain-mind/resources-for-clinicians/dementia-test.html
- **General Practitioner assessment of Cognition (GPCOG):** a screening tool for cognitive impairment designed for GPs
  http://www.gpcog.com.au/
- **Kimberley Indigenous Cognitive Assessment (KICA):** a validated culturally sensitive cognitive screening tool for older Aboriginal and Torres Strait Islander people living in rural and remote areas in the Kimberley region of WA
  https://healthinfonet.ecu.edu.au/key-resources/programs-and-projects/?id=509
- **Montreal Cognitive Assessment (MoCA):** a screening tool for cognitive impairment including mild cognitive impairment
  https://www.mocatest.org/
- **Mini-Addenbrooke's Cognitive Examination (m-ACE):** a short but sensitive cognitive screening tool for mild cognitive impairment and dementia
  https://www.sydney.edu.au/brain-mind/resources-for-clinicians/dementia-test.html
- **Rowland Universal Dementia Assessment Scale (RUDAS):** a short cognitive screening instrument designed to minimise the effects of cultural learning and language diversity
  https://www.dementia.org.au/resources/rowland-universal-dementia-assessment-scale-rudas
- **Standardised Mini-Mental State Examination (SMMSE):** screening test of cognition in older adults
  https://www.ihpa.gov.au/what-we-do/standardised-mini-mental-state-examination-smmse

NOTE: *Many of these tools can also be found here:*

- **Dementia Outcomes Measurement Suite (DOMS):** a collection of validated tools for the assessment of various aspects of dementia by healthcare professionals
  https://dementiaresearch.org.au/resources/doms/

Many studies on fall risk factors and fall prevention strategies targeting 'people living with dementia' were pragmatic in their recruitment approach and used inclusion criteria of 'diagnosed dementia' and cut-points on validated cognitive assessments. Some of these studies, therefore, refer to the study population as 'cognitively impaired', and this has resulted in the terms cognitive impairment and dementia being used interchangeably in the literature. For the purposes of this article, we will refer to the study populations as having dementia.

Identifying impaired cognition

Cognitive impairment can be challenging to identify, particularly in the early stages of cognitive decline. A range of assessment tools are available to help clinicians objectively determine an individual's level of cognition. Box 1 highlights assessment tools that can help GPs identify cognitive decline and monitor cognitive performance over time.

Fall risk: screening and assessment

Falls are usually multifactorial and different individuals will present with different risk factors. Screening will help identify who is at risk, but not necessarily why. Screening for falls risk should be undertaken annually for all older people. In people with dementia who are in the moderate- to high-risk group for falls, identifying risk factors and implementing interventions to reduce risk becomes important and screening should be more frequent (i.e. six monthly).

There are many ways to screen people with dementia for fall risk. The simplest way is to ask whether they have had a fall in the past six to 12 months. People who have fallen in the past year are at least twice as likely to fall in the coming year.[5-7] If a person has had two or more falls in the past 12 months, is presenting with a fall or is reporting walking or balance difficulties, they should undergo multifactorial assessment.[8,9] This can be done in the GP practice, at a specialised clinic, at their residential aged care facility, at a physiotherapy clinic as part of a management plan, in their home (e.g. an occupational therapy home visit) or any combination of these to ensure that appropriate assessment and management plans are implemented.

When an individual is identified as being at increased risk of falls, it is important to systematically identify risk factors and put in place appropriate intervention strategies. Table 1 highlights potential fall risk factors for people with dementia and potential approaches to assessment. In people with dementia, impaired balance and mobility, slow gait speed, depressive symptoms and physical inactivity increase fall risk.[2,3,5] Impaired executive function, processing speed and visuospatial ability and higher levels of anxiety and concern about falls have also been identified as fall risk factors.[5] Centrally acting or psychotropic medications (e.g. sedatives, hypnotics, antidepressants and antipsychotics), as well as polypharmacy (more than four medications), have been identified as fall risk factors in both community and residential care settings, and GPs play a crucial role in reviewing medications and rationalising their ongoing use.[3,5,10,11]

A number of relatively simple assessments can be undertaken in the GP clinic or recommended by the GP. These include assessing vitamin D levels and bone health; vision (has the patient's vision been assessed in the last 12 months, do they use bifocal or multifocal glasses, do they have cataracts?); blood pressure (including postural); and physical activity levels. Although these assessments are not specific people with dementia, they have either been conducted in populations that included older people with dementia or represent good clinical practice for assessing and managing fall risk.

Several fall risk assessment tools have been developed for use in people with dementia living in residential care. The fall-related impulsive behaviour scale (FIBS) is quick and easy to administer and involves three simple questions to residential care staff or a carer:

- Does the resident try to sit down before getting right up to the chair/toilet/bed?
- Does the resident attempt to stand before wheelchair brakes have been applied or footplates moved or walking frame placed in front of them?
- Does the resident try to walk without help when asked not to?

