Urban Living Room: An explorative study of elderly and public space in high density living

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Abstract

The urban living room in this paper refers to the space where families gather however no longer limited to within the home but beyond this boundaries and into public space as housing options trend towards smaller living unit. This paper describes the exploratory study of the thermal environment and associated behavior of elderly in three areas and four public housing developments with varying associated amenities and public space in Hong Kong, where the projected elderly population is 30% by 2044 and currently about one-third of the elderly live under the poverty line. The selected housing developments depict a range from low-rise to high-rise housing to form an understanding of how public space planning affects elderly behavior in different living conditions. Many of the public housing developments are associated with new town planning and in some areas almost half of the elderly live in public housing who are one of the primary user groups of the urban living room. One of the key findings is a single well-shaded large open space near centralized amenities tended to attract many elderly, which although showed strong signs of belonging had some negative impacts such as lack of co-generational cohesion with other age groups.

Keywords: high density, activity space, microhousing, urban space, elderly

1. Introduction

The living room is a place usually in a residence for socializing and relaxing and is defined as a space for common social activities of the occupants. As many Asian cities are undergoing mass urbanization, housing in high density cities are tending to challenge conventional dimensions of living space, challenging even the scale of microhousing. The small housing footprint begins to challenge the importance and role of the living room within the housing unit, and transfers demand of collective space where activities typically happen in the living room to the outdoor public space – and thus refers to a term of the urban living room. Elderly in high density cities are of particular concern since they are in most need of accessible socializing living space and their numbers are growing as the ageing population continues to rise in many cities. The urban living room is the open space that lies within housing developments that have become so essential to residents as

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relief from their undersized and cramped homes.

Hong Kong (HK) has the world’s most unaffordable housing, with city apartments costing 18 times gross annual median income based on Demographia survey where 5.1 times median income is already considered severely unaffordable. Hong Kong has resorted to high-rise building types starting with 8-story housing buildings in 1950s to 40-story public housing towers since 2000s to meet the demand of affordable housing in a high-density city with a population of 7.3 million living in 1081 km2 of land, rampant with high unaffordability and limited space. In addition to the change in height of housing buildings, there has been an evolution of housing unit plans and a move towards smaller units both in the public and private housing sectors. As of 2016, 45.6% of the population live in public housing developments with a mean living area per person of 13.1 square meters (sq.m), unit sizes range from 14 sq.m to 36 sq. m with about 46% of the units having an unit area of 30 to 40 sq.m [1]. Units of 14 sq.m are typically aimed at elderly and at this size, there is limited space to conduct living room activities making the outdoor areas the main alternative. Tieben, H. (2016) [2] mentioned that the outdoor spaces in the public housing estates played a significant role to the dwellers as such public area served as an extension of the private living areas and a place for social interaction of residents. With a projected elderly population of 30% by 2044 [3] and currently about one-third of the elderly living under the poverty line, urban space within public housing for elderly in Hong Kong becomes an important consideration for healthy aging and urban planning for an aging population, setting a precedent for other Asian cities facing this imminent issue.

2. Activity patterns of elderly and the local external environment

Fig. 1. Elderly activity space in local environment adapted for Hong Kong where public open space has a big significance with home, friends, shops/market and food/eatery. Examples of typical activity locations serving urban community in low-rise village and high-rise tower setting.

In this research we focused on the external environment available for the elderly in their local neighborhood which has a much bigger impact in their physical and psychological living quality than for younger age groups due to limited mobility of the elderly. They have a smaller perception of action space, where they hold their activities, called activity spaces [4] which hold basic needs of health services, food, companionship and communal space such as a public park. The local environment usually within 500m radius of their homes are considered the activity space for the elderly with key activity locations being shops, eateries, clinics, pharmacies, friends and public open space as shown in Fig. 1. The types of activity locations vary based on the type of housing and planning of amenities to serve the neighborhood community. The urban village setting comprises of 3-story multifamily buildings that were once farming villages but no quite isolated low-rise communities nestled among high-rise housing buildings. The shops, eateries and
clinics are usually privately owned and the public spaces are smaller within the urban villages whereas in the high-rise housing developments, similar amenities are provided in one multistory complex (shopping mall) with many franchise businesses to service a larger community.

