



# A qualitative GIS investigation in exploring the older adults' perceptions of their exercise space in the neighbourhood and the planned exercise space designed for them

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# Background

- Research studies has been suggesting physical activity (PA) behaviour is a result of a myriad of interrelated factors from individual, social, organizational, environmental and policy factors.

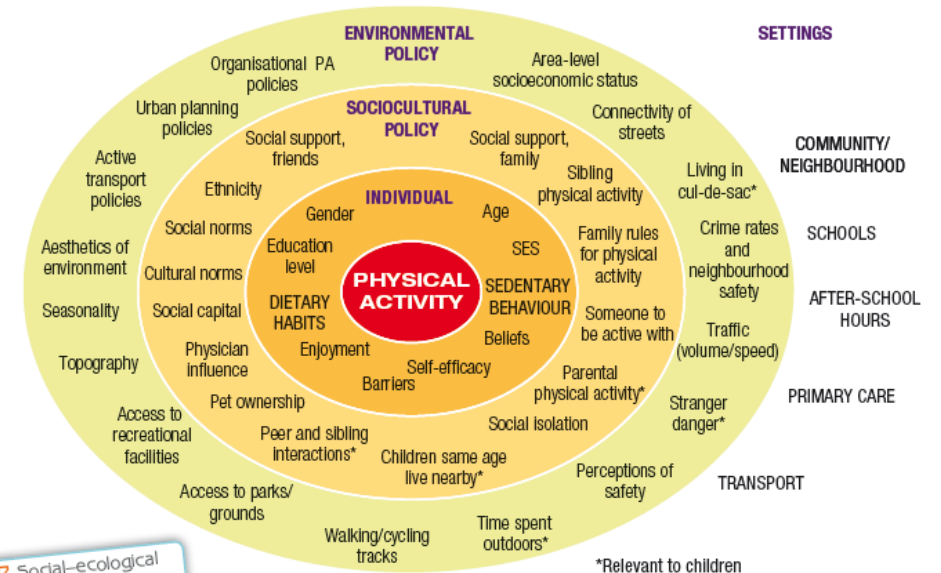


FIGURE 2.7 Social-ecological model of physical activity

Adapted from: Salmon & King 2005

Source: <https://images.app.goo.gl/1nyHAQmdrB31Y61a6>

# Background



- A belief that changes in the environment could result in a more sustainable changes in PA behaviours than individual level intervention has driven research studies that investigate **what aspects of the neighbourhood environment inhabit PA** and what aspects of the environment **promote PA**.

# Background



(Morales-Campos, 25)



Figure 2. Pupils using the mapping method tools and process.

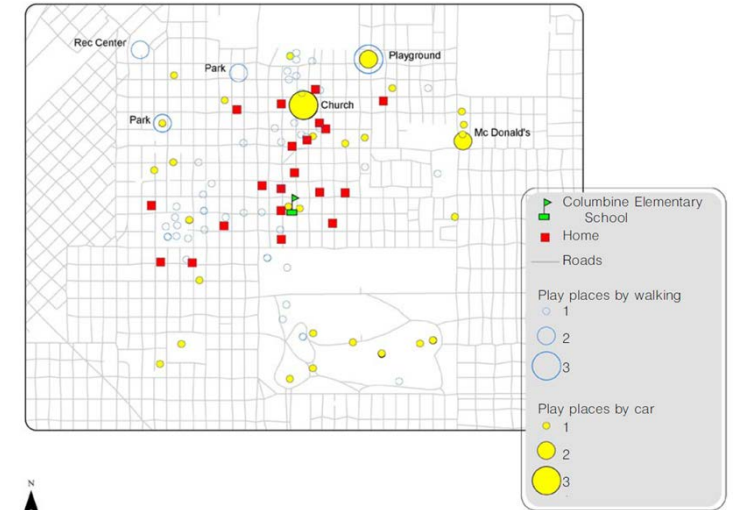


Figure 4. [In color online.] Transport to play places used by children in the study group.

