Balance and Brains: Falls Prevention in Dementia and Delirium

Paul Cadger – Dementia Education Lead
February 2026

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Introduction

- Falls and dementia experience in acute hospital
- Thanks to Cornwall Health Library
- www.joindementiaresearch.nihr.ac.uk

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AIM

- What is defined as a fall
- Current concern for falls, dementia and delirium in CloS
- What is dementia and why it increases risk of falls
- What is delirium and why it increases risk of falls
- Does falling over increase risk of delirium or dementia?
- Assessment
- Prevention
- Interventions

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Abbreviations

4AT – 4 A's Test
6CIT – Six item Cognitive Impairment Test
CloS – Cornwall and Isles of Scilly
CPFT – Cornwall Partnership NHS Foundation Trust
HCP – Health Care Professional
Heterogeneous – diverse in character or content
OR / RR – Odds Ratio 1 = Exposure does not affect odds of outcome
<1 = Exposure reduces odds of outcome
>1 = Exposure increases odds of outcome
MFRA – Multifactorial Falls Risk Assessment – Comprehensive Falls Assessment
RCHT – Royal Cornwall Hospitals NHS Trust
TUG – Timed Up and Go
- Fracture

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Definition of a fall – Office for Health Improvement and Disparities (2022)

An event which causes a person to, **unintentionally**, rest on the ground or lower level, and is **not a result of a major intrinsic event** or overwhelming hazard (such as external force - being pushed over).

Intentional Slumped, nearly slipping out of chair, staff take person to the floor to hoist to a safe position – NOT a fall – near miss
Person throws themselves to floor - NOT a fall, report as Self-harm

Unintentional Walking with person and their knee gives way, staff guide to floor - if injury/harm report as fall if no injury/harm report as near miss

Major intrinsic events
Stroke
Seizure – multiple causes not just epilepsy
Cardiac arrest
Pulmonary embolism

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CloS falls and dementia stats

September 2025 estimated 10,063 PLwD in Cornwall.
6,252 people in CloS are registered with dementia (62.1%) - NHS Digital, (2025)
Therefore 3,811 – without a diagnosis = without available support

CloS Integrated Care System estimate 58,000 people are likely to fall each year .

In2022/23 falls accounted for 2,160 admissions in over 65's – 880 hip fractures
***under reporting** – don't record fall, record the injury

CPFT Apr 23 – Mar 24 - 1,361 falls, involving PLwD ??
RCHT Apr 23 - Mar 24 - 1,324 falls, involving PLwD 283 (21%)
Delirium (4 of 8 femoral #), 15-50% all falls RCHT

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What is dementia

- Over 200 different sub-types of dementia
- Damage is progressive > terminal diagnosis
- Chronic not acute like delirium, but are interlinked
- Impacts memory, thinking, speech, planning, emotions, behaviour, personality – consider sub-type on presentation
- Developed <65 called young onset dementia – why is this important?

317 people with YOD in Cornwall

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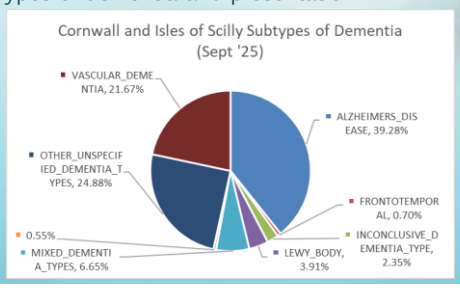
Types of dementia and presentation



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Alzheimer's disease presentation over stages

Early (Mild)	Mid (Moderate)	Later (Severe/End)
Short term memory loss	Poor judgement	**Support with all ADLs**
Difficulty learning new skills	Difficulty with multiple step tasks (prepping meal)	**Increased sleep**
Object recognition	Difficult to identify family/friends	Minimal communication
Communication challenging (repetition, lose chain of thought)	Impulsive	Changes to swallowing (reduced intake)
	Communication (processing and speaking)	Incontinence
	Difficulty with direction (walk with purpose – lost)	

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Vascular dementia presentation over stages

Early (Mild)	Mid (Moderate)	Later (Severe/End)
Loss of motor function	Poor judgement	**Support with all ADLs**
Speech impairment	Moderate to severe communication impairment	**Increased sleep**
Impaired executive function	Need support with some ADLs	Minimal Communication
	More prone to being emotionally labile	Changes to swallowing (reduced intake)
		Incontinence