The quality of the external environment is a very important component to elderly in ensuring a healthy mindset with sense of place and belonging. With a fast-growing ageing population, the city must transform to become more accessible and livable for this age group. The findings presented in an important study by Phillips, 1997 [5] discuss the need for care of elderly to enhance healthy ageing in place and the importance of integrated local environments. For the elderly in public housing, who are economically sensitive, public space and accessibility to the amenities perhaps may be equally if not more important than their home environment.

3. Site selection

Public housing sites in Hong Kong were chosen mainly due to their accessibility for studying the different public spaces within the housing estates and the large concentrations of elderly. The three selected sites are: Site 1 - Shatin (SH) built in 1980s, Site 2 - Wong Tai Sin (WTS) built in 1980s to 2000s, and Site 3 - Ngau Tau Kok (NTK) built in 2000 to 2010s. Within each site, one to two housing developments were investigated each consisting of several towers to house more than 15,000 residents, which is a typical public housing planning strategy adopted in Hong Kong to meet the high demand for affordable housing. The housing developments had about 12% to 25% of elderly households, per 2011 HK Population Census Data, with Site 1 having about 15% elderly, Site 2 more than 20% and Site 3 having 26% elderly. Also, generally public housing residents were better off in Site 1 than in Site 3, and Site 2 was in the middle range of the other two sites. There were 3 steps taken: i) observational studies to measure public space attendance; ii) field measurements to determine public space configurations; and iii) simulation studies to determine thermal comfort.

Fig. 2. Description of the four housing developments within the three sites with photo references for all locations tested for elderly attendance of public open space within the housing developments.

Observation and field measurements were done during the period of January to March 2017 followed by a
period of data analysis and simulation studies of thermal comfort. The data collected and generated from the three steps were compared to determine the correlation between elderly public space selection behavior, thermal comfort and public space design.

4. Observational and field studies

Observations of how elderly occupied the open space, time of day, climate, mapping of activities in the vicinity of the 4 housing developments (Fig. 2) were conducted. Observational studies showed that more elderly gathered in large open spaces, mainly sitting under trees or covered canopies in built-in furniture as available. Where the large open space was near amenities of shop/market and food/eatery, elderly were more tolerant to climate conditions and were even prepared to bring their own furniture to leave permanently within the open space if the seating options were insufficient. The observed behavior of bringing personal furniture to add to the urban open space was seen in public housing developments that were more isolated from the main public traffic (Fig. 3b). Fig. 3a shows the most attended open space areas within the tested housing sites were generally well-shaded large open spaces that are mostly planned next to the activity locations listed in Fig.1 except for Site 3 (Lower and Upper Wong Tai Sin) popular gathering areas which are large and well shaded but not very close to amenities compared to the other sites. The Site 3 housing developments are not isolated and well connected to public transport with many ways to enter the housing development which could mean that residents actually seek more isolated large open spaces for a quieter gathering area.

5. Thermal Comfort of Public Space

The research further studied the public space test locations, and used two parameters to find correlations with public space attendance by elderly within the housing developments. The first parameter is sky view factor (SVF) which has been used in studying thermal comfort in numerous studies [6,7]. SVF is a value from 0 to 1 that measures the openness of an outside area, with 0 meaning no visible sky and 1 meaning full visible sky. In high density cities the SVF between tall buildings is low if the buildings are close together, also referenced as urban canyon effect. The second parameter is mean radiant temperature (MRT), which can be translated as to how hot (or cold) the body feels due to the thermal energy emitted by surrounding buildings or objects that radiate heat to affect the thermal sensations of the human body which is different from measured air temperature [8].
Fourteen test locations within the 3 sites of Fig. 2 were chosen to calculate SVF, MRT and make comparisons with the observational studies. The SVF and maximum attendance, and area of the test locations are compared in Table 1 which shows that elderly tend to gather at places of SVF 0.3 or greater even though the space may be much smaller meaning the public space selection was not so much based on size but of how open the space felt. Generally spaces of SVF 0.3 or above had maximum number of elderly people attendance around 12 to 32 and spaces of SVF less than 0.3 tended to be less popular with lower attendance. However when this trend did not hold, in the case of low SVF and high attendance, the open space was still large but full of shading from large trees (without the trees SVF would be higher than 0.3) with many benches (Location E of Site 3). The need for well-shaded areas yet having a sense of openness are important factors to create a comfortable place for elderly to gather which confirms the observational studies that showed that in large open spaces, elderly mainly gathered under trees or covered canopies with seating options and close to amenities, especially in more isolated housing developments.