(Hamilton, 2017)

- In recent years, qualitative research that investigated environmental influence on individuals used qualitative geographical information system approach (QGIS)
- **QGIS allows** informants to articulate their **perceptions, voice and feelings** of neighbourhood environment in a way that could **be translated to GIS database.**

# Aims and objectives

- Apply Qualitative Geographic Information System (QGIS) to **visualize** older adult's active locations
- To find out the environmental, social and individual **attributes** of why they choose to be active in these locations
- Explore how older adults **perceive** the exercise space ("Elderly fitness corner") that the government designed and built for them



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**news.gov.hk**  
From Hong Kong's Information Services Department November 19, 2017

January 30, 2006  
Leisure  
**92 fitness corners built for seniors**

Elderly fitness corners have been set up at 92 parks, playgrounds and sitting-out areas throughout the territory, with fitness equipment designed for senior citizens, the Leisure & Cultural Services Department says.

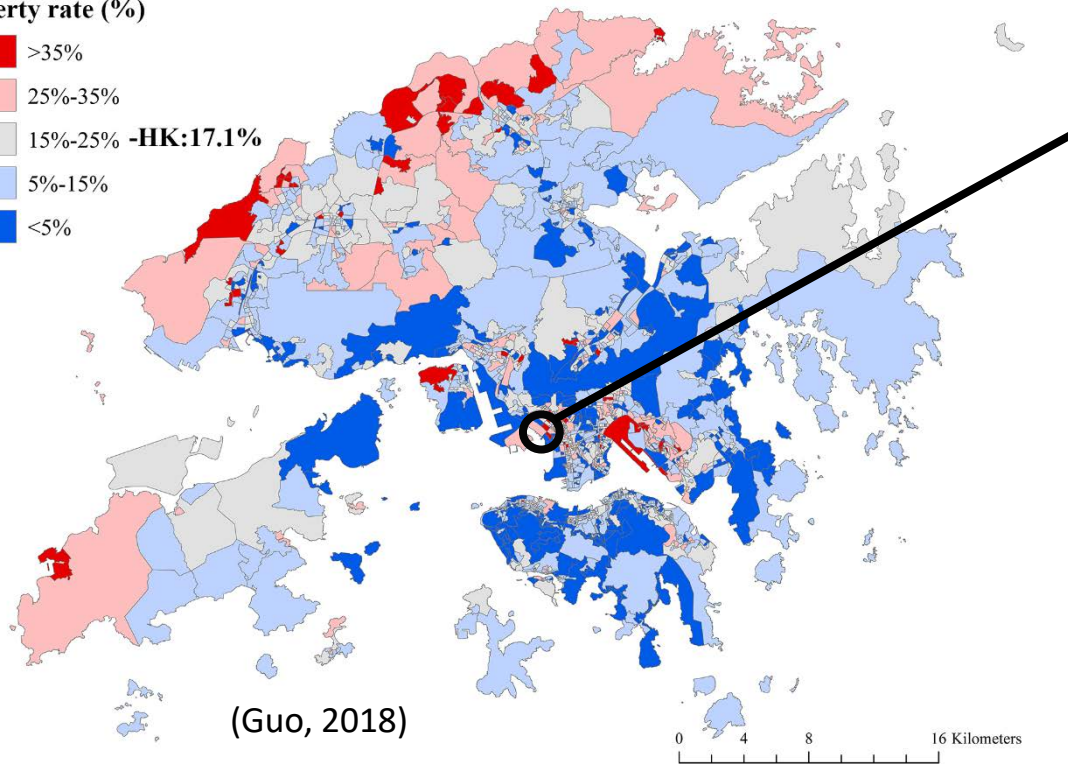
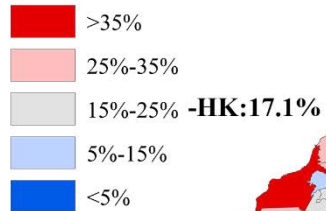


**Fitness fun:** Elderly people using the 'Tai Chi Wheels' (front) and the 'Pull-down Machine' (back) in Chai Wan Park.

# Methodology

## Sample Location

Poverty rate (%)



- Low-income district Sham Shui Po was chosen to be sampling location
- Pok Oi Hospital Mr. Kwok Hing Kwan Neighbourhood Elderly Centre was the sampling site for participant recruitment.

