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Neighbourhood and Health Outcomes

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Background

The characteristics of neighbourhood play an important role in influencing health and social outcomes through:

1) Neighbourhood institutions and resources (e.g. health care facilities)
2) Stresses in the physical environment (e.g. pollutions)
3) Stresses in the social environment (e.g. crime)
4) Neighbourhood-based networks and norms (e.g. social support)

(Ellen et al., 2001)
Evidence from Overseas Studies

- Self-rated health, psychological health and physical functioning are associated with
  - Amenities and facilities
    - Health services, leisure facilities, parks, banks, markets, etc.
  - Accessibility
    - Public transport, walkability etc.
  - Local problems
    - Noise, crime, air pollution, rubbish, etc.
  - Social cohesion
    - Known or trusted neighbours, etc.
  - Built environment
    - Buildings in deteriorating condition, etc.

(Sooman & Macintyre, 1995; Yen & Kaplan, 1999; Stafford & Marmot, 2003; Galea et al., 2005; Bowling et al., 2006; Poortinga et al., 2008; Larson et al., 2009; Parra et al., 2010)
The Hong Kong Situation

- Hong Kong has an area of only 1104 km² and it is divided into 18 District Council Districts for administration.

- Some studies examined the geographical variations in health outcomes (e.g. self-rated health, quality of life, morbidity and mortality) at district level (Wong et al., 2009; Wong et al., 2010; Yu & Wong, 2004; Lloyd et al., 1996)

- However, few local studies attempted to explain geographical variations of health outcomes in terms of the neighbourhood environment characteristics which vary within district.
Objectives

Examine the relationship between neighbourhood environment and health and social outcomes
Study Design

Population
- People aged ≥25 living in Sham Shui Po District and Sai Kung District
- Excluding those living in the district for <1 year

Sampling
- Random sampling based on telephone directory

Setting
- Telephone survey based on structured questionnaire

Study period
- Between 18th April 2009 and 10th June 2010
Sham Shui Po and Sai Kung

**Sai Kung**
- Population: 406,442
- % of elderly population (65+): 8.2%
- Density: 3,135 per km²
- Median household income: HK$21,000
- Unemployment rate: 4.4%
- % of non-schooling population having received tertiary education: 24.8%

**Sham Shui Po**
- Population: 365,540
- % of elderly population (65+): 16.7%
- Density: 39,095 per km²
- Median household income: HK$13,500
- Unemployment rate: 5.8%
- % of non-schooling population having received tertiary education: 18.8%
Explanatory Variables

Perceived neighbourhood environment

- Neighbourhood Environment Index based on six domains
  1) General impression, 2) Accessibility, 3) Safety, 4) Pollution-free, 5) Convenience of amenities and recreation venues, and; 6) Convenience of medical and social facilities
  - Higher scores indicate better environment

Socio-demographic variables

- Age, sex, education level, tenure of accommodation and household income
Outcome Measures

Health-related quality of life

- Physical components of SF-12 (PCS)
- Mental components of SF-12 (MCS)
- Higher scores indicate better health outcomes
  (Ware et al., 1996; Lam et al., 2005)

Social support

- Medical Outcomes Study-Social Support Survey (MOS-SSS)
- Higher scores indicate better social outcomes
  (Sherbourne & Stewart, 1991; Yu et al., 2004; Lee et al., 2005)
Multiple regression models, controlling for socio-demographic variables, were used to study the association between neighbourhood environment and the health and social outcomes.
Results

A representative sample of 814 subjects aged ≥25 living in Sham Shui Po District or Sai Kung District were successfully interviewed.

