

Navigating Barriers, Building Inclusion: The Role of the Built Environment in Shaping Outdoor Participation in an Aging Asian Society



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Mobility Challenges in Older Adults: Burden and Impact

Global Burden

Falls

- Serious injuries are significant public health challenge¹ and economic burden²
- Globally, ~ 33% people > 65 years experience at least one fall annually³

Knee OA (KOA)

- 83% of global OA burden⁴
- By 2050, global prevalence is projected to grow by 74.9%

Psychosocial + Participation Impact

Affects participation, and heightened fear of movement and falling



Built Environment Considerations in Mobility and Participation

Built Environment (BE) risk factors

- Hazards are a major extrinsic fall risk factor⁴
- Environmental hazards⁷ → 73% of outdoor falls
- Neighborhoods with significant environmental barriers or deteriorating conditions increase likelihood of falls⁹
e.g. Poor walkability, limited accessibility, limited opportunities for social connectedness
- Exacerbates psychosocial impact of kOA/fall^{2,10}



Biopsychosocial + Participation Impact

- increase fall risk, pain anticipation
- deter outdoor participation

Research Gap & Study aim

GAP

- Existing BE research has largely focused on structural and physical risk factors
- Limited attention has been given to how the BE shapes the lived experience of participation among older adults with mobility challenges

This study examines the BE's role in shaping the physical, psycho and social dimensions of outdoor participation, and identifies BE features that promote or hinder such engagement.



Methods

Inclusion criteria

- 45- 99 years old
- NICE clinical criteria for knee OA and/or fall(s) within past year
- Independently ambulant outdoors

Recruitment

- 3 restructured, tertiary hospitals' orthopaedic and/or geriatric clinics
- Purposive maximum variation sampling + snowball sampling
- June 2024 – Mar 2025

Study Design

- Mixed qualitative methods
- Interpretive phenomenology

Demographics & Patient-reported outcomes



1a. Semi-structured sit-down interviews

Audio data



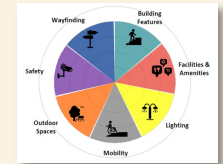
1b. Semi-structured walk-along interviews

Audio-video data

Sit-down and Walkalong Interview Guides

Concepts explored

- Lived psychosocial experiences of knee OA and/or falls (i.e. mobility, physical activity, exercise, outdoor participation)
- Built environment domains (MOHT's EAT-Lite)



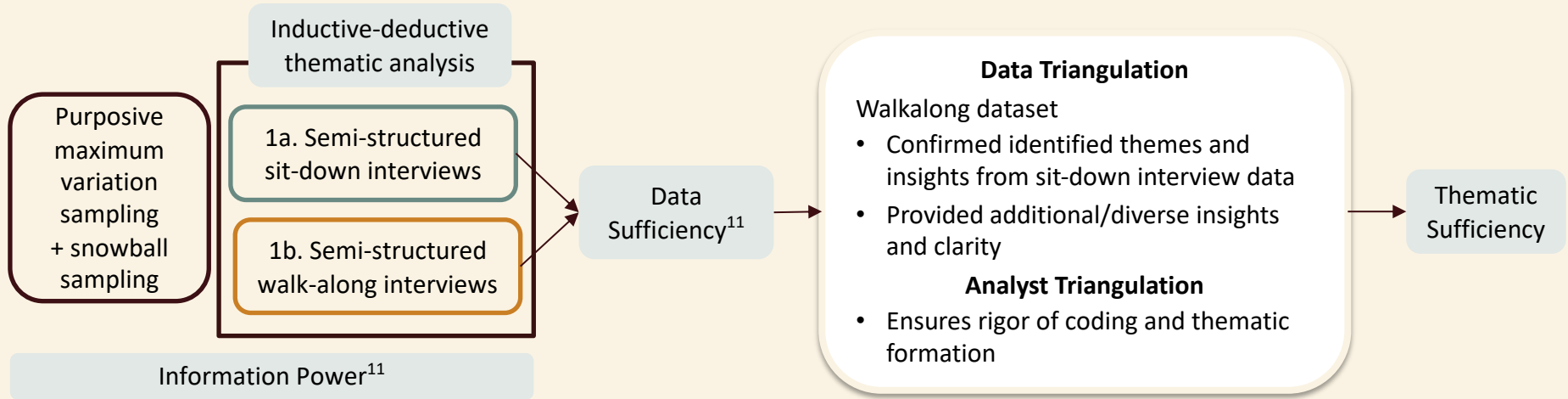
Participants' Characteristics (n = 40)

