

INCLUSIVE SPACE FOR CHILDREN IN VERTICAL HOUSING

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Abstract. This paper aims to explore forms and types of space in vertical housing in order to support the creation of inclusive living environments for children, through observing children's activities and the available spaces and facilities. The field observation was carried out in vertical housing and their surrounding environments in Indonesia and Japan. Housing is currently in high demand in Indonesia, but land availability in cities is limited whereas children population in Indonesia has reached about one third of total population. Vertical buildings, thus, become one of feasible solution. Meanwhile Japan, as a developed country, has implemented vertical housing for a long time to meet society's needs in various places and forms. Housing as a living environment which is suitable for children sometimes receives little attention, especially when there are challenges of limited resources. Therefore there are not many spaces that designated to accommodate various children activities. On the other hand, spaces in vertical housing have their potential to support a child-inclusive living environments. In this study, the qualitative method was employed to explore vertical housing living environments and spaces for children. The results indicated there are three scales of spaces that need to receive attention to the creation of inclusive living environment for children in vertical housing, namely micro, meso, and macro spaces.

Keywords: inclusive space, child-inclusive, child-inclusive space, vertical housing, inclusive design, spaces for children.

Introduction

Population growth in Indonesia leads to the increasing of housing needs for communities. At present, more than 50% of Indonesian population live in urban areas (BPS-Statistics Indonesia, 2014). Due to the scarcity of land in urban areas, one way to develop the existing facilities is through land intensification, with the spatial optimization by constructing vertical buildings. One of its forms is vertical housing that is promoted by the Indonesian government in various urban areas.

In its development, the design of housing should incorporate the concept of sustainability in fulfilling the needs of inhabitants without interfering in the capability of the outside community and the future generation to fulfil their needs. There are various elements that should be considered in applying the concept of sustainability in housing areas. Creating an inclusive living environment is one of the challenges to sustainability, where housing should be designed as far as it could to meet the needs of various people with different characteristic, such as abilities, economic backgrounds, social groups, and ages.

In regard to age, children are one of the inhabitants who need careful attention. The 2015 data shows that the

population of children reaches approximately 33.5% of the total population of Indonesia (BPS-Statistics Indonesia, 2018). Housing as a living environment which is suitable for children sometimes receives little attention, especially when there are challenges of limited resources, hence not many spaces designated to accommodate various children activities. Meanwhile there is a reciprocal relationship between built environments and its inhabitant. Several researches concluded that environmental characteristic of housing gives influence to the children's physical activities and psychological condition (Hanapi & Ahmad, 2016; Blau et al., 2019; Rollings et al., 2017). Housing characteristic also have relation to the children's outcome as young adult (Blau et al., 2019). In these contexts, it is necessary to further examine children's activities within the vertical housing environment where they live in. Therefore, they could have better development for a better future. In their residential environment, inhabitants including children move and interact with other fellow residents, such as friends, parents, other family members and other people. Various children's activities and interactions currently conducted and require spaces in the developed residential environment. These spaces are important and have their

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own potentials to support children's growth and development. In this regard, it is certainly interesting to observe and explore spaces with their potentials by looking at children's activities in their residential environment and the available spaces and facilities.

As one of developed countries in Asia, Japan has already built vertical housings in various places and forms due to the limited availability of land in the country. Facing the condition of aging society, this country continues to build appropriate and adequate facilities for children to support parents or those who plan to have children. Therefore, Japan offers insightful lessons for the suitability of children's activities with the environment where they live in.

The aim of this study is to explore forms and types of space in vertical housing in order to support the creation of inclusive living environment for children. This research was done through field observations on children's activities in their residential environment and the available spaces and facilities in a number of vertical housings in two countries: Indonesia, in Semarang, and Japan, in Kobe and several surrounding cities. The space in this research is focused on the outside of the residential units. There were scholars who studied about children and the spaces in their living environment in vertical housing, but they have different concerns, such as studies regarding consideration or criteria related with living environment for children in vertical housing (Whitzman, 2010; Rinaldi et al., 2017); the impact of housing and its surrounding environments to the condition and development of children (Vandivere et al., 2006; Mizrachi & Whitzman, 2009; Hanapi & Ahmad, 2016; Rollings et al., 2017; Heenan, 2017; Blau et al., 2019); and studies on spaces for children to play and recreation (Baskara, 2011; Shi, 2017; Olsen et al., 2019). This study, on the other hand, explored and investigated the current children's activities, their spaces and the potentials so that it yielded findings of types of space which are used by children and how it could support the implementation of child-inclusive living environment in vertical housing.

