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Occupants' Satisfaction on Internal Layout of Low- Cost High Rise Housing in Kuala Lumpur

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ABSTRACT

The effort to improve the aspect of designing low-cost houses in Malaysia is still abandoned and neglected. The main reason contributing to this factor is due to the low price value; however, occupant's needs and desires should also be considered thus to achieve the level of satisfaction in term of comfortable living environment. This paper assesses the occupants' satisfaction on internal layout of low-cost high rise housing in Kuala Lumpur, Malaysia. The purpose of the study is to improve internal layout of low-cost high rise housing by investigating current internal layout of low-cost high rise housing in Malaysia and determining the level of occupant's satisfaction. The research was done by using quantitative and qualitative approach, where Program Perumahan Rakyat Kampung Limau and Perumahan Awam Putra Ria were selected as the case study. The results showed that the internal layout of low-cost high rise housing is still poor in meeting occupants' needs and desires especially in term of house area, location of room, function, architectural finishes, materials selection and proofing system. Due to these issues, the low level of satisfaction among occupants in Program Perumahan Rakyat Kampung Limau is recorded as compared to occupants in Perumahan Awam Putra Ria. Occupants were dissatisfied with the size and arrangement of bedroom 3, toilet and dry yard, material used for window and also sound insulation of house. Hence, some recommendations on internal layout of house are identified to increase the level of occupants' satisfaction. This research indicates the importance of occupants' satisfaction on improving the internal layout for future development of low-cost high rise housing in Malaysia.

Keywords: *Occupants' satisfaction; Low-cost housing; High-rise housing; Internal*

INTRODUCTION

A house can be defined as a dwelling for human habitation which covers the shelter and security of individuals and households (Rapoport, 1980). According to Adebayo (2013), design of a house is an important aspect in building. The layout and space in a house represent how the individuals' house needs are achieved and fulfilled. Mohit and Azim (2012) noted that the suitable house layout should provide adequate current and the future needs; and also consider the basis of quality such as size, light and building that influence the physical environment for the occupant to interact with. The increase population in urban areas around the world, resulted in higher demand and needs to construct enough housing for a massive number of people in towns and cities. Due to these issues, the basic needs and quality of the housing are ignored in order to cut the cost of construction especially to construct the low-cost housing.

Sam, Zain, and Saadatian (2012) studied that the failures in many housing projects in Malaysia is because of lack of knowledge in determining Residential Satisfaction (RS) concept. Past research regarding on the level of satisfaction among occupant of low-cost housing in Malaysia in 1987 found that most of the occupant were dissatisfied with the physical features such as unit of house, area of dining and bathroom in their unit (Sulaiman & Yahaya, 1987). A study conducted by Goh, Tee, and Ahmad (2011) identified that the main issues in designing low-cost housing are location, sanitary fitting,

unit size, types of houses, types of materials used, unit internal layout, quality in workmanship, structure, and appearance of the house. Due to these issues, the Construction Industry Standard (CIS): 1998 by the Construction Industry Development Board (CIDB) had been implemented, which states that minimum area for every internal space is 63m². Not all occupants can accept these new designs of low-cost housing. Dissatisfaction in the quality of low-cost housing is due to internal room arrangement, unit internal arrangement, location, sanitary fitting, quality of workmanship, structure of the house, and appearance (Adebayo, 2013; Anuar, 2014; Goh et al., 2011; Karim, 2012).

This study aims to analyse the occupant's satisfaction on internal layout in low-cost high rise housing in Kuala Lumpur by determining the level of occupant's satisfaction on the internal layout in the selected buildings. This study is expected to recommend suggestions to improve the internal layout of the low-cost high rise housing as a guide for future development in order to ensure a comfortable living environment.

LITERATURE REVIEW

The key purposes of house or residential is to provide to the building occupants a healthy indoor environment. Occupants' satisfaction on the house may include physical, mental and social aspects that would be affected due to quality of house. In order to provide a favourable indoor environment in the house, good design strategy is a necessity that should be well managed (Sam et al., 2012). According to Goh et al. (2011), they discovered that quality of low-cost housing indicate the occupant's satisfaction. The quality of the house can be divided into house safety, size of house unit, material used, workmanship quality, structure of the house and appearance. Based on previous research in Kuala Lumpur, it was found that household with large number of families which is more than 6 person did not satisfy with the size of existing house (Mohit, Ibrahim, & Rashid, 2010).

Housing Features

The important guideline for requirement of housing is basically referred to the National Standard for One & Two Storey Low-Cost Housing under CIS 1:1998 and the National Standard for Flats Low-Cost Housing under CIS 2:1998 (Ismail, 2003). Besides the standard requirement set by the CIDB, the Ministry of Urban Wellbeing, Housing and Local Government (2013) also stated six criteria for every single low-cost housing. Table 1 shows the typical spaces and dimension of internal layout plan for low-cost high rise housing. The six criteria for low-cost housing in Malaysia are as follows;

1. floor area of 650 square feet (latest amendment from 600 square feet requirement before);
2. three bedrooms;
3. a kitchen;
4. a balcony or an area for drying cloth;
5. tiled floor; and
6. other facilities such as playground, shop lot, parking area and mosque (*surau*).

