

## Preventing Falls in People with Cognitive Impairment Is there any Evidence?

A/Prof Jacqueline CT Close  
Prince of Wales Hospital & Clinical School  
Neuroscience Research Australia  
University of New South Wales



## Epidemiology of falls in CI/ Dementia

- Annual incidence of falls in cognitively impaired populations is 70-80% ie. double the normal population
- Fractures are up to 3x commoner in people with dementia
- Gait abnormalities are more common in people with dementia espec VaD
- Psychotropic drug use more common in people with dementia
- Orthostatic hypotension more common

## AGS/BGS Guidelines – Jan 2010

**“There is insufficient evidence to recommend for or against multifactorial or single interventions to prevent falls in older persons with known dementia living in the community or in long-term care facilities”.**

Multifactorial intervention after a fall in older people with cognitive impairment and dementia presenting to the accident and emergency department: randomised controlled trial

Fiona E Shaw, John Bond, David A Richardson, Pamela Dawson, I Nicholas Steen, Ian G McKeith, Rose Anne Kenny

**The application of a multifactorial intervention known to work in a cognitively intact population does not lead to a reduction in falls in a cognitively impaired population**

## Extrapolation from existing trials

If the mechanism by which the intervention has its effect is understood and not felt to be affected by the presence of cognitive impairment / dementia then it is reasonable to extrapolate data from trials undertaken in cognitively intact populations

Example 1. Treatment of osteoporosis with bisphosphonates

Example 2. Vitamin D

However – that assumes that the risk factor profile and contributors to overall risk in cognitively impaired people is comparable to that of cognitively intact subjects

## FOCIS Falls in Older Cognitively Impaired Subjects

- Prospective risk factor study
- Targeting cognitively impaired older people
- Aged 60+
- MMSE <24, ACE-R<82 or clinician diagnosis of dementia
- Look at cognitive and physical contributors to risk
- Ultimate aim to design successful approaches to intervention

## Physiological and Cognitive Variables

- Strength
- Balance
- Vision
- Reaction time
- Proprioception
- STS
- TUG
- 6m walk
- ACE-R, MMSE
- Trails A & B
- Logical memory
- GDS
- BNT
- FES-I

## FOCIS – Baseline Data

Variable	N=177
Age (median, range)	83 (61.8-99)
Female (%)	100 (56.5)
Place of residence	
Home (%)	138 (80)
Hostel (%)	39 (20)
Living arrangements	
Alone (%)	35 (17)
With someone (%)	102 (58)
Hostel / convent (%)	40 (23)
Years of education (median, range)	9 (0-19)
MMSE Score	22.8
ACE-R Score	65.5
Previous faller (%)	111 (62.7)
Previous recurrent faller (%)	60 (33.9%)

Physiological Measure	Cognitively Impaired (n=177)		Cognitively Intact (n=352)	
Melbourne Edge Test	20	(17 - 21)	19	(18 - 21)
Proprioception	2	(1.4 - 3.4)	2.2	(1.2 - 3.2)
<u>Reaction Time (ms)*</u>	273	(235 - 351)	254	(217 - 280)
<u>Quads Strength (kg)*</u>	19	(13 - 24)	23	(17 - 31)
<u>Balance (mm<sup>2</sup>)*</u>	1907	(987 - 2500)	818	(477 - 1520)
<u>Falls Risk Score*</u>	2.0	(0.9 - 3.1)	0.77	(0.17 - 1.65)

## Group Comparison at 6 months

	Non-Faller n= 92	Faller n= 79
Faller %	54%	46%
Recurrent faller		39/79 (49%)
Age	82.3	83.1
Gender		
Male (%)	38 (51)	37 (49)
Female (%)	54 (56)	42 (44)
Years of education	10.1	9.5
Mean No of medications*	6.9	8.5
On CNS Medications (%)*	26 (28%)	34 (43%)

## Physiological Measures

	Non-Faller n= 92	Faller n= 79	CI
Contrast sensitivity (dB)	19	18	19
Quad Strength (kg) *	20	16	23
Reaction Time (ms)	337	352	254
Sway on floor, eyes open (mm <sup>2</sup> ) *	544	960	
Sway on foam, eyes open (mm <sup>2</sup> ) *	3574	7370	818
Proprioception (°)	2.5	3.1	2.2

## Physiological Measures

	Non-Faller n= 92	Faller n= 79
Sit to Stand 5 (sec) *	20	27
Near tandem stand (sec)*	8	7
6m walk (sec)*	8	11
TUGT (sec)*	19	24
Co-stab (errors)*	32	47
Grip Strength (kg)	20	20

## Neuropsychological Measures

	Non-Faller n= 92	Faller n= 79
MMSE	23	22
Attention*	4.4	3.8
ACE-R	66	64
FES-I*	9.5	11
GDS-15*	2.5	4.5