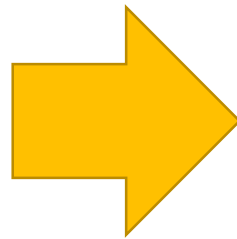
# Methods

- Four 1:5000 topographic colour maps combined to be one big map (Size:150 cm x 120 cm) with 3D photo image on representative architectural buildings placed on map (Figure 3) were used along with interview to explore community-dwelling older adults' active locations, perception of the locations and their awareness and perceptions of government built “Elderly fitness corner”.



# Methodology

- The interview first started with mapping activities then followed by in-depth qualitative interview.





# Results

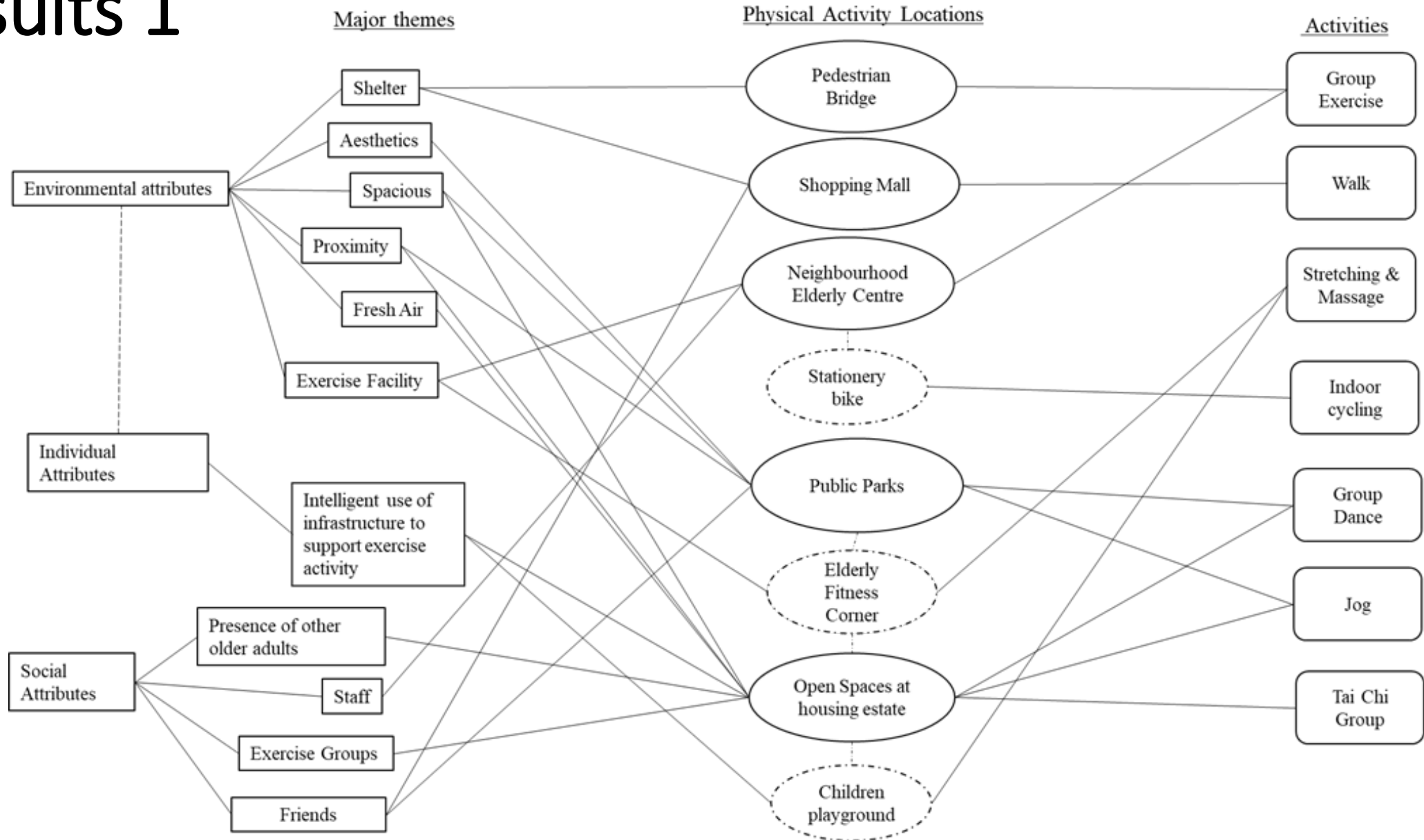
- A total of 15 community-dwelling older adults aged 62-88 years old (mean =  $73 \pm 7.9$ ) participated in the study.