Each question is scored on a Likert scale (0 = never or not applicable, 1 = occasionally, 2 = often, 3 = frequently, 4 = very frequently) and the score is the sum of the four questions. Residents who scored 1 or more were almost three times more likely to fall over the subsequent six-month period.[12]

An alternative four-item assessment can be used to assess fall risk in older people with dementia living in residential care facilities. The assessment is more involved and time consuming and involves assessing four risk factors:

- balance, measured by postural sway (defined cut-point for fall risk: sway >4500 mm with eyes closed)
- attention and orientation using the Addenbrooke's Cognitive

TABLE 1. FALL RISK FACTORS AND ASSESSMENT

Risk factor	Assessment
Impaired mobility and balance	• Repeated chair standing test (5 repetitions) >12 seconds • Alternate step test (eight foot taps, 18 cm high step) >10 seconds • Walking speed <0.8 to 1.0 meters per second (around 1.2 meters per second needed to safely cross at traffic lights) • Near tandem stance (eyes open/closed) <10 seconds • Timed up and go >12 seconds
Low levels of physical activity	• Estimate number of minutes of planned exercise a week • Incidental and planned exercise questionnaire
Impaired cognitive domains • executive function • visuospatial ability • processing speed	• Refer for neuropsychological assessment or specialised clinic review e.g. aged care or memory and cognitive disorders clinic • Assess executive function – Clock Drawing Test (CDT) – Trail Making Test (TMT) part B or TMT part B time minus TMT part A time – Verbal Fluency or Controlled Oral Word Association Test – Frontal Assessment Battery • Assess visuospatial ability – CDT – Visuospatial Domain of Addenbrooke's Cognitive Examination – III – overlapping pentagons or cube drawing • Assess processing speed – TMT part A
Depressive symptoms and anxiety	• Ask the following questions: – 'Over the past two weeks, have you felt down, depressed or hopeless?' – 'Over the past two weeks, have you felt little interest or pleasure in doing things?'[9] • Geriatric Depression Scale 15-item >5/15 • Cornell Depression Scale ≥6, scores >10 probably depression, >18 definite major depression • Goldberg Anxiety Scale >4/9 • Hospital Anxiety and Depression Scale >8/21 on either scale (anxiety/depression)
Pharmacotherapies • polypharmacy • psychotropic medications (e.g. sedatives and hypnotics) • anticholinergic burden • loop diuretics	• Medication review – by GP • Home medication review – by pharmacist
Syncope/dizziness/unexplained falls	• Assess lying and standing blood pressure • Arrhythmias: heart rate and rhythm/ECG/Holter monitor • Assess for benign paroxysmal positional vertigo (BPPV) – Hallpike manoeuvre
Visual impairment	• Visual acuity: Snellen chart • Visual contrast • Cataracts • Multifocal glasses use
Inadequate nutrition	• Assess dietary calcium and protein intake
Low vitamin D levels	• Assess exposure to sunlight for vitamin D • Check vitamin D levels
Poor footwear and footcare	• Podiatry assessment • Footwear (indoors and outdoors): thin, nonslip sole; correct fit; fastenings hold foot firmly; low wide heel; supportive heel cup; adaptable to daily changes in foot size

TABLE 2. SCORING SYSTEM FOR EVIDENCE-BASED APPROACHES TO FALL PREVENTION

Rating	Study population	Outcome
Double gold star ★★	People with dementia	Shown to prevent falls or fall-related injuries
Double silver star ★★	Included people with dementia	Shown to prevent falls or fall-related injuries
Single gold star ★	People with dementia	Shown to improve the identified risk factor
Single silver star ★	Included people with dementia	Shown to improve the identified risk factor
Bronze star ★	Extrapolated from studies involving cognitively intact populations or good clinical practice	Shown to prevent falls or fall-related injuries in the cognitively healthy older people or a good practice point

Examination (defined cut-point for fall risk: score <9)
- anxiety using the Goldberg Anxiety Scale (defined cut-point for fall risk: score >4)
- antidepressant use.[3]

Risk of falls increased with each additional risk factor; all residents with four risk factors fell during six months of follow up.[3]

Interventions

Much of the evidence for intervention in falls prevention is derived from studies involving people who do not have dementia; therefore, caution is needed when extrapolating to a population with dementia. Fortunately, an increasing body of evidence is focused specifically on interventions in people with dementia.

Here we provide an overview of potential approaches to intervention for fall prevention and attempt to rate the level of evidence based on how it was generated (Table 2) to guide the clinician to areas where there is more certainty around likely beneficial interventions for the intended population (Table 3).[9,11,13-47] In Table 3, fall prevention strategies have been assigned a rating (gold, silver, bronze stars) according the population studied and its level of evidence. A description of the rating system is provided below and in Table 2.