Table 1: Typical Spaces and Dimension of Internal Layout Plan in Low-cost Housing

Area/function	Dimension (metre ²)
Living and Dining area (combined)	24.194
Bedroom 1	10.821
Bedroom 2	6.671
Bedroom 3	6.505
Kitchen	4.515
Toilet	1.706
Bathroom	3.071
Yard	2.90
Total	60.383 (650 square feet)

Source: (Ministry of Urban Wellbeing Housing and Local Government, 2013)

Peoples' Housing Programme (*Program Perumahan Rakyat*, PPR)

Since 1998 to 2014, there are 24 Peoples' Housing Programme (*Program Perumahan Rakyat*, PPR) which consist of 34,106 units (Ministry of Wellbeing, Housing and Development, 2006). PPR housing is built to replace slum housing and meet the needs of low-income peoples especially around Kuala Lumpur. The main objective of PPR housing is to increase Malaysian economic growth as well as for resettlement of squatters. The targeted groups are low-income peoples with total income of households below RM 2, 500. The PPR housing is focusing more on family. PPR housing consists of two categories, namely PPR (sale) and PPR (rent). For the PPR (sale), the selling price is between RM 30, 000 to RM 35, 000 and PPR (rent) is RM 124 per month. There are three types of PPR housing in Malaysia which are high-rise flats, walk-up flats and terrace. The characteristic of PPR housing are as follows;

1. floor area minimum 650 square feet;
2. between 5 to 18 storeys;
3. three bedrooms;
4. two bathrooms;
5. a living room;
6. a kitchen;
7. other facilities such as community hall, prayer room (*surau*), food stall/ retail space, kindergarten, handicapped facilities, playground, and open spaces.

Public Housing (*Perumahan Awam Dewan Bandaraya Kuala Lumpur*)

Public Housing in Malaysia or commonly known as *Perumahan Awam*, which is fully managed by the Kuala Lumpur City Hall (Dewan Bandaraya Kuala Lumpur, DBKL). There are two types of public housing, which are low-cost and medium-cost housing. Most of the public housing is rented and some of the units are sold to low-income people. One of the initiatives under DBKL is the Rent Assistance Scheme (*Skim Bantuan Sewa Rumah*) for public housing in the Federal Territory of Kuala Lumpur. The main target of the public housing is the people with total monthly income of household which less than RM 1, 500 and priority is given first to hard-core poor household with monthly income is below RM 580.

METHODOLOGY

The case studies selected for this research are PPR Kampung Limau and Perumahan Awam Putra Ria. Both selected buildings are low-cost high rise housings which are fully managed by the Zone 2 of the Public Housing Department, DBKL. This study is focusing on the low-cost housing programs under the public sector, where comparison between the internal layouts at both case studies will be conducted.

The first phase of the study consists of collecting data from previous research including examination of records, data-bases and literature. The second phase of the study implemented a large-scale survey, which were distributed questionnaires to the occupants of low-cost housing. In the third phase of the study, semi-structured interviews with the architects in the Ministry of Urban Wellbeing, Housing and Local Government were conducted.