Characteristic	n (%)
Age, mean (SD)	69.3 (9.79 SD)
Female	29 (72.5)
Race	
- Chinese	- 25 (62.5)
- Malay	- 4 (10.0)
- Indian	- 10 (25.0)
- Others	- 1 (2.5)
English speaking	- 30 (75.0)
Mandarin speaking	- 10 (25.0)
Education level	
- No formal	- 1(2.5)
- Up to primary	- 4 (10.0)
- Up to secondary	- 18 (45.0)
- Post-secondary	- 13 (32.5)
- University	- 4 (10.0)

Characteristic	n (%)
Employment	
- Retired	- 20 (50.0)
- Working (Full Time/Part Time)	- 13 (32.5)
- Others (homemaker/unemployed)	- 7 (17.5)
Clinical group	
- Falls only	- 7 (17.5)
- Knee OA only	- 20 (50.0)
- Knee OA + Falls	- 13 (32.5)
Recruitment sources	
- Purposive maximum variation sample (3 hospitals)	- 33 (82.5)
- Snowball sample	- 7(17.5)

38/40 (95%) were homeowners
 - including 2 living in privately owned properties
 2/40 (5%) lived in rental flats

Data Analysis and Results



4 major themes emerged from the analysis

Limiting participation
via post-fall fears or kOA
pain

Theme 1:
Barriers vs. Buffers:
How the built environment
simultaneously restricts and
supports outdoor engagement



“So you realise a lot of areas here, a lot of steps. ...because of the way the kerb is constructed...I’d rather walk those flat pathway...[the steps are] pain. The pain and the gravity.” –T05, Walkalong

Theme 1:
Barriers vs. Buffers:
How the built environment
simultaneously restricts and
supports outdoor engagement.

Buffering participation
decline through
supportive features

“The railings are very helpful... When I have the pain, I’m not so steady... the railing helps me to be more steady and it helps me walk without falling.” - W03, Walkalong

*“I’m more independent staying where I am now than previously...All those places I basically need to drive or be driven. And since I don’t drive anymore... I would say that, you know, **knowing that if you want something, you can easily get [in my current place].** First of all, it’s an incentive for you to walk...” –T19, Walkalong*



W03 Walkalong

Theme 2: Distinguishing transient inconveniences from the impact of persistent barriers

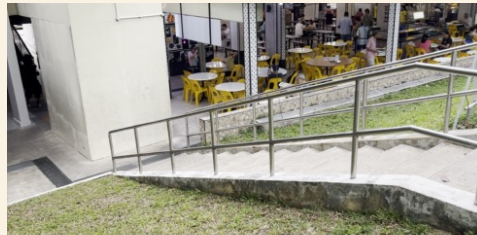


*“They will be travelling on this pavement. And they **go at a very high speed** you know. I try to avoid them because I don't want to have another fall.”
–K06, Walkalong*

Persistent Barriers – sit down interviews

- Cyclists and riders (n=34)
- Wet, slippery, and dangerous flooring and surfaces (n=29)
- Stairs (n=27)
- Slopes and ramps which are too steep/lacking handrails (n=23)
- Shelters and linked walkways (n=21)
- Overhead bridge (n=18)
- Drainage and ponding (n=17)
- Lack of handrails (n=17)

*“That’s the **staircase**...This one is really quite high. That’s why I don’t want, I change bus [to avoid the stairs]” – T17, Walkalong*



Persistent Barriers – walkalong interviews

- Stairs and kerbs (n=33)
- Wet, slippery, and dangerous flooring and surfaces (n=31)
- Cyclists and riders (n=29)
- Slopes and ramps which are too steep/lacking handrails (n=26)
- Lack of handrails for staircases (n=16)

Theme 2:
Distinguishing transient
inconveniences from the
impact of persistent barriers

Transient Inconveniences
– sit down interviews

- Kerbs
- Lack/inadequate public seats and places for gathering
- Crowds
- Issues with traffic and roads



Lack of seat/rest areas

*“If it’s only that piece, of course not enough. **Can do more [chairs]. Seems very little...**If your knee is really painful, you can rest for a while and continue again.”*

–T07, Walkalong

Transient Inconveniences
– walkalong interviews

- Lack/inadequate seats/rest areas (n=15)
- Lighting (n=13)
- Issues with traffic and roads (n=10)
- Crowds (n=6)



Lighting

*“If you were to come by the day or night, the whole thing is very different. Because night is dimmer. **Not very well-lighted**”*

–T05, Walkalong

Theme 3:
Attitudes, physical capability, and social support
moderate the
lived experience of built environment constraints

*"No, no. **I can handle** [the slope]. This is my routine." –T20, Walkalong*

*"**No choice, cannot change** [pain when walking up slope]. Correct?" –T08, Walkalong*