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Lewy body dementia presentation over stages

Early (Mild)	Mid (Moderate)	Later (Severe/End)
Mood and emotional changes	Fluctuating cognition and behaviour (day to day, or hour to hour)	**Support with all ADLs**
Hallucinations	Advanced speech and movement disorder	Minimal communication
Paranoia	Falls	Severe parkinsonisms
Sleep disorder	Swallowing difficulties	Changes to swallowing (reduced intake)
Movement difficulties – parkinsonisms	Reduced short term memory	Incontinence
Urinary urgency/incontinence		Sensitivity to touch

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Parkinson's disease dementia presentation over stages - (20-40% of people living with PD will develop PDD)

Early (Mild)	Mid (Moderate)	Later (Severe/End)
Movement disorder existing for >1 year prior to diagnosis	Fluctuating cognition and behaviour (day to day, or hour to hour)	**Support with all ADLs**
Falls	Advanced speech and movement disorder	Minimal communication or swallow
1/3 orthostatic hypotension	Reduced short term memory	Severe parkinsonisms
Hallucinations / paranoia	Urinary urgency/incontinence	

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Fronto-temporal dementia presentation over stages

Early (Mild)	Mid (Moderate)	Later (Severe/End)
Difficulty word finding	Difficulty with simple language	**Support for all ADLs**
Behavioural changes	Behaviour changes more frequent and severe	
Disinhibition	Memory loss	
	Impaired executive function	
	Impaired motor function	

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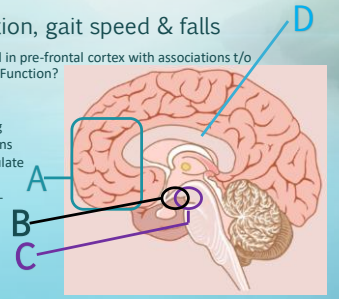
Executive dysfunction, gait speed & falls

Executive function is processed in pre-frontal cortex with associations t/o brain.... but what is Executive Function?

Relationship between cognitive deficits and gait changes including speed, attributed to specific regions brain pre-frontoparietal and cingulate cortical areas and striatal hippocampal networks. (Montero-Odasso and Speechley 2018)



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What is delirium?

- A Medical Emergency
- An ACUTE Change
- A Reversible State
- A Syndrome (caused by something else)
- Fluctuates throughout the day.

- Change to cognition: **memory, visuospatial, language and perception.**

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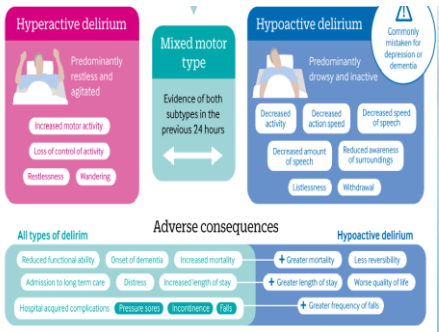

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Assessing for delirium

SQiD Single Question in Delirium

- Ask family/carer - Do you feel that "_____" is more confused or drowsy than normal?

Variable accuracy for identifying delirium but very accurate at ruling it out

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4 A's Test (4AT)

[1] ALERTNESS
This includes patients who may be markedly drowsy (eg. difficult to rouse and/or obviously sleepy during assessment) or agitated/hyperactive. Observe the patient. If asleep, attempt to wake with speech or gentle touch on shoulder. Ask the patient to state their name and address to assist rating.

Normal (fully alert, but not agitated, throughout assessment)	0
Mild sleepiness for <10 seconds after waking, then normal	0
Clearly abnormal	4

[2] AMT4
Age, date of birth, place (name of the hospital or building), current year.

No mistakes	0
1 mistake	1
2 or more mistakes/untestable	2

[3] ATTENTION
Ask the patient: "Please tell me the months of the year in backwards order, starting at December." To assist initial understanding one prompt of "what is the month before December?" is permitted.

Months of the year backwards	Achieves 7 months or more correctly	0
	Starts but scores <7 months / refuses to start	1
	Untestable (cannot start because unwell, drowsy, inattentive)	2

[4] ACUTE CHANGE OR FLUCTUATING COURSE
Evidence of significant change or fluctuation in: alertness, cognition, other mental function (eg. paranoia, hallucinations) arising over the last 2 weeks and still evident in last 24hrs

No	0
Yes	4

4 or above: possible delirium +/- cognitive impairment
1-3: possible cognitive impairment
0: delirium or severe cognitive impairment unlikely (but delirium still possible if [4] information incomplete)

4AT SCORE ☐

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4AT

[1] ALERTNESS
This includes patients who may be markedly drowsy (eg. difficult to rouse and/or obviously sleepy during assessment) or agitated/hyperactive. Observe the patient. If asleep, attempt to wake with speech or gentle touch on shoulder. Ask the patient to state their name and address to assist rating.