Table 1. Characteristics of participants

	N=15
Age (62-88 years old) (m, sd)	73 (7.9)
Sex	
Male	2 (13.3%)
Female	13 (86.7%)
Education	
No formal education	3 (20%)
Primary level (Uncompleted)	2 (13.3%)
Primary level	7 (46.7%)
Secondary level	3 (20%)
Perceived health status	
Excellent	2 (13.3%)
Good	4 (26.7%)
Fair	8 (53.3%)
Bad	1 (6.7%)
Type of Residence	
Public aided housing	12 (80%)
Private housing	3 (20%)
Number of years living in the neighbourhood (3-14 years)	12.2 (2.6)
Rapid Assessment of Physical Activity Level (1-9) (m, sd)	7.3 (1.5)



# Results 1



# Discussion 1 (Highlight)

- In previous older adults' PA studies, only individual factors such as health, lifestyle background, psychological characteristics were reported in affecting older adults' PA (Bjornsdottir, Arnadottir, & Halldorsdottir, 2012; Marquez et al., 2016), **intelligence in utilizing available resources in the built environment was rarely mentioned.**
- This study shows that older adults may be restricted by their mobility in reaching resources designed for them, **but with intelligence, they can make use of available resources in the immediate environment to facilitate their PA behaviour.**



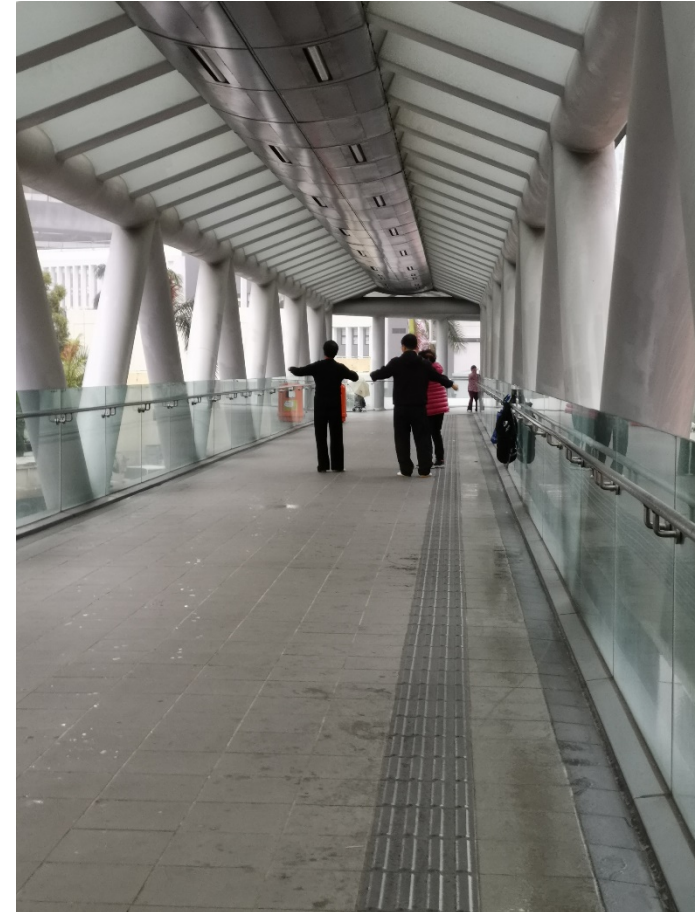
# Discussion 1 (Highlight)

- Future design of PA supporting facilities in open spaces (i.e. playground) may not be age-group bounded.
- It might be more practical to design **facilities that could be used by individuals with different ability and mobility**. Instead of creating space dynamics between the young and the old in public open space, universal design principles for intergeneration use maybe advocated.
- This vision is also suggested in a recent park-based PA intervention systematic review (Saitta, Devan, Boland, & Perry, 2019) and the call from Global Action Plan on Physical Activity (World Health Organization).

