Fall-related injury in people with dementia

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Overview

- Global impact of dementia
- Dementia in Australia
- Dementia and falls
- Hospitalisation trends from NSW
- Areas for future research
Global impact of dementia

Economic impact:
2015: US$ 818 billion
2030: US$ 2 trillion

Greatest increase in LMICs:
2015: 58% in LMICs
2030: 63% in LMICs

Global trends

• Some evidence that prevalence rates are plateauing or may have declined in high income countries\(^1\) (US, England, The Netherlands, Sweden and Denmark)

• Linked to improvements in education (increased cognitive reserve) and more aggressive management of cardiovascular risk factors

\(^1\) Langa KM. Is the risk of Alzheimer’s disease and dementia declining. *Alzheimer’s Research and Therapy* (2015) 7:34
Dementia in Australia

- Around 340,000 people are living with dementia and this is expected to surpass 900,000 by 2050.
- Of all Australians:
  - Aged 65 and over - 9% have dementia (1 in 11 people)
  - Aged 85 and over - 30% have dementia (3 in 10 people)
- People with dementia have significantly higher hospitalisation rates than people without dementia of similar age.
- Injury has recently been shown to be most common reason for admission to hospital for people with dementia.
- However, relatively little is known about hospitalisation for people with dementia who have sustained a fall-related injury.

1 Australian Institute of Health and Welfare (AIHW). Dementia in Australia. AGE 70. AIHW, Canberra 2012
Dementia and falls

- Older people fall (around one third of adults aged over 65 fall each year)
- Older people with dementia fall more (Around 60% of adults with dementia fall each year)
- Dementia is an independent risk factor for falls, *but why?*
- Balance (increase sway on foam and coordinated stability score) and mood (depressive symptoms) associated with falls in people with dementia
- Potentially modifiable risk factors

Fall-related injury hospitalisations in Australia

2.4% per year 65-74 years of age
1.8% per year 75-84 years of age
2.8% per year 85 years and older

Figure 4.2: Age-standardised rates for fall injury cases for three age groups, Australia 1999-00 to 2010-11

Note: Lines represent the modelled rates over the period, while symbols represent the age-standardised rate value for each year.
Fall-related injury hospitalisations in NSW

Figure 2.2: Fall-related injury hospitalisations by quinquennial age group, persons aged 65 years and over, NSW, 1998-99 to 2011-12
Impact of dementia on fall-related injury

• Trends in fall-related injury have changed over the last decade
  - Hip fracture rates (1.3% per year in NSW\(^1\))
  - Traumatic brain injury rates (8.6% per year in NSW\(^1\))

• People with dementia are 3-fold more likely to have hip fractures
• People with dementia are 2-fold more likely to have head injuries

• Are there differences in hospital characteristics and health outcomes for individuals with and without dementia?
• What impact is the increased number of people living with dementia having on the disparate injury trends?

Trends in NSW

• Hospitalisation (APDC) and death data (RBDM) for 235,612 individuals, aged 65 years and over, admitted to hospital for a injury between 2003-2012 in NSW were probabilistically linked

• Statistical analysis
  – Age-standardised rates per 100,000 population
  – Dementia and CCI comorbidities identified using a 12-month lookback period
  – Cox proportional hazards and logistic regression was used to adjust mean LOS and 30-day mortality, controlling for differences in age, sex, comorbidity and year of admission
  – Trends over time analysed using negative binomial regression
  – Hospital costs were calculated using AR-DRG codes; average AR-DRG version 6.0 costs were assigned to each episode of care, and summed for an individual’s hospital stay
Results: Mechanism of injury

With Dementia
- Falls 91%

Without Dementia
- Falls 75%

Falls
- Exposure to inanimate mechanical forces
- Intentional self harm
- Other/unspecified

