

## Assessment of Residents' Satisfaction of “Liveability” in Low-Income High-rise Housing in Colombo

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### ABSTRACT

Housing low-income communities in high-rise housing have been an issue worldwide. The liveability of housing is compromised due to the need for providing large numbers of housing at minimum cost. There is a lack of understanding of the aspirations, needs, and what defines a liveable home for low-income dwellers.

This study explores the residents' satisfaction with liveability in low-income high-rise housing in Colombo. A questionnaire survey was conducted among 65 random residents from two typical low-income high-rise housing. A five-point Likert scale was used to measure satisfaction with liveability at three scales namely dwelling unit: building and complex. Results showed that residents were dissatisfied with the dwelling unit and the overall housing complex but satisfied with the building. Although residents were satisfied with safety within dwellings safety in the building and the complex was of concern. Provisions for open spaces, shops, medical facilities, and safety were critical for the liveability of the housing complex. Provision for more space, balconies, private open spaces, places to interact, and housing that reflected residents' personalities and identities were necessary for liveability.

**KEYWORDS:** Liveability, High-Rise; Low-Income; Housing Satisfaction; Colombo

## 1. Introduction

High-rise living has been researched in many parts of the world, testing its appropriateness across different regions, cultures, and socio-economic groups. However, high-rise living has been associated with many physical, social, and psychological issues. Some studies show that high-rise living affects dwellers' mental and social health such as fear, phobia, dissatisfaction, stress, behaviour problems, suicide, poor social relations, depersonalised living environment, reduced helpfulness, and hinders child development and safety of children (Yuen, 2005; Gifford 2007). Gifford (2007) discusses six types of fear related to high-rise living such as fear of family or a neighbour jumping off from the building, fear of fire, earthquakes, attacks, strangers and crime, fear of lack of social support and absence of community and the fear of communicable diseases generated by others. Low-quality construction, lack of maintenance, and lack of choice are some physical problems associated with high-rise living (Yuen, 2005). Lai, et al., (2013) point out issues affecting health due to poor air quality, poor ventilation, lack of daylight inside housing units, windows facing neighbouring blocks, and unpleasant living conditions. However high -rises are also known to have sensible solutions to maximizing the use of space and saving land for green space and countries such as Hong Kong and Singapore show a public acceptance of living in high-rise housing in contrast to the west (Yuen, 2005). High-rise living is also associated with positive factors such as prestige, status, privacy, views, the sensation of height, savings in land for development, accessibility, vitality, and quietness (Coorey, S. B. A., & Lau, 2005; Yuen, 2005; Gifford, 2007).

In the 1980s Sri Lankan government commenced the onsite slum upgrading facilitating infrastructures and services. However, in the 1990s, slum dwellers were relocated to high-rise apartments. One of the major issues in these developments was that the residents sold or rented their apartments and returned to their original settlements and living on upper levels posed problems for their livelihood (Wijesinghe, 2010). Maintenance and the cost for maintenance, quality of construction, and management were also identified as issues in high-rise living (T. C. Samaratinga & O'Hare, 2014; T Samaratinga & Hare, 2013; Wijayamali, et al., 2014; Wijesinghe, 2010). Ariyawansa & Udayanthika, (2012) shows that social issues such as theft, trespassing, noise, and difficulties in educating and socializing children were problems found in low-income high-rise housing in Sri Lanka. When it comes to housing, people try to move from place to place until they are satisfied with their housing needs, or they attempt to change their houses as per their requirements within their capacities. According to Thushara Samaratinga & O' Hare (2013) re-location, social, cultural, architectural, planning, technical, financial, management, and operational issues are the reasons for residents' dissatisfaction (Samaratinga & Hare, 2013).

As stated by Turner, (1980) "housing is not just a commodity but a complex process of many people and organizations doing many things to get many kinds of real or expected results". The success of housing programs in either developed or developing countries is not measured by simply providing sufficient

housing but by the suitability of the living environment to meet its residents' needs. Such needs will significantly vary across different contexts and the development of liveability theory needs to recognise the results of studies done in various contexts (Lu, Li, & Jones, 2012). Housing projects fail due to the lack of knowledge of the physical aspects of housing quality and the design criteria that satisfies residents' needs (Ukoha & Beamish, 1997). According to Salma (as cited in Rahim & Hashim, 2008) affordable housing should not just aim at providing affordable shelter but should be sensitive to privacy, social cohesion, preferences, and the lifestyles of the target population.