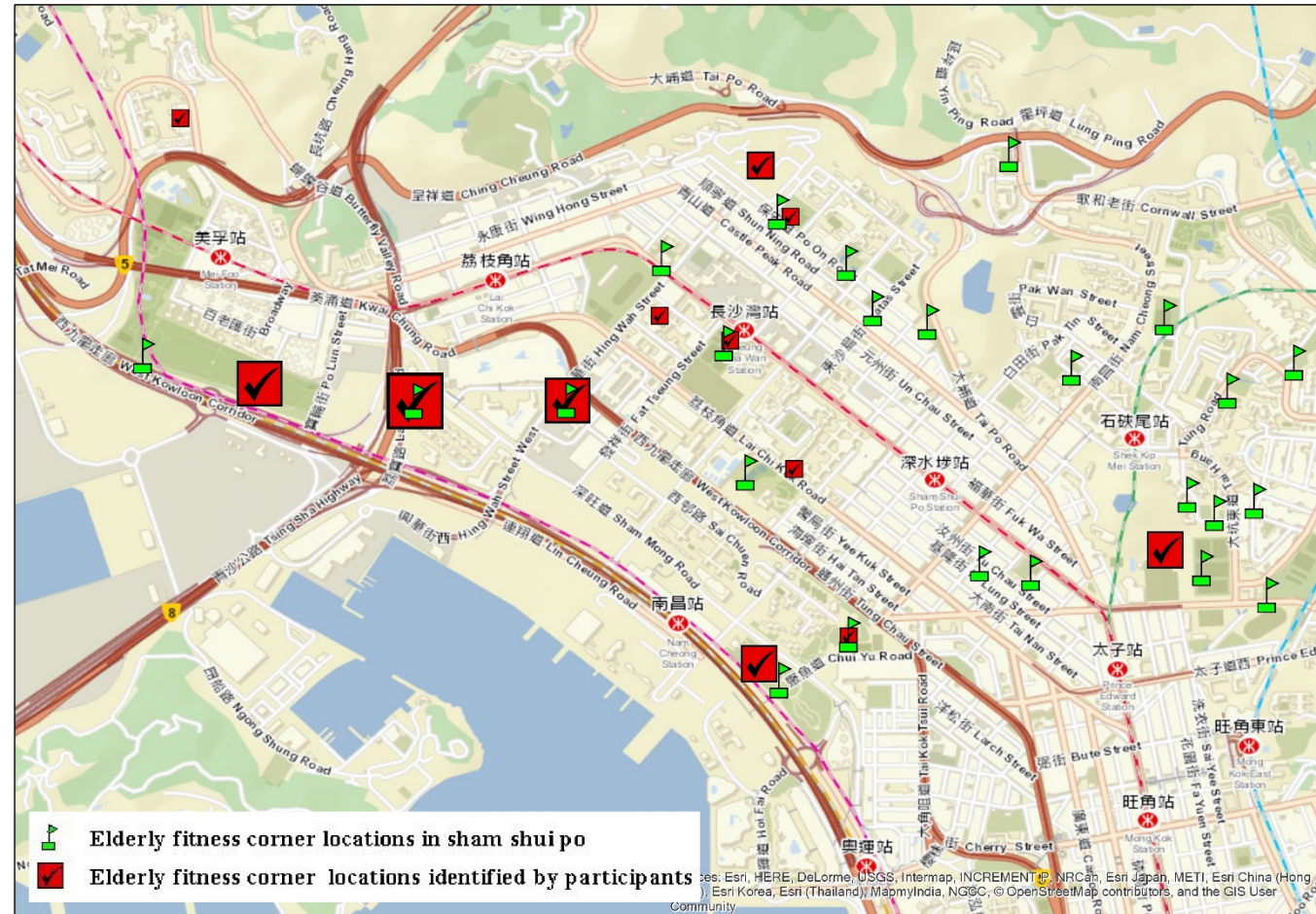


# Discussion 1 (Highlight)

- In this study, **footbridge**, as pedestrian infrastructure was identified as locations where older adults **perform structured PA like group-based tai chi and dance**
- Although the urban space is for pedestrian in nature, but the shelter environmental attribute **attracted older adults to perform PA during bad weather situation**. The footbridge act as a temporal exercise amphitheatre during bad weather situation.
- **Consist with previous research**, shelter as environmental attribute is important facilitator for older adults' PA especially during cold weather and when there is extreme heat in summer (Bjornsdottir et al., 2012; Marquez et al., 2016). Research also suggested that shelter has been considered as important environmental attribute because it could provide opportunity for rest after PA (Moran et al., 2014).