*"Just **bear the pain over** [the puddle]. Just bear it, just try to clear the route as soon as possible." –T05, Walkalong*

Attitudes
pain, falls, physical constraints, age, self-activation

Enabling

Limiting

Automatic avoidance behaviours

Public image concerns

*"I don't really like walking as my legs get sore. I will **only walk if it necessary.**" –T06, Walkalong*

*"I dare not go out even when someone asked me because it was painful. I was in a bad mood... I am someone who paid more attention to my appearance. **I don't like people seeing my "ugly" side.**" - W04, Sitdown*

Theme 3:
Attitudes, physical capability, and social support
moderate the
lived experience of built environment constraints

Social support
valued when symptomatic

*"I think I was really very touched. Yes. Especially with my son and daughter-in-law and my son now also, I think he also has that fear that he doesn't want his mother to have a fall again, you know. So **he makes sure that I am secured enough so whenever we go out, he holds my hand. Yes. Or he will ask his daughter to hold my hand and walk.**" –K06, Walkalong*

Physical Capability

Limitations

Adaptive &
Self-Protective behaviours

Strengthened

Through own training,
clinical interventions,
community programmes

Theme 4:

The centrality of elaborate decision-making to the quality and engagement of outdoor participation

Decision-making Matrices

*Convenience, Safety, Needs, Interests,
Enjoyment, Value of Activity/Participation*

Value of Activity/Participation

*“Even if there is a bit of pain, you can still overcome it... when friends invite ‘come, **come out for gathering**’. It’s hard to come by, because in life, **if you reject an opportunity, sometimes it may not come again.**”*

–T21, Sit down

Needs

*“if I go out, I find difficult. Every time my wife will have to support me. And then when she walks, she walks so far away and I’m very slow... I don’t go out unnecessarily. **There must be a purpose, then I’ll go.**”*

– W06, Sit down



Introduction

Methods

Results

Discussion

Discussion

The BE plays a dual role by amplifying perceived risk or buffering declines in participation

+

in the context of one's attitudes, physical capabilities, and social support



Highlights how the BE is experienced as **evoking psychological responses** (e.g. fear, pain appraisal, danger anticipation)

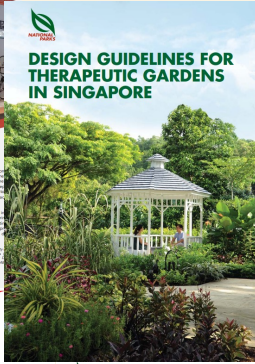


The lived experience of built environment constraints can be moderated

Clinical interventions → improve self efficacy, physical capabilities, foster adaptive behaviours etc



Emphasizes the increasing importance of **inclusive and age-friendly design** as Singapore's population ages rapidly.



Guide to Universal Design index



A GUIDE TO DESIGNING AND IMPLEMENTING COMMUNITY GARDENS



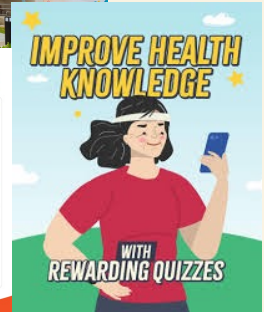
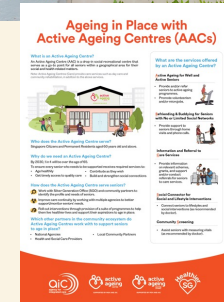
Discussion

Access enables participation ... but sustained engagement depends on decision-making within environmental and contextual demands

Elaborate decision making can be influenced through various initiatives



- *Enhancing health literacy via 'Community Clubs', 'Active Ageing Centres', Digital platforms*
- *Self- management or frailty prevention programmes can foster decision-making capabilities and enhance self-agency*



Application to the Occupational Therapy profession

Practitioner & Community Level

Rehabilitation: Address attitudinal factors and personal capacity, and support patients to apply environmental adaptation interventions.

Health/Frailty Prevention Programmes: Enhance health literacy in the context of occupations, address attitudinal barriers while fostering positive attitudes

Self-Management Programmes: Foster decision making capabilities and strengthen self-agency.

Systems & Advocacy Level

Professional bodies can advocate for BE design and practice standards that better support participation

- eg through Policy, Best Practice Guidelines, Community planning initiatives

Future research

Examine how integrating BE focused participation strategies into community health prevention programmes influences participation outcomes.



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Checklist

Due Date	
25 October 2025	Register and pay registration fees (you must register and pay by the due date to remain in the program)
12 January 2026	Advise/request special audio-visual requirements (if required) to evan@glidingwingsproductions.com.au
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