The liveability of housing plays an important role in resident satisfaction and sustains the community. Previous studies of low-income high-rise housing done in Sri Lanka have not examined residents' satisfaction with liveability across different scales of high-rise living. Hence this study aims to explore the resident's satisfaction with "liveability". The literature review establishes a framework for liveability at three scales namely; dwelling, building, and housing complex. Due to limitations in resources the neighbourhood scale is not within the scope of this study, however several important neighbourhood level indicators such as access to public transport, schools, shops, and employment are considered within the building complex scale.

## **2. Background**

### **2.1. "Housing Satisfaction" & "Livability" in high-rise housing**

"Liveability" is associated with factors such as life quality, safety, health, services, economy, comfort, mobility, living standards, and social interaction. Li, (2013) defines liveability as the ability of an environment to meet people's living demands. He states that liveability research bridges the environment users and the environment creators, helping them understand the users' experiences and demands through their feedback. He further examines the 'liveability' of high-rise housing at four scales namely; the dwelling unit, the building/tower, the complex/estate, and the neighbourhood scale. The liveability of housing varies across socio-cultural, income, and location differences. The liveability of one's living environment greatly depends on the resident's satisfaction. The residents' satisfaction is a guide for planners, designers, developers, and policymakers to provide more habitable and sustainable housing in the future (Ukoha & Beamish, 1997). Housing satisfaction is determined by one's cultural background, place in the lifecycle, socioeconomic status, personality, hopes, and values (Cooper-Marcus, 1995 and cited by Yuen, 2005). Many studies have investigated the reasons for housing dissatisfaction, and factors such as spatial, physical, social, economic, and location-based components have been identified as critical factors for housing satisfaction. Yuen, (2005) investigates the residents living experiences in Singapore's high-rise public housing using several indicators for satisfaction such as floor level, location, views, breeze, privacy, noise from traffic, noise from neighbours, space between buildings, and convenience to facilities. As cited by Ukoha & Beamish (1997) users' characteristics, dwelling unit characteristics, management, environment, location factors, facilities, and services in housing units are important for resident satisfaction. Manatunge &

Abeyasinghe (2017) pointed out that physical, environmental, and socioeconomic factors affect housing satisfaction, and appearance, arrangement, structure, and housing condition matter to the user to maintain their living standards and social level in society.

## 2.2. Indicators for “Livability” in high-rise housing

**Dwelling unit-related indicators:** At the dwelling unit scale, several indicators are discussed by researchers that are both positive and negative for residents' satisfaction and the liveability of high-rise housing. Lukuman, et al., (2017) noted that the physical aspect of the dwelling is the foremost important attribute of several pertinent attributes of liveability. Several indicators such as crowding (Baiden, Arku, Luginaah, & Asiedu, 2011), size (Ibem & Aduwo, 2013), quality of the housing unit, and suitability have been identified to explore liveability. Ukoha & Beamish, (1997) states that features, size of spaces, privacy, and housing condition, affect the satisfaction of housing units. According to Gifford, Owens, Niu, Lau, Ko, Lawrence, Huang as cited in Li, (2013) showed that size, layout, and infrastructure of the housing unit, daylight, natural ventilation, number and position of the windows, thermal comfort, noise, view from windows, and private outdoor spaces are an important indicator to the housing unit.

**Building-related indicators:** Li, (2013) identified several liveability indicators at the building scale such as; quality and quantity of lifts, public lighting, ventilation of public space, barrier-free design, upkeep of public facilities, and collection of domestic waste. In addition features such as building elevation (Li, 2013), identity (Kowaltowski et al., 2006), and construction quality (Gou, 2012; Li, 2013; Wijayamali, Waidyasekara, & Dahanayake, 2014b), communal spaces (Bay, 2004) and facilities in the building (Bennett, 2010; Ibem & Aduwo, 2013; Li, 2013), household density within the housing block (Li, 2013, Haarhoff, Beattie, & Dupuis, 2016) safety and security in the high-rise building (Iyanda & Mohit, 2016; Mohit & Iyanda, 2016; Rangga, Jiram, Ismail, & Aziz, 2019; Senlier, Salihođlu, & Yildiz, 2013), relation with neighbours (Bennett, 2010; Kraatz et al., 2020) green areas and landscapes (Coorey, 2016; Li, 2013; Yuen, 2005; Yuen & Yeh, 2011), maintenance and management of the building block (Wijayamali et al., 2014b) as important indicators for residents living high-rise housing.

