Loneliness and Mortality: Results from a Longitudinal Survey of Social Isolation, Health, and Lifestyles

Angelique Chan
Duke-NUS Graduate Medical School, Singapore
Department of Sociology, Singapore
Outline

• Demographic changes in Singapore and the East Asian region
• Implications
• Priority areas for research and policy
  • Long-term care
  • Caregiver burden
  • Social isolation
• Analyses of the effects of social isolation on mortality in Singapore
• Results and discussion
Demographic changes in Singapore and East Asia

• Lower fertility
• Higher rate of non-marriage
• Later marriage
• Increased longevity
Percentage of Population aged 65+

Percentage of Population aged 80+

Implications of Demographic Trends

• Fewer family members available to support older adults

• Sandwich generation caring for children below 12 and members aged 65+ simultaneously

• Longer period of caregiving → increased financial and emotional burden (E.g., dementia)
Other implications of population aging

• Increased dialogue on:
  • Social integration of older adults within families and society
  • Burden of chronic disease
  • Caregiving
  • Role of family versus the State in providing care
  • Sustainable health system

• NEED FOR EVIDENCE-BASED POLICY FORMULATION
Priorities for Older Persons in East and Southeast Asia

• Maximize family care
• Aging in place
• Strengthen community based health care services
• Minimize hospitalizations and institutionalization

• HOW?
Rethink social policies

• Reconsider traditional assumptions

• Account for changing cohort characteristics

• Not one size fits all: need targeted policies
Example: Social policy and living arrangements

• Traditional social policies in Asia have enforced the importance of living in multi-generational families.

• Recent evidence has shown a decline in multigenerational households and an increase in single and two person households.
  • How do living arrangements impact health of older adults?

• Will traditional policy work going forward?
Trends in living arrangements in Singapore, South Korea, and Japan

Household Types in Asia

Source: UN Demographic Yearbook
Why is loneliness important?

Social relationships, or the relative lack thereof, constitute a major risk factor for health - rivaling the effect of well-established health risk factors such as cigarette smoking, blood pressure, blood lipids, obesity, and physical activity.

(House, Landis, and Umberson; Science, 1988)
How does loneliness affect mortality?

Pathways

Main effects model: Social relationships directly encourage protective health behavior, and loneliness can alter human physiology (increased vascular resistance, higher systolic blood pressure)

Buffering model: Social relationships help dampen responses to stressors.
How is loneliness measured?

**Three dimensions**
(Holt-Lunstad et al. 2010)

Social networks: Level of integration in social networks
   E.g. involvement in community and religious groups

Supportive social interactions
   E.g. inter-generational transfers

Individual: Perceptions of availability of support
   E.g. feelings of alienation and dislocation
Research questions

1. Independent of health, is loneliness associated with mortality?
2. How do different dimensions of loneliness affect mortality?

Approach

1. Loneliness + socio-demographics
2. Loneliness + socio-demographics + social networks
3. Loneliness + socio-demographics + social networks + living arrangements
4. Loneliness + socio-demographics + social networks + living arrangements + health
Methods

• PHASE -1 , 2009
  • Nationally representative survey conducted by MCYS of community-dwelling adults aged 60 years and above (N=4,990)

• PHASE – 2 2011
  • Follow-on to SIHLS
  • Sample restricted to only those who answered the social isolation questions in 2009 (N=3,802)

• Variables: Socio-demographics, chronic diseases, social isolation and loneliness, cognitive impairment, depression, disability, functional status, vision, sleep, lifestyle, dental health, mental health
Methods: Cox proportional hazards model

• Outcome variable: Mortality based on follow up survey and National Death Registry, up to December 2012
• Time-to-event calculated in days calculated from the 2009 interview date
• Covariates from baseline survey
• Baseline survey weights used
• Stata 12 (StataCorp, College Station, TX)
Measuring social isolation

**UCLA 3-item Loneliness Scale**

- How often do you feel that you lack companionship?
- How often do you feel left out?
- How often do you feel isolated from others?

Responses: Always, fairly often, occasionally, rarely, never

- Score range: 0-12
Independent variables

Modified Lubben Social Network Scale (12 questions)

• How many relatives/friends/neighbors ...  
  • do you see or hear from at least every month?  
  • are close enough to ask for help or discuss private matters?

• How often do relatives/friends/neighbors...  
  • consult you before making an important decision?  
  • available to talk when you have an important decision to make?
Independent variables

Living arrangements (categorical)

• Living...
  • alone
  • only with spouse
  • only with child(ren),
  • with spouse AND child(ren)
  • only with others
Independent variables

- **Socio-demographic**: Age, gender, ethnicity, marital status, housing type, and education

- **Health**: Number of comorbidities, ADL limitations, IADL limitations, smoking status, depression, cognition
Table 1: Distribution of social networks outside the household (Lubben’s revised scale) and living arrangements by extent of loneliness