<table>
<thead>
<tr>
<th>Site</th>
<th>Site 1 - SH</th>
<th>Site 2 - NTK</th>
<th>Site 3 - WTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVF</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>0.41</td>
<td>0.57</td>
<td>0.39</td>
<td>0.33</td>
</tr>
<tr>
<td>Max.</td>
<td>12</td>
<td>32</td>
<td>12</td>
</tr>
<tr>
<td>Attendance</td>
<td>740</td>
<td>1260</td>
<td>1250</td>
</tr>
</tbody>
</table>

MRT was calculated using thermal simulations of ENVIMET software and compared with attendance counted at 16 test locations every hour from 09:30 to 17:30 (Fig. 3). From the simulations, the majority of the test locations had comfortable MRT in the range of 20 to 30°C which allows elderly to participate in outdoor activities safely without health risk. According to Table 2, the elderly chose not to stay for long period under high MRT conditions, such as above 50°C and at noon, also due to being lunch period. will lead to uncomfortable and consequence reduce the usage of areas. However, some locations such as Site F in WTS, Site A in NTK and Site B in SH with the higher MRT more than 50°C (shown in far right dots of Fig. 4. still had a big volume of elderly, since the areas were closely connected to public facilities and amenities which are daily activity locations. This result can also be confirmed in the study conducted in the urban square of Japan by Thorsson et al., 2007 [9].

![Fig. 4. Mean radiant temperature plotted public space attendance of all 14 test locations. Heavy concentration and high attendance during MRT of 20 to 30°C.](image)

6. Conclusion

The observation, field and simulation studies reveal that elderly concentrate in areas of good thermal environment with tendency to large well-shaded areas especially those that are close to amenities (shop/market, food/eatery, healthcare) which are key locations of elderly activity space. Overall, public open space is desirable for elderly to gather between mealtimes as a place to meet friends and socialize and
well-shaded large open space is more popular especially when close to amenities. Although they are sensitive to heat, making them stay shorter in areas where the thermal conditions become uncomfortable, well-designed open space is able to make the elderly more tolerant of the thermal conditions.

In isolated housing developments, elderly are comfortable enough to bring out their own furniture to claim the open space and transform it to meet their needs, meaning they feel a stronger sense of belonging, compared to those housing developments that were more connected within the city, where elderly used the built-in furniture that was available which affected their choice of open space more than the proximity to amenities. As elderly are willing to transform the open space with personal furniture to fit their needs, it emphasizes the dire necessity of the open space. Therefore public space needs to better designed for elderly community if housing developments are more connected within the city as opposed to developments in the periphery of main traffic ways. In the high-rise high density housing developments, elderly preferred large open spaces where they sought out well-shaded spots either by trees or canopies to gather, however the high-concentration of elderly, deterred other age groups from using the public space for prolonged periods creating little interaction between the age groups within the public housing open space, leading to segregated public space. Urban planning and design of open space should address this issue to encourage cogenerational interaction to enhance healthy living within high density housing developments.

As public housing is becoming increasingly the viable housing option for elderly, the role of how these housing developments affect the thermal and social patterns of these residents will inform the urban planning principles for open space design. This study is relevant as many Asian societies are undergoing this transition from the economic model of private ownership to public housing and smaller housing units due to wealth polarities and unaffordable housing prices. As Hong Kong tests the extremities of microhousing it is becoming a live laboratory of urban public space succumbed to ownership by clusters of residents seeking sense of belonging.

References
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