**Housing Complex-related indicators:** Housing cannot be separated from its surroundings and the level of acceptance or satisfaction is dependent on where the unit is situated more than on its actual or perceived quality (Gruber & Shelton, 1987). Sufficient open spaces, gathering, and recreational spaces, and safety, are considered important for residents living in high-rise buildings (Coorey, S. B. A., & Lau, 2005; Coorey, 2016; Li, 2013). Parking bays playgrounds and shops close to the housing complex are also important indicators for residents (Lukuman et al., 2017). Li, (2013) in his study on the liveability of highrise housing estates in China identifies several physical and psycho-social dimensions for liveability in the housing estate or complex scale. Green areas for landscape; play areas for children; activity places for the elderly, pedestrian walkways, internal motor roads, car/bike parking, internal public service facilities, barrier-free design, building density, and spacing, outdoor environment in summer, and in winter, wind Environment are indicators for

liveability (Coorey, 2016; Li, 2013; Lukuman et al., 2017; Moreira Cavalcante, 2016; Wong & Yap, 2003). Psycho-social dimensions include population density, maintenance and management, community security, and sense of community (Li, 2013). Some of the neighbourhood factors identified by Li (2013) are local public spaces, local service facilities, noise, traffic situation, public transportation, and environmental tidiness. Although the neighbourhood scale is not within the scope of this study relevant indicators such as access to public transport, education, and employment are considered.

However, the importance of these indicators varies across residents of different contexts, lifestyles, cultures and socio-economic groups.

### 3. Objectives

The study aims to identify the indicators for “liveability” in high-rise housing based on the framework established from the literature review. Following this the residents' satisfaction with the liveability indicators will be examined. The significant indicators for the overall satisfaction of liveability across the three scales of high-rise living namely; dwelling unit; building and complex will be explored. The neighbourhood scale although important when assessing the “liveability” of high-rise living, is not considered within the scope of this study, due to the limited time and availability of resources.

### 4. Method

A “survey research” strategy was employed to explore satisfaction among residents living in low-income high-rise housing. A simple random sample of 65 household representatives was selected from 2 typical low-income high-rise housing in Colombo consisting of a total of 1694 households. The survey was conducted face-to-face to increase the response rate. The survey was conducted immediately after the Covid-19 pandemic and the access to dwelling units was limited hence a smaller sample size was obtained. Future study will expand on the sample size for better generalizability. The “Questionnaire” consisted of closed and open-ended questions. A 5-point Likert Scale is used; “1” = very dissatisfied; 2= dissatisfied; 3= neither; 4= satisfied and “5” = very satisfied. The questionnaire explored the residents' satisfaction with indicators for liveability across three scales of the living environment namely the dwelling unit; the building and the complex. The indicators were explored in the literature review and the most relevant ones applicable to the local context and conditions of local housing were selected for the study. The indicators explored at each scale are listed in table 1 below.

Open-ended questions further explored the residents' opinions on liveability.

Both descriptive and inferential statistics are used to analyse data. Descriptive statistics explores and compares the residents' satisfaction with liveability indicators across the three scales. When using the Likert scale Cronbach's Alpha measures internal consistency between the items in a scale. However, the alpha coefficient for 45 items is 0.782, suggesting that the items have relatively high internal consistency. “Spearman's correlation analysis” with correlation significance at 0.01 level (2-tailed) and 0.05 level (2-tailed) are

explored to identify the significant liveability indicators for residents' satisfaction. Open-ended questions were summarised to gain insight into residents' views on liveability.