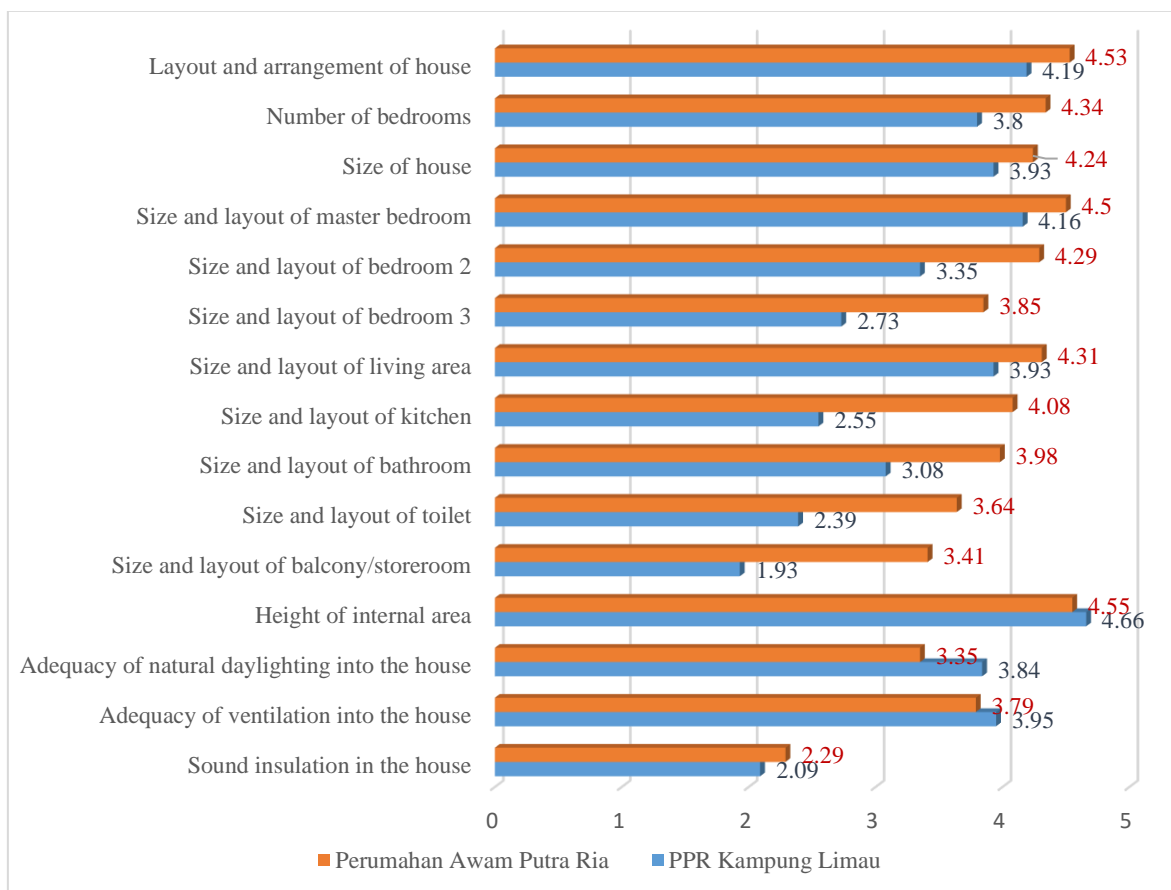
The population of interest for the questionnaires survey included individuals who lived in selected low-cost high rise housings. This limitation leads to the use of convenience or accidental sampling. Unlike the random sampling which gives same chance of selection, convenience sampling is rather not very representative since it does not describe a generalization of the total population. Only, the available and convenient group of population are selected as respondents. Interior designer or architect who involve directly or indirectly in the design of low-cost housings in Malaysia were selected. The list of professional persons was obtained from the Public Housing Department, DBKL.

RESULTS AND DISCUSSIONS

Questionnaire Results

In the quantitative phase, 160 respondents' survey responses were received from both low-cost high rise housing in total. Figure 1 presents the average mean scores of respondents' satisfaction for each potential internal layout in the low-cost high rise housing. The lowest scores for respondents in PPR Kampung Limau were for "size and layout of balcony / yard" (1.93) and the highest for "height of internal area" (4.66). Overall, we could conclude that respondents' satisfaction towards design aspect of PPR Kampung Limau was moderate with 3.37 mean score. For Perumahan Awam Putra Ria, the lowest scores were for "sound insulation in the house" (2.29). It seems that the respondents in Perumahan Awam Putra Ria has higher level of satisfaction on internal layout of house compared to occupants in PPR Kampung Limau. Respondents' satisfaction towards design aspect of Perumahan Awam Putra Ria was good with 3.94 mean score.

It is found that there are several internal layouts that caused lower satisfaction level among respondents in PPR Kampung Limau. Based from the data collected, the existing bedroom 3, kitchen, toilet and yard size in PPR Kampung Limau were at the unsatisfactory level. In term of sound insulation, it seems that both low-cost housing was at unsatisfactory level. It seems that existing design of PPR housing is not meeting the minimum unit size stated in the CIS 1 and CIS 2. Even though bedroom 3 received the lowest degree of satisfaction compared with bedroom 1 and bedroom 2, generally respondents are quite satisfied with the size and layout of existing bedroom 1 and bedroom 2. Although the size of existing kitchen is complying with the minimum size as stated in UBBL, compared to minimum stated in CIS 2 the size of kitchen is smaller.



Source: (Author, 2016)

Figure 1: Average respondents' satisfaction score on internal layout of PPR Kampung Limau and Perumahan Awam Putra Ria

The toilet size is smaller than minimum stated in CIS 2 but still complying with the minimum size as stated in UBBL. The minimum yard / balcony size and location need to be revised so that it can score highest degree of occupants' satisfaction. Results showed that, in term of sound insulation system in both low-cost housing is poor which result in lowest degree of satisfaction. Table 2 shows the comparison for size of rooms in PPR housing between UBBL and CIS 2.

