



Mobility of the elderly in densely populated neighbourhoods in Singapore



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ABSTRACT

With Singapore's rapidly ageing population, it is prudent to acquire a better understanding towards the influence of densely inhabited neighbourhoods on mobility and walking duration as experienced by the elderly. The factors, "road crossing delay", "recreational facilities (social interaction area)", "cycle", "exercise", "medical" and "working" were found to be significantly associated with elderly walking duration at 90% confidence level. Longer elderly walking duration (per week) was associated with whether the elderly is working and the elderly's perceived availability of social interaction areas and shops. This study also reveals how their typically short travel distances point to an importance of the immediate neighbourhood safety and accessibility of elderly living in Singapore, and elderly fallers who sustained lower mobility level(s) and walking duration. Besides developing policies aimed at bettering the health of senior citizens, the findings act as good advice for local authorities in prioritising neighbourhood enhancement schemes.

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1. Introduction

Singapore has one of the fastest ageing populations in the world. Currently, the elderly (aged 65 years old or above) constitutes about 11% of the residential population (Singstats, 2013a). By 2030, one in every five residents will be an elderly (CAI, 2006) as the population is expected to age at a rate faster than countries such as Australia, South Korea, the U.K. and the U.S.A. (ILC-Singapore, 2011). With a declining birth rate and increasing life expectancies, Singapore is experiencing an ageing and shrinking citizen population and workforce. The old-age support ratio (i.e. those in working-age band of 20–64 years versus aged 65 years old or above) of 6.4 in 2013 has been projected to decline to 2.1 by 2030 (National Population and Talent Division, 2013). As such, it is pertinent to cater for the ageing population, in terms of mobility needs, to help attain their self-sustainability and independence to the furthest extent possible.

Walking, as a form of moderate physical activity, is important towards maintaining the health of elderly people (Stuck et al., 1999). Numerous studies have provided evidence of a relationship between neighbourhood characteristics, physical activity and related health aspects (Balfour & Kaplan, 2002; Cerin et al., 2010; Jackson, 2003; Michael, Green, & Farquhar, 2006; Pikora et al., 2006;

Saelens, Sallis, & Frank, 2003; van Lenthe, Brug, & Mackenbach, 2005). Carr (2003) recommended to build sidewalks and pedestrian treatments in residential developments, and amend zoning codes to allow neighbourhood commercial in residential areas. This will reduce the trip distances of the elderly and thereby encouraging them to walk instead of drive. It was found that the presence of environmental barriers (such as lack of resting places, high hills, poor street conditions and busy traffic) in a person's living environment increased the risk for developing new walking difficulties by up to three-fold (Rantanen, 2013). A study (Rosso, Auchincloss, & Michael, 2011) on the relationship between urban built environment and mobility of older adults revealed that safety, and proximity to destinations such as retails and green spaces, are associated with mobility. Therefore, better insights towards the influence of neighbourhood characteristics on the walking behaviour of elderly people shall be useful in developing policies aimed at bettering the health of senior citizens.

The amount of distance walked by an elderly determines his/her mobility state and indirectly affects his/her quality of life (Berg, Arentze, & Timmermans, 2011). Older people tend to have a shorter walking duration or distance than younger folks, which reduces their chances of interacting with others in the neighbourhood. There are many factors that could dissuade an elderly to remain active in the surrounding neighbourhood, such as post-fall trauma (or past experience of falling down), deteriorating health, the lack of a caregiver or a less than elderly-friendly environment. This study

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Fig. 1. A public housing estate in Singapore.

seeks to identify infrastructural features, and social demographic and situational variables that are contributable towards improving elderly mobility in the neighbourhood. This is done by using the perceived infrastructural provision rated by the elderly through a perception survey.

2. Setting and methodology

Singapore is one of the few city state countries in the world where majority (>80%) of the population, which includes the elderly, resides within public housing estates that are densely built (see Fig. 1). The challenges of mobility in the land-scarce country are about maximising land use in an efficient way for accessibility and livability, and so the ubiquitous multi-storey public housings are usually unfenced with spaces on the ground level (called void deck)

for thoroughfare and social interactions. Such neighbourhoods are regularly refurbished to make them more inviting to the elderly, and in order to increase their mobility level and activeness in the society. Elderly inhabitants in residential areas also serve as valuable forum in giving practical inputs into what should be done to increase accessibility and safety in their local outdoor environment (Stahl et al., 2008), which forms the focus of this study.