Response rate = 14%
Table 1  Number of respondents by age group, sex and district

| Age group | Sham Shui Po | | Sai Kung | |
|-----------|--------------|------------------|------------------|
|           | Male         | Female           | Male             | Female           |
| 25-44     | 54           | 90               | 77               | 130              |
| 45-64     | 73           | 77               | 77               | 71               |
| 65+       | 52           | 49               | 28               | 36               |
| Total     | 179          | 216              | 182              | 237              |
Socio-demographic Characteristics

Better health and social outcomes were associated with:

- Younger age
- Male
- Higher education level
- Ownership of accommodation
- Higher household income
Table 2 Relationship between socio-demographic characteristics and outcomes

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>PCS</th>
<th>MCS</th>
<th>MOS-SSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-44</td>
<td>351</td>
<td>4.66**</td>
<td>-0.36</td>
<td>16.28**</td>
</tr>
<tr>
<td>45-64</td>
<td>298</td>
<td>3.72**</td>
<td>-0.68</td>
<td>8.62**</td>
</tr>
<tr>
<td>65+ (reference)</td>
<td>165</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>361</td>
<td>1.54**</td>
<td>-0.18</td>
<td>-1.63</td>
</tr>
<tr>
<td>Female (reference)</td>
<td>453</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-secondary or above</td>
<td>246</td>
<td>2.46**</td>
<td>0.25</td>
<td>14.45**</td>
</tr>
<tr>
<td>Post-secondary below</td>
<td>565</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(reference)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner-occupier</td>
<td>520</td>
<td>1.62**</td>
<td>1.84**</td>
<td>9.94**</td>
</tr>
<tr>
<td>Rented (reference)</td>
<td>284</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Household income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 15,000 HKD</td>
<td>484</td>
<td>2.78**</td>
<td>1.34*</td>
<td>15.84**</td>
</tr>
<tr>
<td>&lt; 15,000 HKD (reference)</td>
<td>295</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*p-value <0.01, **p-value <0.001
### Table 3 Neighbourhood Environment Index

<table>
<thead>
<tr>
<th></th>
<th>Sham Shui Po Mean (s.d)</th>
<th>Sai Kung Mean (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General impression</strong>*</td>
<td>3.5 (0.9)</td>
<td>3.9 (0.7)</td>
</tr>
<tr>
<td><strong>Accessibility</strong></td>
<td>4.2 (0.6)</td>
<td>4.1 (0.6)</td>
</tr>
<tr>
<td><strong>Safety</strong>*</td>
<td>4.2 (0.7)</td>
<td>4.4 (0.5)</td>
</tr>
<tr>
<td><strong>Pollution-free</strong>*</td>
<td>3.6 (1.0)</td>
<td>4.0 (0.8)</td>
</tr>
<tr>
<td>*<em>Amenities &amp; recreation venues</em></td>
<td>3.6 (0.7)</td>
<td>3.5 (0.7)</td>
</tr>
<tr>
<td><strong>Medical &amp; social facilities</strong></td>
<td>3.3 (0.7)</td>
<td>3.1 (0.7)</td>
</tr>
<tr>
<td><strong>Overall</strong>*</td>
<td><strong>22.4 (2.9)</strong></td>
<td><strong>23.0 (2.4)</strong></td>
</tr>
</tbody>
</table>

* p-value of independent samples t-test < 0.05
** p-value of independent samples t-test < 0.01
*** p-value of independent samples t-test < 0.001
After controlling for the socio-demographic characteristics of individuals, an unit increase in Neighbourhood Environment Index was associated with:

- An increase of 0.37 in PCS score (p-value<0.001)
- An increase of 0.32 in MCS score (p-value<0.001)
- An increase of 1.22 in MOS-SSS score (p-value<0.001)

Interaction effects between the index and socio-demographic characteristics were insignificant (p-value>0.01)
By including district of residence as a random effect in the models, it was found that

- district was associated with MOS-SSS score, but not associated with PCS and MCS scores
- Neighbourhood Environment Index was still significantly associated with PCS, MCS and MOS-SSS scores

Neighbourhood Environment Index is a better predictor of health and social outcomes than district of residence.
Limitations

- With this cross-sectional study, we can only show association instead of causation.

- The low response rate may imply some selection bias.

- Some factors related to health and social outcomes were not controlled.
Conclusions and Recommendations

Better neighbourhood environment was associated with better health and social outcomes.

To build a better neighbourhood:

✓ Eliminate pollution
✓ Enhance accessibility
✓ Ensure safety
✓ Expand facilities and services
Q & A