Normal (fully alert, but not agitated, throughout assessment)	0
Mild sleepiness for <10 seconds after waking, then normal	0
Clearly abnormal	4

Guide to scoring Item 1: altered level of alertness is >95% likely to be delirium in general hospital settings. If the patient shows significant altered alertness during the bedside assessment, score 4 for this item.

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4AT

[2] AMT4
Age, date of birth, place (name of the hospital or building), current year.

No mistakes	0
1 mistake	1
2 or more mistakes/untestable	2

Guide to scoring Item 2: the Abbreviated Mental Test 4 or AMT4 is a brief test of orientation in which the patient is asked: age, date of birth, place (name of the hospital or building), and the current year. 1 mistake scores 1 point on the item, and 2 or more mistakes scores 2 points.

If the patient cannot provide meaningful answers because of altered arousal, inability to produce speech, etc., then the patient is given **a score of 2** (given for patients who are 'untestable' on simple cognitive tests).

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4AT

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	Starts but scores <7 months / refuses to start	1
	Untestable (cannot start because unwell, drowsy, inattentive)	2

Guide to scoring Item 3: Months of the Year Backwards is a simple, widely-used test of attention which is sensitive to both delirium and general cognitive impairment. The patient is asked to recite the months of the year in backwards order from December.

If the patient verbally declines to start the test or is not able to correctly recite to June, score 1. If the patient cannot start the test for example through being drowsy or too inattentive they are in the 'untestable' category for this item and receive **a score of 2**.

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4AT

[4] ACUTE CHANGE OR FLUCTUATING COURSE
Evidence of significant change or fluctuation in: alertness, cognition, other mental function (eg. paranoia, hallucinations) arising over the last 2 weeks and still evident in last 24hrs

No	0
Yes	4

Guide to scoring Item 4: rapid (hours, days) deterioration in mental functioning is highly specific to delirium. If there is evidence of change or fluctuation then this item scores 4. This gives an overall 4AT score of at least 4, indicating likely delirium.

Item 4 requires information from one or more source(s), eg. your own knowledge of the patient, other staff who know the patient (eg. ward nurses), GP letter, case notes, or carers.

As part of the process of determining change from baseline in non-cognitive areas it can be helpful to elicit any hallucinations and/or paranoid thoughts by asking the questions such as, "Are you concerned about anything going on here?"; "Do you feel frightened by anything or anyone?"; "Have you been seeing or hearing anything unusual?"

Fluctuation can occur without delirium in some cases of dementia, but marked fluctuation usually indicates delirium.

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Volume 53, Issue 12
December 2024

JOURNAL ARTICLE

The association between delirium and falls in older adults in the community: a systematic review and meta-analysis

Charlotte Eost-Telling, Lucy McNally, Yang Yang, Chunhu Shi, Gill Norman, Saima Ahmed, Brenda Poku, Annemarie Money, Helen Hawley-Hague, Chris J Todd ... Show more

Difficult to identify specifics due to many variables – Frailty, polypharmacy, dementia and co-morbidities

Hyperactive – restlessness ⇧ exposure
Hypoactive – Deconditioning
Visual and auditory hallucinations
Impaired attention
Disorientation
Fluctuating cognition

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Does falling over increase risk of delirium

- To many confounding variables but there is an association
- Increased risk if person has cognitive impairment

Eost-Telling et al., (2024)

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Predictors who to assess? - Inpatients

NICE (2025) Falls: assessment and prevention in older people and in people 50 and over at higher risk (NG249)

Below patients at risk of falls and should have a comprehensive falls assessment (nee MFRA) and individualised interventions within 72 hours of admission.

1. All patients >64
2. Patients aged 50 to 64 years who are judged by a clinician to be at higher risk of falling because of an underlying condition.

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Predictors who to assess? - Care homes

Age and Ageing 2022; **51:** 1–36
https://doi.org/10.1093/ageing/afac205

GUIDELINE

World guidelines for falls prevention and management for older adults: a global initiative

Perform a comprehensive multifactorial assessment at admission to identify factors contributing to fall risk and implement appropriate interventions to avoid falls and fall-related injuries in care home older adults.