<table>
<thead>
<tr>
<th>N=4536</th>
<th>Loneliness</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never lonely (49% (n=2259))</td>
<td>Sometimes lonely (32% (n=1390))</td>
<td>Mostly Lonely (19% (n=887))</td>
<td></td>
</tr>
<tr>
<td>Social networks outside the household</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated</td>
<td>25.8</td>
<td>17.6</td>
<td>29.3</td>
<td></td>
</tr>
<tr>
<td>High risk of isolation</td>
<td>22.1</td>
<td>22.9</td>
<td>22.1</td>
<td></td>
</tr>
<tr>
<td>Moderate risk of isolation</td>
<td>23.5</td>
<td>28.4</td>
<td>34.9</td>
<td></td>
</tr>
<tr>
<td>Low risk of isolation</td>
<td>28.7</td>
<td>31.0</td>
<td>13.7</td>
<td></td>
</tr>
<tr>
<td>Living arrangements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>4.7</td>
<td>5.5</td>
<td>13.1</td>
<td></td>
</tr>
<tr>
<td>With spouse only</td>
<td>17.4</td>
<td>18.0</td>
<td>14.1</td>
<td></td>
</tr>
<tr>
<td>With children only</td>
<td>18.3</td>
<td>15.3</td>
<td>29.2</td>
<td></td>
</tr>
<tr>
<td>With spouse and children</td>
<td>54.9</td>
<td>54.9</td>
<td>36.8</td>
<td></td>
</tr>
<tr>
<td>With others only or maid only</td>
<td>4.7</td>
<td>6.4</td>
<td>6.8</td>
<td></td>
</tr>
</tbody>
</table>

Social networks outside the household (modified version of Lubben’s revised social network scale): Scale consisted of 12 items (6 each for social networks with friends and with relatives outside the household). Scores from all 12 were added up, a higher score indicating stronger social networks. Cumulative score was divided in quartiles for the above tables. Those in the first quartile were considered isolated, those in the second at high risk of isolation, those in the third at moderate risk of isolation, and those in the fourth at low risk of isolation. *n’s are unweighted
Table 2: Distribution of extent of loneliness and living arrangements (Lubben’s revised scale) by social networks outside the household

<table>
<thead>
<tr>
<th>Loneliness</th>
<th>Isolated</th>
<th>High risk of isolation</th>
<th>Moderate risk of isolation</th>
<th>Low risk of isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=4536</td>
<td>23.8% (n=1117)</td>
<td>22.4% (n=1145)</td>
<td>27.2% (n=1086)</td>
</tr>
<tr>
<td>Never lonely</td>
<td>52.9</td>
<td>48.4</td>
<td>42.2</td>
<td>52.9</td>
</tr>
<tr>
<td>Sometimes lonely</td>
<td>23.8</td>
<td>32.8</td>
<td>33.5</td>
<td>37.3</td>
</tr>
<tr>
<td>Mostly lonely</td>
<td>23.3</td>
<td>18.8</td>
<td>24.3</td>
<td>9.7</td>
</tr>
</tbody>
</table>

| Living arrangements            |                |                          |                          |                          |
| Alone                          | 9.1            | 7.7                      | 5.6                      | 4.2                     |
| With spouse only               | 16.4           | 16.8                     | 20.2                     | 23.5                    |
| With children only             | 30.2           | 24.8                     | 24.5                     | 18.0                    |
| With spouse and children       | 36.3           | 44.9                     | 44.8                     | 50.2                    |
| With others only or maid only  | 8.1            | 5.9                      | 4.9                      | 4.0                     |

Loneliness: The UCLA three-item loneliness scale was used to assess loneliness. The three items were: How often do you feel you lack companionship? How often do you feel left out? How often do you feel isolated from others? Each item had five possible responses (always, fairly, often, occasionally, rarely, never), scored from 0 (always) to 4 (never). The score of each item was reverse coded, and were added up. Scores were divided into 3 categories: never lonely (0), sometimes lonely (1-3), mostly lonely (4-12)

*n’s are unweighted
## Results of multivariate analyses

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unadjusted</th>
<th>Model 1 (Loneliness and social isolation)</th>
<th>Model 2 (…. + sociodemographic)</th>
<th>Model 3 (…. + health indicators)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lonely</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never lonely</td>
<td>ref</td>
<td>ref</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Sometimes lonely</td>
<td>1.5*</td>
<td>1.55*</td>
<td>1.41*</td>
<td>1.44*</td>
</tr>
<tr>
<td>Mostly lonely</td>
<td>1.91*</td>
<td>1.82*</td>
<td>1.62*</td>
<td>1.34</td>
</tr>
<tr>
<td><strong>Social Isolation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated</td>
<td>2.07*</td>
<td>1.97*</td>
<td>0.47*</td>
<td>0.71</td>
</tr>
<tr>
<td>High risk</td>
<td>1.87*</td>
<td>1.77*</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>Moderate risk</td>
<td>1.46*</td>
<td>1.35*</td>
<td>0.62*</td>
<td>0.97</td>
</tr>
<tr>
<td>Low risk</td>
<td>ref</td>
<td>ref</td>
<td>ref</td>
<td>ref</td>
</tr>
</tbody>
</table>
Insight

• **Perceived loneliness** is associated with a greater risk of death in Singapore
• It is more predictive of mortality than living arrangements and social networks
How can we apply what we learned to policy?

- Multi-generational housing may be valuable, but it is not sufficient
- Policy should address perceived loneliness
  - Psychosocial services
  - Promote awareness by community and health care providers
Acknowledgements

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