This study used field observation to collect the data and qualitative method in analyzing the data in order to explore the vertical housing and its surrounding environment in accordance with the aim of the study. There are several steps conducted to reach the aim of this study: first, understanding inclusive space, the children, and vertical housing with its facilities based on the literature review; second, conducting field observations on children's activities along with the form of vertical housing living environment and available spaces and facilities in several locations in Indonesia and Japan; third, conducting analysis through comparing, describing regularities of activities and its facilities; fourth categorizing the spaces based on certain characteristics with their potentials; and the last, concluding the results.

Discussion

People always need space to carry out their activities. Various types of activities, conducted by various people with

different characteristics, require a variety of spaces to accommodate them properly and comfortably. Therefore it is hoped that the available spaces are inclusive. Concern toward provision of spaces and built environment which is inclusive has been conducted in the approach of inclusive design. Basically, inclusive design focus on a design approach where designer make sure that the product or service provided could serve the widest possible audience, irrespective of age or ability (UK Design Council in Clarkson & Coleman, 2015). Inclusive design has unique challenges because it aims to improve usability for a wide range of users (Goodman-Deane et al., 2014). It is about making places everyone can use (Fletcher, 2006). Comprehension on inclusive design oftentimes is used in the same meaning and interchangeably with other terms such as Design for All, Universal Design, Barrier Free Design, as they share similar aims (Persson et al., 2014). According to Fletcher (2006) there are principles in implementing inclusive design, namely: placing people at the heart of the design process which involve as many people as possible on the design; acknowledging diversity and difference which meets as many people's needs as possible; offers choices where a single design solution cannot accommodate all users; having flexibility in use which can adapt to changing uses and demands; and convenient and enjoyable to use for everyone. Within these comprehension, inclusive space is hoped as a space that could accommodate various people with different characteristics. These characteristics then reflect different abilities and ultimately diverse needs, including children who have different characteristic from adults, especially for the younger ones.

Children have different characteristics based on their ages, starting from infancy to adolescence, and during this phase they develop their physical, cognitive, and social and emotional dimensions (Paris et al., 2019). Furthermore, Paris et al. (2019) emphasized that these developments are multi-contextual influenced by both nature or genetics and nurture or the environment. Therefore, attention to the creation of an environment, in this case physical environment, which supports child development is important. An appropriate design is informed by the fact that children have different needs and spatial ranges as they age (Whitzman, 2015). Related to ages, furthermore Whitzman put forward that: from infancy to the age of 2, there is the need for some space to toddle around in both indoor and adjacent outdoor areas; starting from pre-schoolers, children need more outdoor play space within easy access from their parents; from the age of 6 to 9, children use communal play spaces semi-independently and begin to venture autonomously in their immediate neighborhoods; from the age of 10 to 12, children generally want more adventurous play spaces and begin to venture further. These needs and concerns need to be implemented in built environment including vertical housing as a living environment for the children.

Living environment in the form of vertical housings is widely developed due to the scarce availability of land. Therefore, the form of vertical housings as residential

environment is certainly different from landed houses. Based on field observations, vertical housings that have been developed to date and the children activities have various forms.

1. The form of vertical housings

In various cities in Indonesia, one of which is Semarang, many vertical housings have been developed and widely provided by the government focusing on the lower income communities in the form of rental flats. The percentage of vertical housings in this city at this time is still small compared to landed houses. Therefore, the vertical housings built in groups are between landed houses in their vicinity, both in the inner city and fringe areas.