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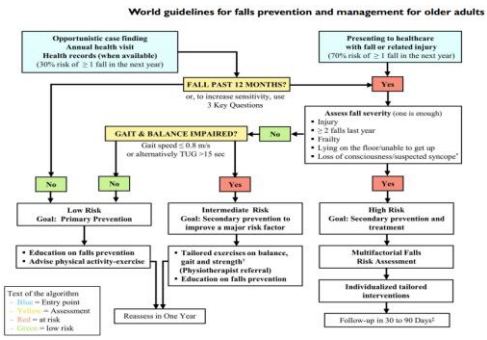

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Key questions if person highlighted as a risk

- Are you able to get on / off the floor?
- How would you raise the alarm?
- Ensure they know they are not a burden for asking for help, more time spent on floor – more problems longer on the floor.
- How could you keep warm on the floor?

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What should a comprehensive falls assessment include (where appropriate)?

- Alcohol intake related to falls
- Diet, fluid intake and weight loss
- Feet and footwear
- Functional ability
- Gait, balance, mobility and strength
- Hearing impairment
- Long term conditions (arthritis, PD, diabetes, dementia)
- Medication
- Neurological examination
- Osteoporosis (new for inpts)
- Incontinence
- Vision
- Home hazard/Environment

Cardiovascular Ax inc lying and standing BP

Dizziness

Community Falls ssessment (MFRA*

Cognition, **mood** & delirium

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Assessment of cognition, mood & delirium

BMJ Best Practice

Assessment of falls in the elderly

- Dementia – 6 CIT
- Delirium and falls inpatient OR 2.81 (Kalivas et al, 2023) – 4AT
- Delirium and falls community OR 2.01 (Eost-Telling et al, 2024) – 4AT
- Depression and falls OR 1.63 (Deandrea et al, 2010)
  - Common in people living with dementia (early stages of vasc and AD) also 31% their family/carers
  - Assess with Cornell Scale for Depression in Dementia
- Anti-depressants and falls OR 1.57 (Seppalla et al, 2018)
- Link with Community Mental Health Team / Falls Team for support

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Prevention

Carer awareness and understanding

Meaningful activity and engagement

Strength and balance

Environment

Digital Technologies

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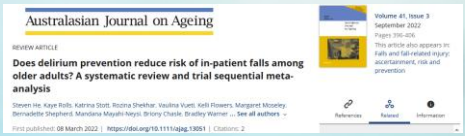
Australasian Journal on Ageing

REVIEW ARTICLE

Does delirium prevention reduce risk of in-patient falls among older adults? A systematic review and trial sequential meta-analysis

Steven He, Kaye Rolls, Katrina Stott, Rozina Sheikhar, Vasilina Vueti, Kelli Flowers, Margaret Moseley, Bernadette Shepherd, Mandana Mayahi-Neysi, Briony Chasle, Bradley Warner ... See all authors

First published: 08 March 2022 | https://doi.org/10.1111/ajag.13051 | Citations: 2

Volume 41, Issue 3
September 2022
Pages 396-406

This article also appears in: Falls and fall-related injury: ascertainment, risk and prevention

References Related Information

Delirium prevention reduced falls by 43%

Pain Mx
Feeding and hydration support
Address urine retention and constipation
Medication review
Orientation activities

Education on falls and delirium
Specialist geriatrician input (Nurse and Dr)
Screening falls risk factors
Individualised care plan
Therapeutic activities
Mobility interventions
Prevent sensory deprivation
Promote sleep hygiene

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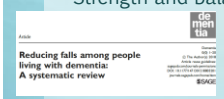
Strength and balance activities (-ve)


Reducing falls among people living with dementia: A systematic review


BMC Geriatrics

RESEARCH Open Access

Fall prevention in community-dwelling adults with mild to moderate cognitive impairment: a systematic review and meta-analysis


Clinical Interventions in Aging

REVIEW

Effectiveness of exercise programs to reduce falls in older people with dementia living in the community: a systematic review and meta-analysis


SYSTEMATIC REVIEW

Efficacy of exercise-based interventions in preventing falls among community-dwelling older persons with cognitive impairment: is there enough evidence? An updated systematic review and meta-analysis

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Strength and balance activities (+ve)

Mild cognitive impairment and dementia

Strong recommendation. Community-dwelling older adults with cognitive impairment (mild cognitive impairment and mild to moderate dementia) should be offered an exercise programme to prevent falls.