Table 1: indicators for the survey

Scale	Indicators	References
Dwelling unit	Natural light, ventilation, size of the dwelling, size of bedroom, size of the kitchen, size of the toilet, sound privacy, safety.	(Lee, Jin, & Kim, n.d.); (Rangga et al., 2019); (Lukuman et al., 2017); (Ibem & Aduwo, 2013); (Iyanda & Mohit, 2016); (Wijayamali et al., 2014a)
Building	colour, floor level, circulation, aesthetics, building condition, lifts, services- water supply, electricity, garbage, drainage, cleanliness, and noise.	(Lee et al., n.d.); (Senlier, N. et al., 2013); (Jones, 2018); (Rangga et al., 2019); (Lukuman et al., 2017); (Ibem & Aduwo, 2013); (Kowaltowski et al., 2006); (Iyanda & Mohit, 2016) ; (Aulia, 2016); (Premarathna et al., 2020); (Thushara Samaratunga & Hare, 2013); (Wickrema, 2005); (Ariyawansa & Udayanthika, 2012); (Wijayamali et al., 2014a)
Complex	gathering places, open spaces, playgrounds, community hall, government medical facilities, noise, safety at night, on streets, safety due to unauthorized activities, safety to the property, access to public transport, employment, and education.	(Senlier et al., 2013); (Jones, 2018); (Rangga et al., 2019); (Lukuman et al., 2017); (Kowaltowski et al., 2006); (Iyanda & Mohit, 2016); (Aulia, 2016); (Premarathna et al., 2020);(Wickrema, 2005); (Ariyawansa & Udayanthika, 2012); (Wijayamali et al., 2014a)

## 5. Results and Discussions

### 5.1. Background of Housing Complex

Table 2: Description of the two selected Housing

Case 1	Case 2
A UDA development and occupied in 2018. The site extent is 16,84 sq.m. A total of 941 housing units are located in 4 towers consisting of 15 floors. Dwelling units are approx. 500 Sq.Ft and consists of 2 bedrooms, a kitchen, a living/dining, and a toilet.	A UDA development and occupied in 2018. The site extent is 16,75 sq.m. A total of 703 housing units are located in 3 towers consisting of 14 floors. Dwelling units are larger than 500 Sq.Ft and consists of 2 bedrooms, a kitchen, a living, and a toilet.





## 5.2. Demographic Data

The sample included 52% male and 47.7% female and all are above 26 years. 90% are married. Respondents include Sinhala (38%), Tamil (33%), and Muslim (27%). 87% of residents own their housing unit. 86% had lived there for 3 to 5 years and 14% lived there for 1 to 2 years.

## 5.3. Residents’ Satisfaction with Liveability

### 5.3.1. Evaluation of “overall satisfaction” across the three scales of the living environment

As shown in Figure 1, the overall satisfaction of the building scores higher mean (3.97) for satisfaction as opposed to the dwelling unit (3.02) and complex (2.98). Results show that (Figure 2) 81.5% of respondents are either “satisfied” or “very satisfied” with their building while only 49.2% and 44.6% are “satisfied” or “very satisfied” respectively with their complex and dwelling unit. Thus, indicating that residents show higher satisfaction with the building compared to the dwelling unit and the complex.