Meanwhile, the percentage of vertical housings or apartments in Japan has reached more than 40 percent from the total number of housing stocks in 2013 (The Building Centre of Japan, 2017). In the inner city areas,

the high-rise buildings and vertical housings are more numerous and can easily be found. On the other hand, in small cities and fringe areas these buildings are less and among the landed houses, as in the case of Semarang.

The vertical housings in Semarang have been developed in the form of groups of several building blocks, approximately 4 to 9 blocks, at planned sites (Figure 1). Most of these vertical housing blocks are not interconnected except the one in Pekunden. Meanwhile in Japan, besides the group of vertical housing blocks developed at one particular site, many vertical housings also stand on their respective sites (Figure 2). This last form of development is mostly found in the inner city area. The planned shapes of the buildings are vary such as single loaded corridor, double loaded corridor and centralized access (Figure 3).

In the vertical housings in Indonesia, the shared facilities for residents are often placed on the ground floor. They consist of parking lots for motorcycles, bicycles, and other public and social facilities such as *Posyandu* (integrated



Kudu



Kaligawe



Pekunden

Figure 1. Vertical housings in Semarang and its surrounding area



Port Island



Akashi



Osaka

Figure 2. Vertical housings in Kobe and its surrounding area



Figure 3. The planned shapes of the vertical housings

healthcare centre) for the elders and children, libraries, and community meeting rooms. The vertical housing in Pekunden has more complete public and social facilities, such as markets and shops that can also be visited by residents of the surrounding landed houses. This condition is similar to the development of vertical housings in Japan. Shared facilities, such as parking lots for bicycles and motorcycles as well as mailboxes are placed on the ground floor of the building.

Outside the vertical housings building in Indonesia, there are car parking facilities and also playgrounds designated for children. More complete facilities, such as education and health center facilities, are mostly merged with the surrounding landed houses following the city facilities for the communities. In the context of Japan, there are also some facilities outside the buildings. In the areas that are designed for large-scale vertical housing development, as found in Port Island, the facilities for education and health are planned in certain parts of the area so that they could easily be accessible. Meanwhile, in the vertical housings built in each plot of the inner city, more complete facilities are provided by the city government as well as private institutions, which include facilities for playgrounds, health, education, and after-school facilities for a child activity centers.

2. Children's activities

Based on the field observations carried out, there are various kinds of children's activities in the vertical housing. In vertical housings in Semarang, young children play in the corridor or hallway in front of the dwelling units on each floor (Figure 4). In this corridor, parents also take care of their young children while talking with other residents. This parenting activity is also carried out on the ground floor of the building. This condition is different from Japan where corridors are merely functioned as circulation spaces.

In Indonesia, some children do their activities in their house and its surrounding areas after school, while in Japan, some children have activities in designated places after school, such as a child activity center. The various activities carried out by the children usually include chatting, playing, medical examinations, studying, sports, worshipping, and developing their own abilities, such as reading books and playing music. In general, the older the child is, the more diverse the activities they do and the wider areas they go to, so they require more varied and appropriate facilities (Figure 5).

3. Facilities available for children

In terms of providing facilities for children, there is an attempt to create a housing suitable for children's needs, through facilities and infrastructure provided by the government, private sector, as well as from the community itself (Figure 6). The latter includes facilities established by the children themselves when using the available spaces to accommodate their activities. These facilities for children are available inside the vertical housing building itself as well as outside the vertical housing building, both on site and off site on a neighborhood scale and city scale that can be used with other vertical housing residents.

The facilities provided in the buildings are often found on certain floors of the building, especially the ground floor, which includes a children's medical check-up facility, a small library and reading room, prayer rooms, as well as multipurpose rooms that can also be used for children's gathering and playing. The facilities provided outside the building are very diverse. On the site of vertical housing, parks, playgrounds, and sports facilities are often provided. As previously described, on the outside of the vertical housing site, more complete facilities are available for children, such as educational facilities, health center



Figure 4. Children's activities in the corridor of vertical housings in Semarang



Figure 5. Diverse children's activities covering wider areas

facilities, recreational facilities, after-school facilities for child activity centers, and other kind of facilities.