World guidelines for falls prevention and management for older adults: a global initiative Montero-Odasso et al (2022)

Exercise more effective at ↓ falls in community compared to residential care

Effective exercises can be multi-component - strength / balance or balance alone (tai chi)

Significant barriers?

Average PLwD adhere 45%
Average PLwD complete 55%

Reject idea at risk of falls, EVEN AFTER A FALL
-> Lack of purpose to interventions

Falls prevention seen as future "me" problem (Peach et al, 2017)

Lack routine

Reduced mobility

Lose of autonomy/control

Frustration/apathy

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Facilitators to ⇧ adherence (Hancox et al, 2019)

Activity >4 times week (average 98 mins NHS guidance 150 mins)

Clinician

Tailor exercises to person — EDIP Explain, Demo, Imitate, Practice

OTAGO (picture and text) — Emotional and practical support

Carer and PLwD understand why — Support goal setting and feedback

Greater cognitively impaired more clinical support (24>14 over 3 months)

PLwD — Intertwine exercise with daily routine

Rationale (pros/cons) goals — +ve past sport & exercise experiences

Individual or group based (icareimove, local community hall)

Carers — Carers understood rationale and goals

Support with prompts — Emotional and practical support

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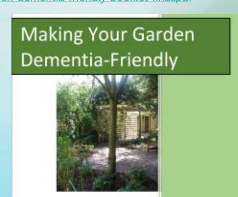
Environment

https://www.alzheimers.org.uk/sites/default/files/migrate/downloads/making_your_home_dementia_friendly.pdf

https://www.worcester.ac.uk/documents/Making-your-garden-dementia-friendly-booklet-final.pdf



https://www.newcastle.edu.au/__data/assets/pdf_file/0007/137185/HOMEFAST-Home-Falls-Accidents-Screening-Tool.pdf

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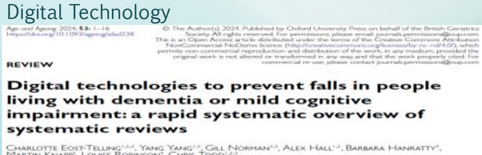
Digital Technology



Age and Ageing 2024; **53**: 1–16
https://doi.org/10.1093/ageing/afad238

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REVIEW

Digital technologies to prevent falls in people living with dementia or mild cognitive impairment: a rapid systematic overview of systematic reviews

Charlotte Eost-Telling[1,2,3], Yang Yang[1,2], Gill Norman[2,3], Alex Hall[1,2], Barbara Hanratty[4], Martin Knapp[5], Louise Robinson[4], Chris Todd[1,2,3]

Evidence is weak

Exercise gaming (2) may improve balance

Environmental sensors/visual monitoring (6) inconclusive

Virtual reality (1) help identify PLwD likely to fall

Wearables/sensors (13 studies) help identify PLwD likely to fall

No apps reviewed

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Walking aid recognition

Pimp my zimmer

Case study in care homes which states 60% ↓ falls by personalising walking aids

https://www.bbc.co.uk/news/av/health-42284621

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The golden nuggets

Be inquisitive – Many false negatives to “Have you had any falls in past 12 months?”

Carer is integral – include them

Using exercise program – is it delivered as designed - (Otago - 3x weekly + 2x 30 min walk) visit @ 1, 2, 4 and 8 weeks

Cog impairment needs more F2F input >23 visits in 3 months

Seek support to follow through – iCareiMove? Reablement? add to care plan?

www.joindementiaresearch.nihr.ac.uk

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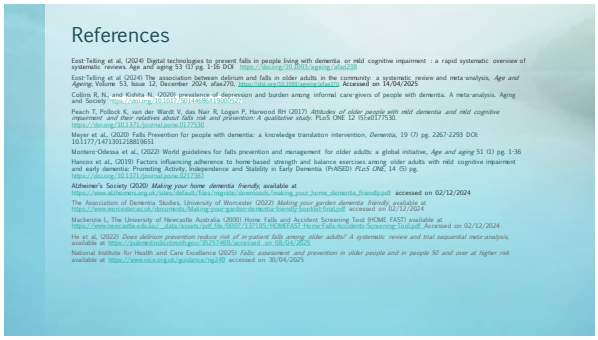
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