- Double gold stars represent studies where evidence has been generated specifically in people with dementia and the intervention has been shown to prevent falls or fall-related injuries such as fractures.
- Double silver stars represent interventions where the original studies included some people with dementia and the intervention has been shown to prevent falls or fall-related injuries.
- A single gold star represents studies where evidence has been generated specifically in people who have dementia and the intervention has been shown to improve the identified risk factor (as opposed to falls or fall-related injury as an outcome).
- A single silver star represents interventions where the original studies included some people with dementia and the intervention has been shown to improve the identified risk factor.
- A bronze star represents fall prevention evidence that has largely been extrapolated from studies involving cognitively intact populations or is considered a good practice point.

Fall prevention by setting

The evidence for fall prevention broadly, and specifically in people with dementia, is setting specific, i.e. community, residential care.[13,48] People living in residential care tend to have greater levels of impairment (cognitive and physical) and the level of support available and environment in which the interventions are being delivered are inherently different from the community setting. These differences support setting-specific approaches to fall prevention interventions and perhaps explain why, so far, interventions, their delivery and effectiveness differ by setting.[13,48]

Preventing falls in the community

Exercise probably prevents falls in people with mild to moderate dementia living in the community, but the reduction in fall rate is shown by just a few studies (Table 3).[14] The exercise programs have usually been prescribed by a trained professional with experience in working with people with dementia, are at least six months in duration and provide some level of supervision by a trained professional. Evidence suggests that exercise-based interventions may be more beneficial for fall prevention in people with mild to moderate dementia who have better physical function.[15,16]

Preventing falls and fall-related injury in residential care

A recent Cochrane review showed that overall, the evidence to support fall prevention interventions in people with dementia in residential aged care is inconclusive, or is neither harmful nor effective for most intervention strategies, e.g. exercise and multifactorial interventions.[13] In people with dementia who are vitamin D deficient, vitamin D supplementation may reduce the rate of falls (Table 3).[13] Although these

TABLE 3. POTENTIAL MANAGEMENT STRATEGIES FOR IDENTIFIED FALL RISK FACTORS

Fall risk assessment	Potential management strategies	Rating of evidence base (Table 2)
Impaired mobility and balance	• Referral for tailored and progressive exercise for community-dwelling patients[14-16,21] – balance training – functional exercises – cognitive-motor exercises – foot/ankle exercise – Tai Chi	★★
	• Identify reversible causes for any peripheral sensory changes	★
	• Review medications that may be contributing to poor balance	★
	• Consider referral to a falls clinic or physiotherapist[22]	★★
	• Consider a podiatry referral if experiencing foot pain or for foot and ankle exercises[23]	★
Cognitive and cognitive-motor impairment	• Physical activity[24-26]	★
	• Cognitive training[27,28]	★
	• Cognitive-motor training or dual task training[29,30]	★
Depressive symptoms and anxiety	• Physical activity[31-33]	★
	• Social engagement programs or cognitive stimulation [34,35]	★
	• Refer to a specialist, e.g. psychogeriatrician, psychologist	★
	• Medical management if indicated and nonpharmacological approaches not appropriate or unsuccessful	★
Medication	• Medication review (standalone in community-living older people)[11]	★★
	• Offer bone health treatment for all patients who have had a minimal trauma fracture unless contraindicated[36,37]	★★
	• Ensure vitamin D levels are adequate (>50 nmol/L), particularly in aged care residents[13,17-19]	★★
	• Reduce or stop psychotropic medications where possible[38]	★★
	• Reduce or stop medications that are no longer indicated[38,39]	★★
Syncope/dizziness/ unexplained falls	• Review medications that may be contributing to orthostatic hypotension or low blood pressure	★
	• Refer for further assessment if unexplained syncope	★
	• Treat benign paroxysmal positional vertigo if safe: Epley manoeuvre (canalith repositioning), refer for further assessment and rehabilitation, e.g. vestibular physiotherapist	★
	• Education on adequate hydration, postural changes and postprandial blood pressure changes	★

recommendations are not specific to people with dementia, the studies contributing to this recommendation include people with dementia.[17-19] There is no reason to believe that this intervention would be any less effective in people with dementia.