Accessible circulation pathways and a safe environment are often found in vertical housings living environment in Japan. There are designated facilities on a city and neighbourhood scale, such as playgrounds, educational and health facilities in the vertical housing development area, such as in Port Island, public parks in residential neighborhoods in urban areas, schools, and facilities for children's after school activities. It appears that there are also facilities provided for children with community participation and initiation, including children themselves, with the support of the building owners and community groups. These facilities are such as the provision of a self-service book loan or library for children in neighbourhood area, and provision of a community gathering room by converting one of the residential unit, where it can also be used to accommodate children's activities (Figure 6, the first and second from right below).

4. The spaces for children

Based on the field observations, there are notes that need to be taken into account regarding children, their conducted activities, and the utilized facilities and spaces. The spaces used by children for doing activities stretches from the space in front of each dwelling unit to the spaces and facilities for children in the building of vertical housings,

as well as spaces outside the buildings, both indoors and outdoors. The closer the space to the dwelling unit, the more it is used by children of a younger age. Meanwhile, the farther the space is, the more various activities that can be conducted by the children. The formation and utilization of space by children can be done directly, in which they participate consciously in the planning and implementation of the planned space, or indirectly, where they utilize the space and unconsciously they contribute to the shape and condition of the space.

This condition shows that there are various forms of space that can be used by children in a vertical housing living environment, and the distance of space to the dwelling unit also plays a role in the implementation of an inclusive vertical living environment for diverse children. The spaces, stretching from the front part of the dwelling unit, have the potential to support the creation of an inclusive space for children in a vertical housing living environment. Related with the proximity of the existing spaces to dwelling units in vertical housings and children's activities, there were three spatial scales that could be inferred to support the implementation of inclusive spaces for children in vertical housings as seen from Figure 7 below.

Space on a micro scale. This space is the area on each floor of the vertical housing, which is right next or in front of the dwelling units, often in the form of circulation space on each floor. As explained earlier, in this space, there are activities of toddlers and their parents, and activities of



Figure 6. Facilities available for children in several housings and its surrounding area in Indonesia (above) and Japan (below)

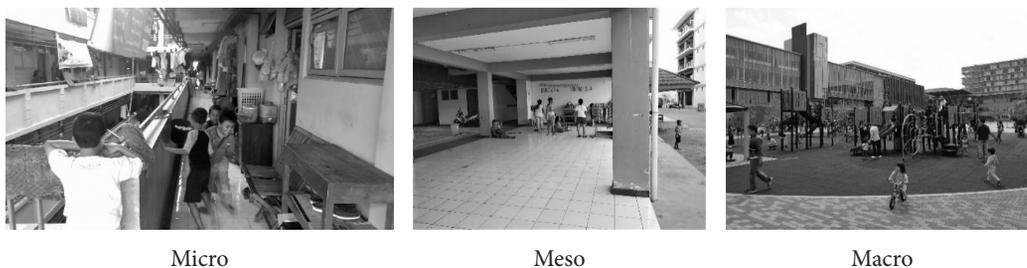


Figure 7. Three spatial scale of spaces that could support the implementation of inclusive space for children in vertical housing living environment

younger children playing with their friends. This space is the closest area to the dwelling units. Regarding its potential, this space allows younger children to do activities with adults more easily, both by parents and the other adults who live in the vertical housings on the same floor. This space can be similar to the area in the neighborhood road and the front yard of the landed houses. It potentially offers convenience for parents and adults to observe and take care of their children particularly the younger ones during their activities. As put forwards by Whitzman (2015), a baby, from birth to 2 years old, needs to have some spaces to toddle around, and the pre-schoolers in particular, need spaces that can be easily accessed by their parents. This micro scale space also has the potential to stimulate social cohesion and togetherness among residents. The formation of good social cohesion and togetherness could create joint supervision and security in their living environment, because residents could know each other well and care for one another. Another potential is that the participation of children is more possible and easier to be conducted in order to make the space more suitable for them at this scale. As suggested in the principles of inclusive design (Fletcher, 2006) which show that it is important to place people at the heart of the design process which involves as many people as possible. It is expected that children's participation could contribute in shaping the space more suitable and comfortable for them. Improving usability of spaces for a wide range of users is one of the unique challenges in an inclusive design (Goodman-Deane et al., 2014). However, regarding the activities carried out at the micro space scale, it is also important to pay attention to children's safety and other problems, such as circulation, due to the activities and misplacement in the circulation space. For that reason, a clear spatial planning and design concerning this matter is required.

