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Neighbourhood Matters: Exploring Spatial Patterns in Older People's Health in Hong Kong

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Neighbourhood matters: explaining spatial patterns in older people's health in Hong Kong

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Why study the association

- Increasing number of people moving from rural areas to cities
- Ageing population in cities: increasing prevalence of diseases; disabilities and frailty; hence need for 'age-friendly' environment
- Examine relation between urban design and health; is there an age-friendly and health promoting environment?



An Integrated Framework

Personal Factors

Lifestyle

Diet; Physical activity; Smoking habit; Substance abuse/usage; Gambling; Internet usage

- Socio-economic
 Education; Occupation; Absolute
 & disposable income
- Psychosocial

Self-rated ranking in society; Social norms; Family influence; Stigma

Environmental Factors

- Home and neighborhood environment
- Open spaces
- Air pollution
- Climateric stress

Aging Well: Outcomes

- Population level
 - Mortality; DALY; Productivity loss
- Individual level

Neurodegenerative, musculoskeletal diseases; Heart failure; Mental health; Frailty, physical and cognitive dysfunction; Multi-morbidity; Quality of life

Biological level

Pathophysiology; Biomarkers; Genetic markers, e.g. Telomere length as an indicator of life span at the cellular level, and a reflection of accumulated damage during the life course Innovation of Service Development and Evaluation



Age-adjusted hip fracture case fatality rates by DC districts in Hong Kong, by year of occurrence





Age-adjusted hip fracture incidence rates by DC districts in Hong Kong, by year of occurrence





Age-standardized stroke case-fatality rates by DC districts in Hong Kong, by stroke

subtypes and periods





Age-standardized stroke incidence rates by DC districts in Hong Kong, by stroke

subtypes and periods





Problems in addressing this research question

- Difficult to establish direct causal relationship since it is difficult to control for all intrinsic and extrinsic variables eg. What is the evidence that open spaces are good for health?
- Can only draw inferences from associations; from comparative studies and regional variations controlling for other confounding factors, to estimate the magnitude of contribution of the environment



Relevant factors

- Design to promote healthy lifestyles
- City planning for easy access to transport, healthcare, shops etc (age-friendly patterns)
- Planning buildings and roads with awareness of impact of -heat and cold; noise; pollution; open spaces



Relevant factors

- Specific design for elder housing and residential care homes for the elderly, especially for those with cognitive impairment
- Neighbourhoods



District variations in self-rated health, frailty & 4 year mortality in HK Chinese aged >=65 years

 Lifestyle, SES & regional characteristics directly & indirectly through interactions contribute to these health outcomes

Reference:

 Woo J et al. (2010) Relative Contributions of Geographic, Socioeconomic, and Lifestyle Factors to Quality of Life, Frailty, and Mortality in Elderly. PLoS ONE 5(1): e8775. doi:10.1371/journal.pone.0008775



Results

Path analysis model of FI(log) (adjusted for age & sex)



- a: Tsuen Wan (-0.04)*, Kowloon City (0.042)*
- b: Eastern (0.043)*
- c: Kowloon City (-0.058)*, Eastern (-0.082)*
- d: Kwai Tsing (-0.046)*, Yuen Long (-0.061)*, Kowloon City (-0.050)*, Kwun Tong (-0.045)*, Eastern (-0.052)*, Yau Tsim Mong (-0.057)*
- *p<0.05
- Coefficients within path: standardized β from regression

Findings

- Our findings
 - District variation in health outcomes among Chinese elderly in HK
 - District of residence, SES & lifestyle factors directly & indirectly affect the studied health outcomes
 - Higher self-rated SES and better lifestyle (e.g. better diet quality, more physically active) contribute to better health outcomes



Discussion

- Effect mediated through neigbourhood characteristics?
 - Neighbourhood deprivation is associated with worse health outcomes
 - Social support, leisure facilities, safety, environmental pollution, crowdedness etc. (van Lenthe, 2006; Ko et al, 2007)
 - Exert effect partly through psychological mechanisms mediated via neuroendocrine system (McEwen et al, 1999)
 - Supported by our previous study of district variation in telomere length (Woo et al, 2009)



Green space, psychological restoration, and telomere length

	Telomere length				Odds ratio (95% CI)
-	1 st quartile (shortest; n=243)	2 nd quartile (n=245)	3 rd quartile (n=244)	4 th quartile (longest; n=244)	
Shatin	31 (12.8%)	43 (17.6%)	39 (16.0%)	68 (27.9%)	1
Kowloon City	21 (8.6%)	17 (6.9%)	18 (7.4%)	14 (5.7%)	0.50 (0.30-0.83)
Wong Tai Sin	19 (7.8%)	20 (8.2%)	31 (12.7%)	14 (5.7%)	0.59 (0.37-0.94)
Sham Shui Po	31 (12.8%)	22 (9.0%)	21 (8.6%)	15 (6.2%)	0.38 (0.24-0.60)
Yau Tsim Mong	22 (9.1%)	21 (8.6%)	21 (8.6%)	16 (6.6%)	0.48 (0.29-0.78)

Table Association between telomere length and region of residence in Hong Kong Woo J, et al. Green space, psychological restoration, and telomere length. Lancet 2009; 373(9660): 299-300



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%



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%

Sham Shui Po and Sai Kung









Neighbourhood Characteristics to be Studied

- General impression
- Accessibility
 - Walking around the neighbourhood
 - Accessing public transport
- Safety
 - Safety in walking around the neighbourhood at night
 - Presence of illegal activities
- Pollution
 - Presence of noise pollution, air pollution and accumulated garbage
- Amenities & recreation venues
 - Ease in accessing wet market, supermarket, shopping mall, Cantonese restaurant, food outlet, bank, post office, public library, public swimming pool/ beach, indoor sports centre, outdoor sports ground, recreation and open space
- Medical & social facilities
 - Ease in accessing public hospital, accident and emergency departments, day hospital, private hospital, private clinic, community centre and elderly centre

Walkability

- Two of the above factors
 - Obstruction on walkway (e.g. ramps, stairs, slippery floor)
 - Safety to walk around the neighbourhood at night

define "walkability"

- Different from the standard scale which also include other dimensions like residential density, access to service, land-use mix, etc
- A narrower definition is used since most neighbourhoods in HK are compact such that most services are in proximity
- Accessibility of services are evaluated as separate factors

Walkability

- Here, walkability is defined by
 - Obstruction on walkway (e.g. ramps, stairs, slippery floor)
 - Safety to walk around the neighbourhood at night
- Different from the standard scale which also include other dimensions like residential density, access to service, landuse mix, etc
- A narrower definition is used since most neighbourhoods in HK are compact such that most services are in proximity
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High vs Low Walkability







Age-related differences in association between wellbeing and environment

- Walkability is the predominant factor associated with health-related quality of life and social support
- Leisure facilities and social facilities were rated lower by the older age group >65+ compared with younger age groups



Conclusion

- Neighourhood design impacts on health of ageing populations
- The magnitude of the impact could be equivalent to that from lifestyle and socioeconomic factors
- There is a dearth of research in this area, which requires cross disciplinary studies



Research Questions

- Need to collect evidence on the interaction between health and environment using quantitative and qualitative methods: FACTS INFLUENCE POLICY
- Utilize existing network of contrasting cities and intra-cities differences to address these questions
- Examine subgroup differences (age, culture, ethnicity: eg WHO Age Friendly Cities), with detailed adjustments for confounding factors