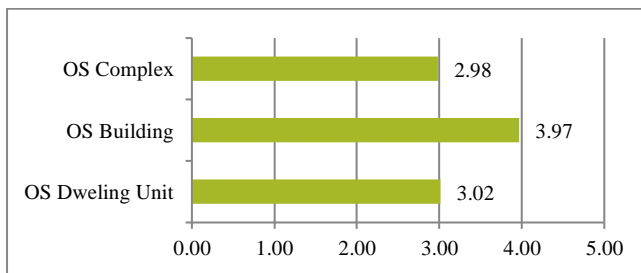


Figure 1: Overall Satisfaction across the three scales of living environment

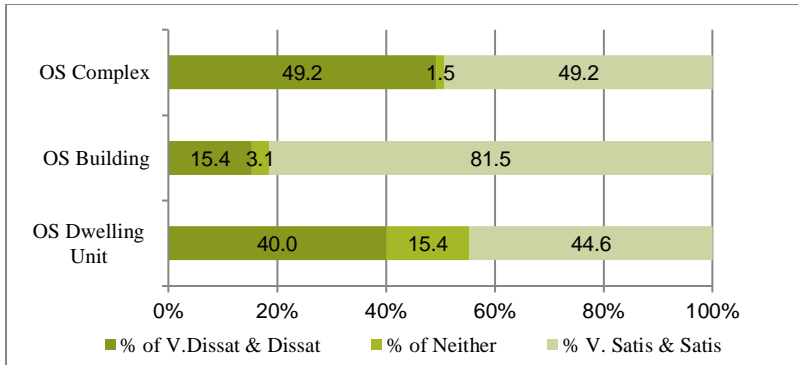


Figure 2: Percentages of the Overall Satisfaction

### 5.3.2. Evaluation of satisfaction of “Dwelling Unit”

Figure 3 below shows the satisfaction scores for indicators in the Dwelling Unit. Less than 3.5 mean values are observed for satisfaction with natural ventilation, and size of dining and bedroom. The least means value is observed for satisfaction with “size of dining”. Based on open-ended questions it was noted that most units don’t have a designated space for dining, use other spaces for this function. Satisfaction with dwelling unit size and sound privacy also score 3.52 mean values. It can be stated that respondents’ levels of satisfaction with the liveability indicators in the dwelling unit are low (3.5 and less) except for safety.

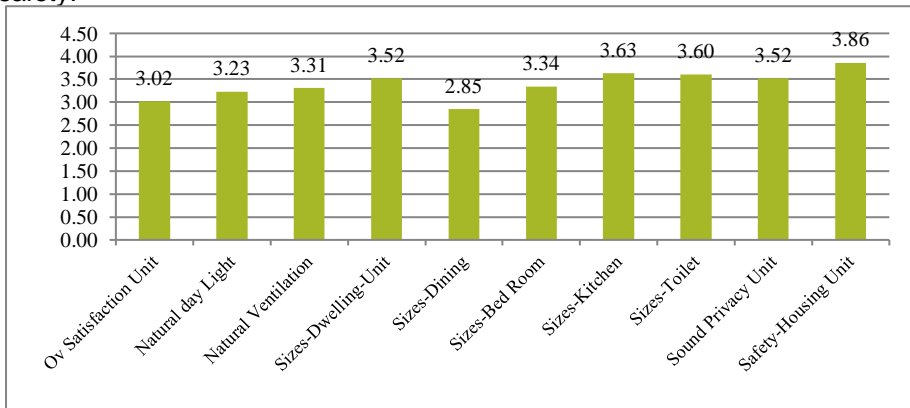


Figure 3: Dwelling unit - Mean Values for the satisfaction of livability

Correlation analysis shows that satisfaction with the dwelling unit is not significantly correlated to any of the indicators considered above. However, it is observed that the overall satisfaction with the size of the dwelling is significantly correlated with the satisfaction with bedroom size ( $r=0.551$ , Sig = 0.000) and kitchen size ( $r=0.410$ , Sig = 0.001). This indicates that when satisfaction with bedroom and kitchen size increases their overall satisfaction with dwelling size significantly increases. Indicating that these two spaces play an important role



in the overall satisfaction of dwelling unit size. Satisfaction with ventilation is also correlated to their satisfaction with lighting ( $r=0.374$ , Sig = 0.002), size of dwelling ( $r=0.333$ , Sig = 0.007), size of bedroom ( $r=0.338$ , Sig = 0.006), size of the kitchen ( $r=0.450$ , Sig = 0.000). Correlation is significant at 0.01 level (2 – tailed).

Based on the open-ended questions regarding their satisfaction most referred to their previous house and stated dissatisfaction with the “limited number of bedrooms”, “small living area” and “no dining”. Some also lived in two-story houses and have been restricted in floor area in their current house. Factors such as “no storage places”, “no private balcony” or small “private open area”, and inability to reflect “differences, identity, dignity, power, economic standing”, were also mentioned as reasons for dissatisfaction. Hence the above indicators are relevant to low-income high-rise housing in Colombo.