Space on meso scale. This space is the area located in a certain part of vertical housing that is often found on the ground floor, or it might also be located on a certain upper floor. In this space, there are activities of caring for toddlers, playing with children, and other kind of activities such as health and recreational activities in smaller scale. Indoor playroom, health facility, small library, prayer room, and childcare could be found here. This space could potentially provide an area to accommodate more diverse children to do activities through indoor facilities. Therefore, it is hoped that it could acknowledge more diversity and offers choices in accommodating various activities as addressed by Fletcher (2006) in the principles of inclusive design. This space is protected from outside weather and could be easily accessed by children and parents who resided in the vertical housings. The participation of children are still possible, especially in the certain spaces intended to accommodate them. This meso scale space also has the potential in providing a space for children to interact with other children or persons who live on the different floors of the building. According to Paris et al. (2019), children develop in social dimension, as well as in physical, emotional, and cognitive dimensions. Ultimately

this condition hopefully can support in developing a better vertical neighborhood interaction in a vertical housing living environment.

Space on a macro scale. This space is the area outside the vertical housings building. It could be inside or outside the vertical housing sites, and also public spaces on a city scale. In this space, a variety of activities can be carried out to accommodate the needs of children, at both young and older ages. It could also provide various facilities such as educational centre, health and worship facilities, childcare and activity centre for an after-school program, and other recreational facilities. This space has the potential as a space for children who live in vertical housings to interact with other children living outside the building, including those from the surrounding areas or from other vertical housings. In this space, the participation of children is increasingly limited. However, the space in this scale has the potential in providing a greater variety of spaces and facilities. The more macro the available space is, the more possibilities that it has to accommodate larger and various children's activities, especially older children, and the more complete facilities it provides for children's development. Therefore, the activities that children need to carry out for their physical, cognitive, emotional, and social dimension development could be more feasible here. In this space, the need of older children of 10 to 12 on more adventurous play space and venturing further abroad (Whitzman, 2015) could be more fulfilled. Accessibility is an aspect that requires attention in this scale. Secure and comfortable access is needed to receive more attentions.

All the potentials that each space has needs attention, certainly without neglecting the space's main functions, for the purpose of creating an inclusive space for children. They also need to be considered as a whole and integrated entity, which complements each other. Therefore, it could offer choices in which single solution cannot accommodate all users, as pointed out by Fletcher (2006) on the principles of inclusive design. By offering these choices, it is expected that an inclusive space could be more available, and eventually, the implementation of the sustainability concept could receive more support. The sustainability concept embraces ecological, economic, and social aspects, and it allows the future generation to have more opportunities to fulfill their needs, as well as the current generation with their various characteristics to fulfill their needs.

Conclusions

Inclusive space is one of the concern needed to shape a more balance living environment and to embrace people with different characteristic, where children is a part of it. Supporting the implementation of inclusive living environment for children in vertical housing could be started from the closest space to the residential unit until the space outside of the vertical housing in a wider scale. The findings show various forms of vertical housing, the

facilities for children to do activities in their living environment along with the other spaces utilized. Based on the proximity of the existing utilized spaces to the residential units in vertical housing and the children's activities, there were three spatial scales could be inferred: micro, meso, and macro scale spaces. Each of the spaces, with its particular potential, is expected to complement each other and offer choices by taking into account the context in which a vertical housing is built. Thus the creation of more inclusive spaces suitable for children in a vertical housing hopefully could be achieved for the sake of supporting the implementation of the sustainability concept.

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