Relationships of Perceived Neighbourhood Built Environment and Walking for Different Purposes in Hong Kong Older Adults

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Background

- Number of 65+ year olds: 27% of population in 2033
- Health and walking
- Environment and walking
- Most research conducted in low-density urbanized areas of Western countries (Australia; Canada; USA)

- Asian urban areas:
  - Higher density
  - Greater reliance on public transport
  - Socio-cultural differences
  - Differences in the built environment

- Need to study associations of built environment with walking in Chinese elders
Aim

• To examine associations of perceived neighbourhood environment with walking for different purposes in Chinese-speaking older adults of Hong Kong
Methods: Instruments

- A questionnaire of perceived environmental factors developed from the Neighborhood Environment Walkability Scale – Abbreviated (NEWS-A; Cerin et al., 2006) and adapted to Hong Kong settings and older adults

- Residential density
- Land use diversity (distance to destinations)
- Access to services
- Physical barriers to walking
- Indoor places for walking
- Fence separating footpath and traffic
- Bridge/overpass connecting to services
- Easy access of residential entrance
- Traffic speed
- Social disorder / littering
- Crime
- Street connectivity
- Infrastructure for walking
- Aesthetics
- Presence of people
- Crowdedness
- Traffic road hazards
- Sitting facilities
Methods: Instruments

- A questionnaire on walking behaviour based on the *Neighbourhood Physical Activity Questionnaire* (NPAQ – Giles-Corti et al., 2006) and adapted to Hong Kong elders
  - Walking for transport within the neighbourhood
  - Walking for recreation within the neighbourhood
Methods:

Participants and procedure:

- Interviewer-administered questionnaires
- N = 484 (aged 65+) – multi-stage stratified sampling strategy
  - Four areas varying in socio-economic status and walkability
    - High SES and high walkability (Wan Chai)
    - High SES and low walkability (Tseung Kwan O)
    - Low SES and high walkability (Nam Shan)
    - Low SES and low walkability (Yeun Long)
  - 8 residential blocks per area; 15 participants per residential block
  - Members of the Elderly Health Centres

Walkability (GIS) = dwelling density + street connectivity
Area SES = Median household income for a TPU
Methods: Analyses

• Generalized linear models with appropriate variance and link functions
  – Variance function: Gamma
  – Link function: Logarithmic
  – Robust standard errors to account for clustering effects
  – Controlled for age, gender and educational attainment
## Results

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Low walkable areas</th>
<th>High walkable areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking for transport (min/wk)</td>
<td>235 (187)</td>
<td>303 (258)*</td>
</tr>
<tr>
<td></td>
<td>160 (225)</td>
<td>230 (235)</td>
</tr>
<tr>
<td>Walking for recreation (min/wk)</td>
<td>270 (167)</td>
<td>252 (202)</td>
</tr>
<tr>
<td></td>
<td>195 (140)</td>
<td>180 (190)</td>
</tr>
</tbody>
</table>

Pink: Mean (SD); white: Median (IQR)
## Results

Associations of perceived neighbourhood attributes with self-reported weekly minutes of walking within the neighbourhood (expressed as $r$ values)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Walking for Transport</th>
<th>Walking for recreation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential density</td>
<td>0.07</td>
<td>-0.06</td>
</tr>
<tr>
<td>Land use mix – diversity</td>
<td>0.15$^c$</td>
<td>0.01</td>
</tr>
<tr>
<td>Access to services</td>
<td>0.11$^a$</td>
<td>0.10$^a$</td>
</tr>
<tr>
<td>Physical barriers to walking</td>
<td>0.06</td>
<td>-0.09$^a$</td>
</tr>
<tr>
<td>Street connectivity</td>
<td>0.06</td>
<td>0.09$^a$</td>
</tr>
<tr>
<td>Human and motorized traffic</td>
<td>0.12$^b$</td>
<td>-0.09$^a$</td>
</tr>
<tr>
<td>Infrastructure for walking</td>
<td>0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>Indoor places for walking</td>
<td>0.07</td>
<td>0.12$^b$</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>0.01</td>
<td>0.10$^a$</td>
</tr>
<tr>
<td>Social disorder / litter</td>
<td>0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>Traffic speed</td>
<td>-0.05</td>
<td>-0.10$^a$</td>
</tr>
<tr>
<td>Presence of people</td>
<td>0.03</td>
<td>-0.06</td>
</tr>
<tr>
<td>Crime</td>
<td>0.11$^a$</td>
<td>0.01</td>
</tr>
<tr>
<td>Fence separating traffic from sidewalks</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Bridge/overpass connecting to services</td>
<td>-0.03</td>
<td>0.09$^a$</td>
</tr>
<tr>
<td>Easy access of residential entrance</td>
<td>0.11$^a$</td>
<td>0.08</td>
</tr>
<tr>
<td>Sitting facilities</td>
<td>0.20$^c$</td>
<td>0.03</td>
</tr>
</tbody>
</table>

$^a$ $p<.05$; $^b$ $p<.01$; $^c$ $p<.001$
Conclusions

- The creation of local environments supportive of walking may help Hong Kong older adults maintain an active and, hence, healthier lifestyle.

- The presence of conveniently-located services, sitting facilities, easy access of residential entrances, traffic safety, indoor places for walking and green areas appear to be potentially important factors contributing to the creation of age- and health-friendly cities.

- Larger scale studies using perceived as well as objective measures of the neighbourhood environment and a combination of objective and self-report measures of walking are needed to confirm and explore further environment-walking associations in Hong Kong elders.
Thank You!

Questions?