### 5.3.3. Evaluation of satisfaction of “Building”.

High mean value for satisfaction is observed for “circulation” (4.14) and low mean values for satisfaction is observed for “safety” (2.42), “Aesthetics” (3.20) and services such as “Electricity” (3.18), “Water” (2.63), “Lifts” (3.18), “Drainage” (2.74), “Garbage collection” (3.23) and “Cleanliness of Service areas” (3.38) in their building (Figure 4).

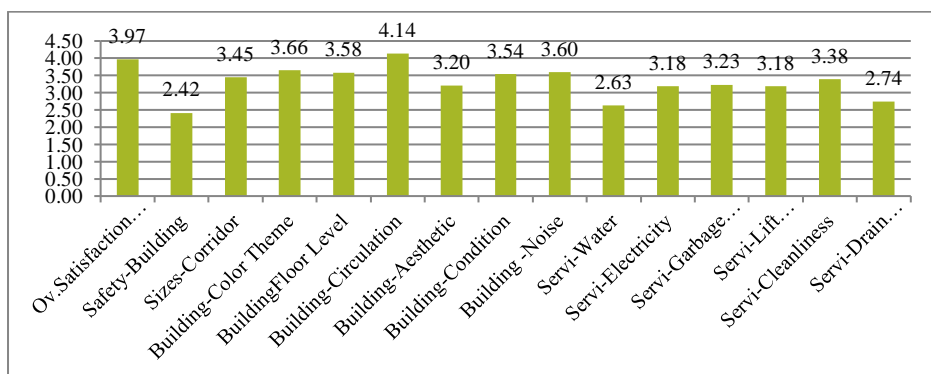


Figure 4: Building - Mean values for the satisfaction of liveability

Results show dissatisfaction with the safety in the building although safety in the dwelling was satisfactory. Correlation analysis shows that the overall satisfaction of the building is significantly correlated with; “safety” ( $r=0.356$ , Sig = 0.004) and “noise” ( $r=-0.551$ , Sig=0.000). Correlation is significant at 0.01 level (2–tailed). The services such as satisfaction with; “water supply” ( $r=0.283$ , Sig=0.022) are also significantly correlated to the overall satisfaction of the building. The correlation is significant at 0.05 level (2 –tailed).

Answers to open-ended questions also reveal that residents are dissatisfied with safety. Hence safety measures such as gates, locks, and barriers to fire staircases, and rooftops have been installed to protect the buildings. Such measures will further create a sense of fear among the residents. They further noted that they have limited spaces for interaction and social exchange compared to their previous housing.

### 5.3.4. Evaluation of satisfaction of Complex

As shown in Figure 5, the satisfaction of liveability indicators related to the Complex. Accordingly, it shows that residents are most satisfied with “access to public transport” (4.22). Both cases are located in Colombo city adjacent to the main roads and easy access to public transport. The satisfaction with gathering places, open spaces, shops, community halls, medical facilities, kids’ play areas, playground, etc facilities in the complex is low. Indicating the need for the provision of these spaces and further improving the quality of these spaces. The satisfaction with safety-related indicators such as; streets at night, safety in pedestrian pathways, safety due to unauthorized activity, and safety to property shows low mean values. Results indicate the need for improving the liveability at the complex scale.

