Home ownership and fall-related outcomes among older adults in South Korea

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Young Kyung Do¹ and Cheong-Seok Kim²

¹Program in Health Services and Systems Research, Duke-NUS Graduate Medical School, Singapore
²Department of Sociology, Dongguk University-Seoul, Korea

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Falls: a major clinical and public health concern

- **Common**
  - Annual incidence among elderly (≥ 65) in the US: 33%
  - Prevalence of recurring falls: >50%

- **Large health and economic burden**
  - **Health consequences**
    - 10–15% result in severe fractures (25% recovery rate of hip fractures)
    - **Other serious consequences**: depression, social isolation, head injuries, limiting movement, fear of recurring falls
    - Prevalence of falls and fall-related complications increases with age
  - **Healthcare costs**
    - Direct medical costs: 200M USD (fatal falls) and 19B USD (non-fatal falls)
    - Double with increasing age: up to 8B USD among adults aged 75-84 years

BACKGROUND
Moylan and Binder, 2007; Delinger et al., 2006; Stevens et al., 2006; Rubenstein, 2006
Promoting mobility and physical activity without increasing the risk of falling is important.

Physical activity
- A major health-promoting factor
- Maintains and improves mental and functional health
- Increases mobility and relieves the pain of chronic pain sufferers

Fear of recurring falls
- A major activity-restricting factor
- Negative impact on physical and psychological health

Individual risk factors for falls
- demographics, anthropometrics
- geriatric conditions
- medication use, physical function
- lifestyle

Environmental risk factors for falls

HOME OWNERSHIP

Guvlisk et al, 2011; Wang et al, 2011; Tse et al, 2011; Andersen et al, 2006, Lim et al, 2011; Visschedijk et al, 2010; Wert et al., 2011; Rubenstein, 2006; Leung et al. 2010; Woo et al., 2009; Fuller, 2000; Leveille et al., 2009; Woo et al., 2009; Faulkner et al., 2009; Stevens, 2005; Lord et al., 2006; Letts et al., 2010; Engelhardt et al., 2010; Pynoos et al., 2009
Home ownership and falls among older adults

- South Korea has one of the **highest rates of elderly poverty** among developed countries (approx. 50%)
- Three major types: own home, long-term & short-term rental
- A substantial number of older adults live in short-term rental homes with relatively small amounts of monthly rent
- **Short-term rental homes** can potentially influence fall-related outcomes:
  - Overall low quality of the home environment: risk factors
  - Occupants’ attitude and willingness to improve their housing conditions: risk factors are less likely to be addressed by occupants and owners
These risk factors for falls are less likely to be addressed in short-term rental homes

- Tripping or slipping hazards
- Absence of stair railings or grab poles
- Having unstable furniture
- Uneven flooring
- Poor lighting
HYPOTHESIS

Compared with own home, short-term rental home is associated with:

- Increased risk of fall incidence among older adults
- Increased risk of fear of falling
- Increased risk of limiting activities due to fear of falling

- Nationally representative sample of adults ≥ 45 in 2006

Variables

- Three fall-related outcomes
  1. Incidence (any new falls in the past 2 years, i.e., 2006-2008)
  2. Fear of falling
  3. Limiting activity due to fear of falling

- Three variables on home ownership
  1. Own home
  2. Long-term rental (deposit-based)
  3. Short-term rental (monthly rent-based) and other

- Control variables: age, gender, currently married, coresiding with adult child, education, total assets, residence area, self-reported health, grip strength, eyesight, any falls in past 2 years
## Summary statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Incidence model (N=8,016)</th>
<th>FoF/Activity limitation model (N=17,214)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall-related outcomes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any falls in past 2 years (Wave 2)</td>
<td>2.4%</td>
<td>-</td>
</tr>
<tr>
<td>Fear of falling</td>
<td>-</td>
<td>44.9%</td>
</tr>
<tr>
<td>Limiting activity due to fear of falling</td>
<td>-</td>
<td>33.1%</td>
</tr>
<tr>
<td><strong>Home ownership variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home owner</td>
<td>77.5%</td>
<td>78.9%</td>
</tr>
<tr>
<td>Lease on deposit basis (long-term rental)</td>
<td>11.1%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Monthly rent and other (short-term rental)</td>
<td>11.4%</td>
<td>10.2%</td>
</tr>
</tbody>
</table>
RESULTS (1)
Compared with owned home, short-term rental home predicted higher likelihood of reporting any falls in the past 2 years

Note: *p < 0.05; logistic regression model controlled for age, gender, being currently married, coresidence with an adult child, education level, total household assets, residence area, self-reported health, grip strength and eyesight.
RESULTS (2)

Compared with owned home, short-term rental home predicted higher likelihood of limiting activity due to fear of falling (but not fear of falling per se)

<table>
<thead>
<tr>
<th>Home ownership</th>
<th>Selection equation: Fear of falling</th>
<th>Main equation: Limiting activity due to fear of falling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home owner</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Lease on deposit basis</td>
<td>Not stat. sig.</td>
<td>Not stat. sig.</td>
</tr>
</tbody>
</table>

Note: Probit model with sample selection controlled for age, gender, being currently married, coresidence with an adult child, education level, total household assets, residence area, self-reported health, grip strength and eyesight, and survey year. Statistical significance was determined by $p < 0.05$. 
Discussion

• Housing and the environment are important determinants of fall-related outcomes among older adults in South Korea
• Older adults living in short-term rental homes are at-risk group
• Implications
  – Risk assessment tools
  – Awareness
  – Financial support
Thank you!