# Result 2



Elderly fitness corner locations identified by participants through mapping activities and the actual elderly fitness corner locations. On average, participants could identify  $2.5 \pm 1.9$  elderly fitness corners installed by government to align with ageing-in-place policy in their neighbourhood

# Results 2



**Positive Perceptions: Instructions, assistance, rehabilitation**

**Negative Perceptions: Crowded, Far, weather, safety, monotonous, fear of injury and inadequate promotion**



# Discussion 2 (Highlight)

- The theme inadequate promotion **reinforce previous research that call for the need from promotion activities and guidance on equipment usage** to community-dwellers on this type of outdoor exercise facility (Cohen, Marsh, Williamson, Golinelli, & McKenzie, 2012; Scott, Stride, Neville, & Hua, 2014; Sibson, Scherrer, & Ryan, 2018) .



# Discussion 2 (Highlight)

- Regarding safety, informant of the current study overlap the **concept of safety with “familiarity” of the people** around, this is in agreement with previous study conducted in Korea (Yoo & Kim, 2017) in which social safety, feeling safe in familiar neighbourhood with long-time neighbours was important for older adults’ PA behaviour.



# Conclusion

- This study **improves current understanding** on what environmental, social and individual attributes affect PA behaviours among older adults.
- The use of QGIS in the study **opens a dialogue** between older adults' residents, planners and researcher that allows locally specific interventions that promote PA.

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# References

- Bjornsdottir, G., Arnadottir, S. A., & Halldorsdottir, S. (2012). Facilitators of and barriers to physical activity in retirement communities: experiences of older women in urban areas. *Physical therapy, 92*(4), 551-562. doi:10.2522/ptj.20110149
- Cohen, D. A., Marsh, T., Williamson, S., Golinelli, D., & McKenzie, T. L. (2012). Impact and cost-effectiveness of family fitness zones: a natural experiment in urban public parks. *Health & Place, 18*(1), 39-45.
- Guo, Y., Chang, S. S., Sha, F., & Yip, P. S. (2018). Poverty concentration in an affluent city: Geographic variation and correlates of neighborhood poverty rates in Hong Kong. *PloS one, 13*(2), e0190566.
- Hamilton, K. C., Richardson, M. T., Owens, T., Morris, T., Hathaway, E. D., & Higginbotham, J. C. (2017). A community-based participatory research intervention to promote physical activity among rural children: theory and design. *Family & community health, 40*(1), 3-10.
- Marquez, D. X., Aguiñaga, S., Campa, J., Pinsker, E. C., Bustamante, E. E., & Hernandez, R. (2016). A Qualitative Exploration of Factors Associated With Walking and Physical Activity in Community-Dwelling Older Latino Adults. *Journal of Applied Gerontology, 35*(6), 664-677. doi:10.1177/0733464814533819
- Morales-Campos, D. Y., Parra-Medina, D., & Esparza, L. A. (2015). Picture This!: Using Participatory Photo Mapping with Hispanic Girls in a Community-based Participatory Research Project. *Family & community health, 38*(1), 44.

# References

- Moran, M., Van Cauwenberg, J., Hercky-Linnewiel, R., Cerin, E., Deforche, B., & Plaut, P. (2014). Understanding the relationships between the physical environment and physical activity in older adults: a systematic review of qualitative studies. *International Journal of Behavioral Nutrition and Physical Activity*, 11(1), 79.
- Scott, A., Stride, V., Neville, L., & Hua, M. (2014). Design and promotion of an outdoor gym for older adults: a collaborative project. *Health promotion journal of Australia: official journal of Australian Association of Health Promotion Professionals*, 25(3), 212.
- Sibson, R., Scherrer, P., & Ryan, M. M. (2018). 'I think it adds value, but I don't use it': use, perceptions and attitudes of outdoor exercise equipment in an urban public park. *Annals of Leisure Research*, 21(1), 58-73.
- Yoo, S., & Kim, D. H. (2016). Perceived urban neighborhood environment for physical activity of older adults in Seoul, Korea: A multimethod qualitative study. *Preventive medicine*.