## Multivariate Model

Independent and significant predictors:

	OR (95% CI)
Sway	1.76 (1.23-2.50)
GDS	1.26 (1.11-1.43)
Attention	0.73 (0.55-0.96)

## FOCIS – to date

- High risk population
- Physiologically poor in comparison to matched CI population
- Fallers in 6 months are poorer in terms
  - Physiological performance
  - Mood
  - Attention
- Have potentially modifiable risk factors

## AGS/BGS Guidelines – Jan 2010

“There is insufficient evidence to recommend for or against multifactorial or single interventions to prevent falls in older persons with known dementia living in the community or in long-term care facilities”.

## Intervention in the Community

### EXERCISE INTERVENTIONS – Level 1 evidence

Wolf, 1996	“free from debilitating processes”
Campbell, 1997	MSQ <7
Buchner, 1997	‘major psychiatric illness’
Robertson, 2001	“unable to understand trial requirements”
Barnett, 2003	“excluded if they had cognitive impairment”
Lord, 2003	MMSE <20
Means 2005	MMSE <25
Li 2005	“having no cognitive impairment”
Skelton 2005	“significant cognitive impairment”
Voukelatos 2007	“excluded if they had dementia”

Extrapolation – if benefits from exercise are from improved strength, balance & reaction time – why shouldn't people with cognitive impairment and dementia benefit.

## Intervention in the Community

### NON-EXERCISE SINGLE INTERVENTIONS

Cumming, 1999	not excluded if live in carer
Nikolaus, 2003	excluded “severe cognitive decline”
Campbell 2005	“unable to understand trial requirements”
Harwood, 2005	excluded “those with memory problems preventing the completion of the lengthy questionnaire”
Kenny, 2001	MMSE <24
Day, 2002	MSQ < 6
Campbell, 1999	MSQ <7
Pitt, 2007	Intervention was with GPs
Haran 2010	MMSE <24

Extrapolation – Cognitively impaired people will have been included in some of these studies. Above interventions may have benefit in people with cognitive impairment.

## Intervention in the Community

### MULTIPLE / MULTIFACETED INTERVENTIONS

Tinetti, 1994	MMSE <20
Hornbrook, 1994	"severely mentally ill"
Clemson 2002	MSQ <8
Wagner, 1994	?
Close, 1999	not excluded if live in carer
Davison, 2005	MMSE <24

\*Mahoney 2007 benefits only in people with MMSE <27

Extrapolation – Cognitively impaired people will have been included in some of these studies. Above interventions may have benefit in people with cognitive impairment.

## Interventions in RACF

### MULTIFACETED INTERVENTION

Ray 1997	Did not exclude cognitively impaired
Jensen 2002	Did not exclude cognitively impaired
Schnelle 2002	Did not exclude cognitively impaired
Becker 2003	Did not exclude cognitively impaired

Jensen 2003 – benefits were in those with MMSE >19

Becker 2008 – benefits were enhanced in those with cognitive impairment (MDS-Rai)

Cognitively impaired people should not be excluded from multifaceted RACF based falls prevention programs

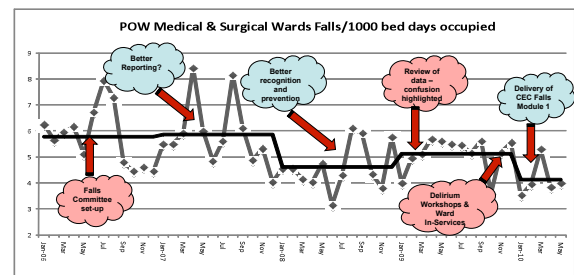
## Interventions in Hospitals

### MULTIFACETED INTERVENTION

Haines 2004	Cognitively impaired people included
Healey 2004	Cognitively impaired people included
Stenvall 2007	Cognitively impaired people included
Dykes 2010	Cognitively impaired people included

Cognitively impaired people should not be excluded from multifaceted hospital based falls prevention programs

## Preventing In-Patient Falls - A Journey not an RCT



## Conclusions

- People with cognitive impairment are at increased risk of falls
- The risk factors identified in this population are similar to cognitively intact older people
- Extrapolation of results from cognitively intact populations to cognitively impaired populations requires careful consideration
- Cognitive impairment has not been an exclusion criteria in successful trials in hospitals and RACF
- More research required to test approaches to intervention

## Acknowledgements

- Stephen Lord
- Morag Taylor
- Stef Mikolaizak
- Tasha Kvelde
- Jodie Martin
- Henry Brodaty
- The Falls Advisory and Implementation Group – POWH
- Area Health Service Falls Steering Group