The geographical residential spread of the elderly is shown in Fig. 2 (SLA, 2013), which shows that most of the elderly is largely concentrated in the central and eastern regions of Singapore. Surveyors were thus deployed to these residential neighbourhoods to interview the active elderly (≥65 years old), either at the chit-chat areas at the void decks or at nearby elderly activity centres (e.g. eldercare centres and exercise areas). An active elderly is defined as someone who goes out of his/her house at least once per day. The respondent subjects were approached by random solicitation to participate in a questionnaire survey, the completion of which be rewarded with a \$10 (USD8) cash voucher. The survey was conducted during daytime hours and, wherever possible, while the elderly respondents were seated to minimise any physical exertion when answering the questionnaire.

During the survey, information was sought on the elderly’s estimated walking duration (in minutes) per day and per week within the neighbourhood. Walking in this research include walking as a form of exercise, and walking to amenities and transport nodes. They were then asked to rate on a scale of 1 (strongly agree) to 4 (strongly disagree) on each of 18 statements or descriptions pertaining to the surrounding environment that the elderly spend some time in (see Table 1). The use of an even scale of 4 was intentional to avoid “sitting-on-the-fence” cases. The environmental factors were structured in terms of infrastructural compatibility factors that are found to be important for walking in the local (Singapore) context (Koh & Wong, 2013). The factors included in this study are security, detour, road crossing delay, directional sign,

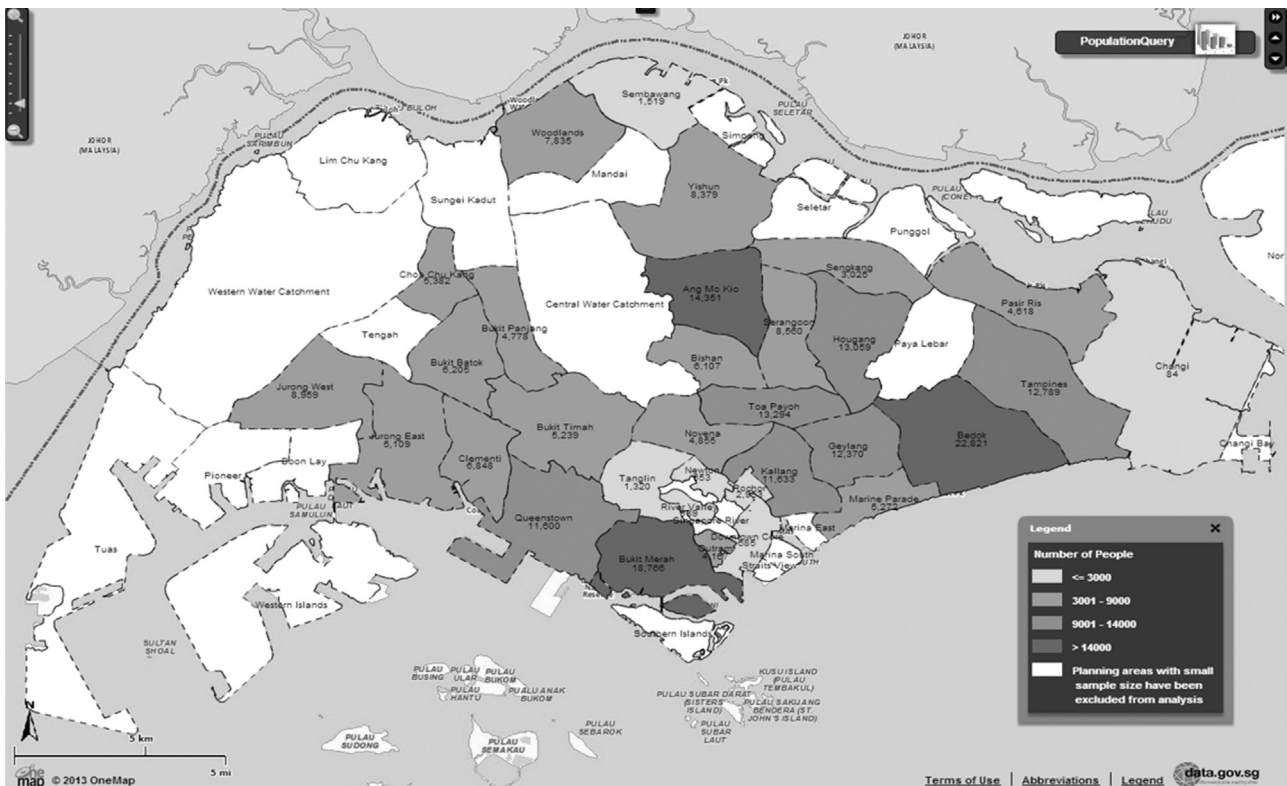


Fig. 2. Geographical residential spread of elderly (SLA, 2013).

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