One recent Australian study showed that increasing dietary calcium and protein intake by eating more dairy products (milk, yoghurt and cheese) prevented falls and fractures (including hip fractures) in people living in care facilities.[20] People with dementia were included in this study (in a subgroup with data reported for this variable, around 50% had dementia) and osteoporosis-related medication use was similar between the intervention and control groups. Subgroup analysis of another Australian study, published since the Cochrane review, showed exercise reduced falls and fall-related injury in people with mild to moderate dementia living in care facilities.[49]

Bone health

Osteoporosis is associated with increased fracture risk; therefore, bone health is an important factor that should not be overlooked in this population. Interventions to improve bone health may benefit patients through improved fracture prevention. Although bone health medications have been shown to reduce fracture risk, older people with dementia are undertreated.[50,51] Medications used to improve bone health are summarised

TABLE 3. POTENTIAL MANAGEMENT STRATEGIES FOR IDENTIFIED FALL RISK FACTORS *continued*

Fall risk assessment	Potential management strategies	Rating of evidence base (Table 2)
Environmental hazards	• Refer for occupational therapy home visit to assess for fall risk and to adapt the home environment and home processes[40-42]	☆☆
Footwear and footcare	• Podiatry referral[23,43] • Recommend appropriate footwear[44]	☆ ☆
Sensory impairment: vision and hearing	• Refer for vision assessment if more than 12 months since last review • Removal of first cataract[45] • Consider single lens glasses for community ambulant people (tailored approach needed, may not be appropriate for some people)[46] • Audiology assessment if hearing impaired or suspected hearing impairment	☆ ☆☆ ☆ ☆
Nutrition	• Increase dairy intake to increase dietary calcium and protein levels[20]	☆☆
Bone health and osteoporosis	• Treat reversible secondary causes[9,47] • Treat low vitamin D (<50 nmol/L; or those with inadequate sunlight exposure) and calcium levels (e.g. vitamin D supplement, dietary calcium, education on safe sun exposure)[13] • Treat with antiosteoporosis medication as indicated[36,37] – patients aged over 50 years with minimal trauma fracture and/or T-score ≤2.5 – patients aged 70 years or over – patients with corticosteroid-induced osteoporosis and/or T-score ≤1.5 • Assess and manage fall risk[47] • Weightbearing exercise and balance and progressive resistance training (consider supervision and safety; evidence for benefit in community-living older people)[15-17] • Cease smoking and reduce or limit alcohol[9,47] • Maintain a healthy weight • Education[9,47]	☆ ☆☆ ☆☆ ☆ ☆☆ ☆ ☆ ☆

in Box 2. People should be replete in calcium and vitamin D before initiating the antiosteoporosis medications. There is no requirement for dual-energy x-ray absorptiometry in older people who have sustained a low trauma fracture (fall from standing height or less) before prescribing these medications. Appropriate treatment selection to improve bone health requires careful patient assessment. Important considerations before starting treatment include: [47]

- the patient's preferences
- whether the patient is likely to adhere to the medication regimen
- ensuring any secondary causes of osteoporosis have been addressed
- ensuring appropriate vitamin D and calcium levels
- addressing oral health care needs
- assessing whether the patient's renal function is sufficient for the treatment selected.

Specialist referral for prevention and management of falls

Specialist clinics may be able to support the GP in their assessment and management of fall risk in people with dementia. Geriatricians may also be able to support GPs in this area. However, specialist clinics and specialists may not be available in all areas of Australia, such as some regional and remote areas. Therefore, GPs are pivotal in assessing and managing fall risk in older patients.

2. MEDICATIONS TO REDUCE FRACTURE RISK

Vitamin D and calcium
- Aim for vitamin D level above 50 nmol/L
- Aim for 1000 to 1200 mg calcium per day in diet and consider supplement if dietary intake is inadequate

Bisphosphonates (alendronate, risedronate, zoledronic acid)
- Administered orally or intravenously
- Avoid if impaired renal function (creatinine clearance <35 mL per minute)
- Check if any dental work is required (osteonecrosis of the jaw)

Denosumab
- Administered subcutaneously every six months
- Can be used in people with renal impairment
- Important to ensure doses are not missed as delays are associated with rapid bone loss

Raloxifene
- Once daily oral dose
- Recommended for postmenopausal women with a minimal trauma fracture
- Evidence is primarily for vertebral fracture prevention

Teriparatide
- Daily subcutaneous injections for 18 months
- Specialist prescription for those who have failed on other treatments

Romosozumab
- Monthly subcutaneous injections for 12 months
- Specialist prescription for those who have failed on other treatments

GPs may also refer community-dwelling older people with dementia to allied health professionals such as physiotherapists, exercise physiologists, podiatrists, pharmacists and occupational therapists to assist with assessing and managing fall risk (Table 3). For community-dwelling older people with dementia, these services can be accessed privately or through community-based hospital or outreach services. For those in residential aged care, access to these services may be facility dependent, although family members may be able to organise some services privately.

Conclusion

Older people with dementia are at high risk of falls and often suffer more severe consequences and have poorer outcomes as a result. GPs have an important role in screening and managing fall risk in older patients, particularly in regional and remote areas. Screening, assessing and managing fall and fracture risk has the potential to improve the lives and outcomes for many patients with dementia. The research supporting prevention strategies in this group is slowly growing, with more evidence needed to help appropriately direct prevention efforts. MT

Further reading

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A list of references is included in the online version of this article (www.medicinetoday.com.au).

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