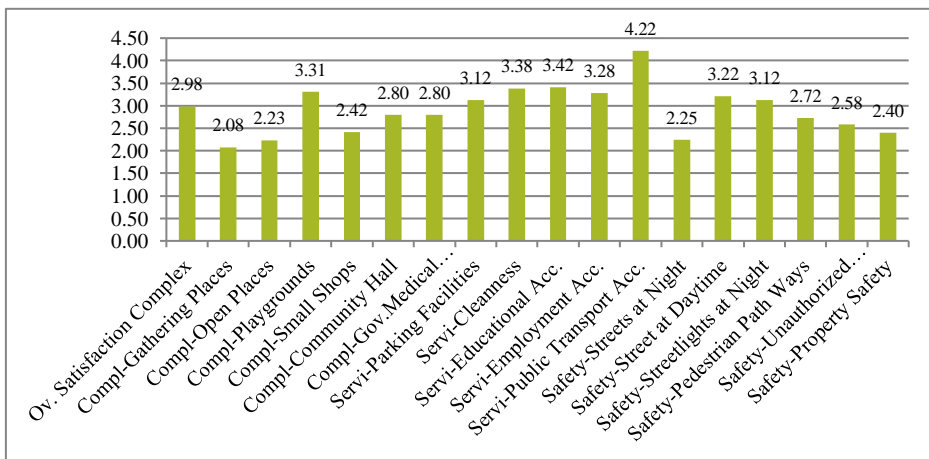


Figure 5: Complex - Mean values for satisfaction for Liveability

Correlation analysis shows that the overall satisfaction of the complex is significantly correlated with satisfaction with; “open spaces” ( $r=0.405$ ,  $Sig=0.001$ ), “safety of streets at day time” ( $r=0.363$ ,  $Sig = 0.003$ ), safety-street lights at night ( $r= 0.463$ ,  $Sig=0.000$ ), “safety from un-authorized activity” ( $r=0.374$ ,  $Sig=0.002$ ) and “safety of property” ( $r=0.460$ ,  $Sig=0.000$ ). Correlation is significant at 0.01 level (2 –tailed). Further, the availability of “small shops” ( $r=0.313$ ,  $Sig=0.011$ ), medical facilities ( $r= 0.312$ ,  $Sig=0.011$ ), safety in pedestrian pathways ( $r= 0.253$ ,  $Sig=0.042$ ) shows significance for the overall satisfaction of the complex. Correlation is significant at 0.05 level (2 –tailed).

Table 3, below summarises the indicators with low levels of satisfaction across the dwelling unit, building, and complex. It further summarises the indicators for liveability that have a significant positive association with residents’ satisfaction across the three scales.

Table 3: Summary of indicators to be considered for satisfaction of “liveability” in low-income high-rise housing

	Dwelling Unit Scale	Building/Tower Scale	Complex Scale
Indicators with low levels of satisfaction.	natural light natural ventilation size of dining size of bedroom dwelling unit size sound privacy	Safety Aesthetics Services – Electricity/Water/Lifts/Drainage/Garbage collection/Cleanlines of Service areas Spaces for interaction & social exchange	Safety in streets at night safety in pedestrian pathways safety due to unauthorized activity safety to property
Indicators that are most significant for improving overall satisfaction.	<u>Based on the open-ended question:</u> Balconies, private open spaces, identity, dignity, economic standing, more bedrooms, living areas	Safety, Noise levels supply of water  <u>Based on the open-ended question:</u> Safety, spaces for interaction-social exchange	open spaces, small shops medical facilities, the safety of streets at daytime streetlights at night safety in pedestrian pathways safety from unauthorized activity safety of property

## 6. Conclusion

Examining the liveability indicators and getting feedback from the residents about their living environment is critical for creating more sustainable housing. Such knowledge can directly help to regulate policies and regulations for future housing developments. Study shows that residents are dissatisfied with several physical indicators such as natural light, ventilation, size of the dwelling unit, maintenance, and services, and social indicators such as privacy, safety, interaction, and social exchange.

As per the study future housing needs to focus on improving the housing complex scale. The provisions for open space, gathering spaces, commercial and medical facilities, safety, and control of vandalism were identified as important for liveability at the complex scale. The study further highlighted that safety is of major concern for residents at both the building scale and the complex scale hence future housing design should focus on creating a safer built environment. The ability to reflect one's individuality and identity, spaces for interaction and social exchange, more space in the dwelling unit, private balconies, and private open spaces were found to be important for residents' satisfaction. It was further noted that the Residents' memories of their previous home have a strong influence on their acceptance and satisfaction with the current dwelling unit. Hence design should reflect on their previous homes and spatial characteristics when designing for the future. The study questions the

implications of the existing high-rise model on the liveability and housing satisfaction of low-income dwellers and the need for a housing model that is more suitable for low-income dwellers in Sri Lanka.

The study was limited to three scales of the living environment namely; dwelling unit; building and complex scale and future studies may include the neighbourhood scale. The study primarily focused on the physical indicators of liveability but the inclusion of more social and psychological indicators such as crowding, privacy, social interaction, community spirit, neighbourly contact, solidarity, identity, and personalisation will enhance the findings. A future study with a larger sample size would improve the generalizability of the findings. This was a preliminary study done as part of a larger one to be conducted in the future.

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