Transport accidents
- Poisoning
- Burns

## Results: Demographic characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>With dementia</th>
<th>Without dementia</th>
<th>Significance</th>
</tr>
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<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
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<tr>
<td>Male</td>
<td>13,208</td>
<td>55,874</td>
<td>p&lt;0.0001</td>
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<tr>
<td>Female</td>
<td>33,858</td>
<td>125,688</td>
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<tr>
<td><strong>Age group</strong></td>
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<tr>
<td>65-69</td>
<td>749</td>
<td>18,341</td>
<td>p&lt;0.0001</td>
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<td>70-74</td>
<td>1,967</td>
<td>22,786</td>
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<td>75-79</td>
<td>5,223</td>
<td>31,925</td>
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<td>80-84</td>
<td>11,875</td>
<td>41,440</td>
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<td>85-89</td>
<td>14,896</td>
<td>38,622</td>
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<td>90-94</td>
<td>9,431</td>
<td>21,571</td>
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<tr>
<td>95+</td>
<td>2,925</td>
<td>6,877</td>
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<tr>
<td><strong>Number of comorbidities</strong></td>
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<tr>
<td>0</td>
<td>27,305</td>
<td>112,937</td>
<td>p&lt;0.0001</td>
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<td>15,889</td>
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<tr>
<td>3+</td>
<td>3,872</td>
<td>13,834</td>
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</tbody>
</table>
Results: Place of occurrence

- Falls 91%
- Falls 75%

Number of hospitalisations

- Home
- Residential Aged Care Facility
- Other
- Unspecified

With Dementia
Without dementia

* Significant difference at p<0.0001 level
Results: causes

- Slip, trip or stumble on same level: 91%
- Involving furniture: 75%

* Significant difference at p<0.0001 level
Type of fracture injury

![Bar chart showing the proportion of hospitalizations for different types of fractures with and without dementia. The chart indicates that fractures of the hip have the highest proportion of hospitalizations with and without dementia, followed by trunk fractures and lower limb fractures. There are lower proportions for fractures of the shoulder and upper arm, forearm, wrist, hand, head and neck, and multiple/unspecified fractures.]
Type of non-fracture injury

![Graph showing the proportion of hospitalizations for different types of injuries with and without dementia.](image-url)
Type of injury (adjusted)

* Reference group: Without dementia

Relative risk of admission by injury type, adjusted for age, sex, comorbidities and year
Length of stay

With dementia: 17.1 days
Without dementia: 15.7 days

* p<0.0001

LOS by injury type, adjusted for age, sex, comorbidities and year
30-day mortality rate

* p<0.0001

30-day mortality by injury type, adjusted for age, sex, comorbidities and year
In-hospital rehabilitation

With dementia: 56.8%
Without dementia: 25.7%

* Significant difference at p<0.0001 level
Trends-hip fractures

Hospitalisation rate for hip fracture decreased in people with dementia (-4.6% per year, p<0.0001), but remained constant for people without dementia (0.2% per year, p=0.5735)
Hospitalisation rate for other (non-hip) fractures decreased in people with dementia (-2.2% per year), but increased in people without dementia (+2.2% per year)
Trends - non fracture injuries

Hospitalisation rate for non-fracture injury increased in people with (+2.5% per year) and without dementia (+6.5% per year)
Hospitalisation rate for TBI increased in people with dementia (+8.0% per year) and without dementia (+11.1% per year)
Trends-TBI by type

Age-standardised TBI admission rates by injury type and year, persons aged 65 years +, NSW 1998/99 to 2010/11

Harvey LA and Close JCT. Traumatic brain injury in older adults: characteristics, causes and consequences. *Injury* (2012) 43;1821-1826
Costs

• The total estimated cost of fall-related injury hospitalisations over the last 2 year period (2010-2012) was $1,226M, with 21.4% ($263M) being for people with dementia.

• The average cost of hospital care for people with dementia was higher than for people without dementia ($16,746 vs $14,255 per hospital stay), however this pattern varied by injury type.
Summary

• People with dementia contribute a disproportionately large proportion of hospitalisations for fall-related injuries
• People with dementia are more likely to be admitted with hip fracture and head injuries (including TBI) but less likely to be admitted for other injuries, notably upper limb fractures
• People with dementia have longer LOS for all injury types, with exception of hip fractures
• People with dementia have higher 30-day mortality rates for all injury types
• Hospitalisation trends over last 10 years differ between those with and without dementia, *but why?*
Directions for future research

• Investigate reasons for difference in trends in hospitalisations between people with and without dementia, in particular to disaggregate influence of residential aged care
  – DCRC-ABC funded data linkage project using NSW hospitalisation data (APDC) linked to Aged and Community Care Management Information System (ACCMIS) and aged care functional assessments (ACFI) from the Aged Care Assessment Program (ACAP) data collection
  – Analysis progressing

• Explore the relationships between use of primary care and preventative care and fall-related hospitalisations and the contributions of person, geographic and service level factors to these relationships
  – Using 45 and Up study data linked to ED, hospitalisation and MBS and PBS datasets
Acknowledgements

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