Table 2: Size Comparison for Room Function between PPR, UBBL and CIS 2

Room Function	PPR	UBBL, 1984 Area (square metres)	CIS 2 : 1998
Living and Dining	24.194	Not specific	25.20
Yard	2.90	Not specific	
Bedroom 1	10.821	11.00	11.70
Bedroom 2	6.671	9.30	9.30
Bedroom 3	6.505	6.50	7.20
Kitchen	4.515	4.50	5.40
Bathroom	3.071	2.00	1.80
Toilet	1.706	1.25	1.80
Total Area	60	Not specific	63.00

Figure 2 shows the average respondents' satisfaction score for material used in low-cost housing. The lowest scores for respondents in Kampung Limau were for "material used on window" (2.58) and the highest for "material used on roof / ceiling" (3.94). Respondents' satisfaction towards material used in PPR Kampung Limau was moderate with 3.33 mean score. For Perumahan Awam Putra Ria, the lowest scores were for "material used on door" (3.46) and the highest for "material used on roof / ceiling" (4.16). Respondents' satisfaction toward material used in Perumahan Awam Putra Ria was good with 3.86 mean score.

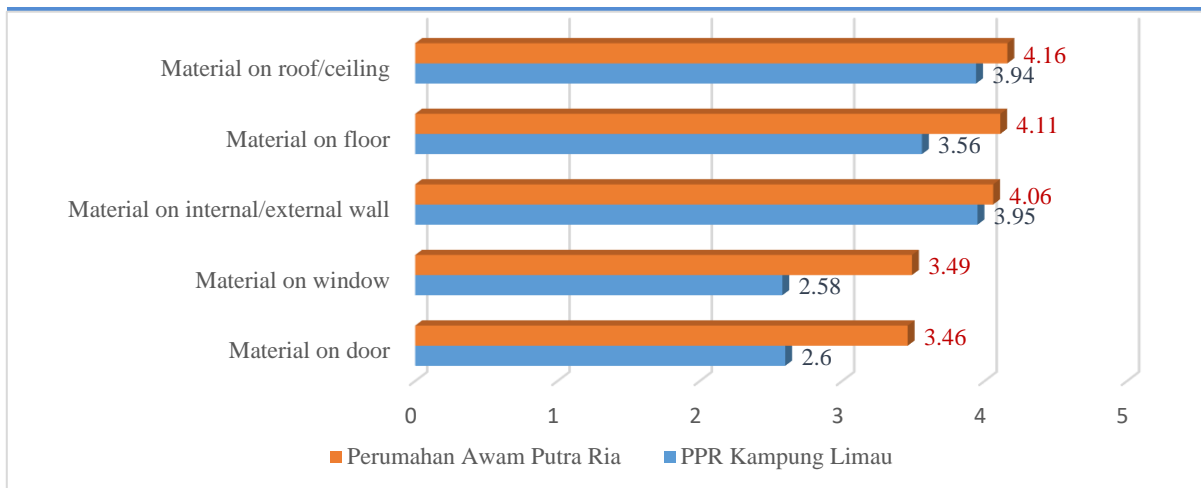


Figure 2: Average Respondents' Satisfaction Score on Material Used of PPR Kampung Limau and Perumahan Awam Putra Ria

Interview Results

Size of House

First issue that has been addressed is the size of PPR house, which seems small especially for families with big number of children. For existing high rise and walk-up flats, the size of PPR housing is 650 square feet which comprises with combined living and dining area, 3 bedrooms, a kitchen, 1 bathroom, 1 toilet and balcony / yard. Due to these issue, the new design size requirement had been set by the Ministry of Urban Wellbeing, Housing and Local Government, which set that the size of house should not less than 700 square feet. The new size of PPR housing comprises 3 bedrooms, 2 bathrooms, living room and dining, kitchen and dry area.

Internal Layout

Second issue that had been addressed is poor internal layout design. Based from the interviews, the design layout of PPR seems poor and backdated. There are some areas of the house that cannot be fully functioned due to improper design arrangement. For example, the location of dry yard / balcony in existing low-cost housings is located beside the kitchen. Due to this layout, the yard cannot be used as drying area because smokes from cooking escape in the kitchen through opening at yard. The existing PPR housing not fully be covered with floor tiles. Due to these problems, the new standard had been carried out states that all area in unit design shall be finished with floor tiles and skirting tiles at least 100mm height.

Material Selection

The third issue is about selection of materials used in constructing PPR housing. Adjustable louvered windows are used in most PPR housing in Malaysia. The use of adjustable louvered windows is dangerous because it carries the risk of glass panes. The new casement window is the best selection of window compared to adjustable louvered windows. In term of insulation or proofing materials, it seems that existing PPR housing is lack in term of sound and water proofing. This happened due to limit in budget allocated. Skim Coating System need to be applied onto all concrete surfaces including internal wall, ceiling soffit and concrete panel wall for weather resistant anti fungus function. For floor finishes, cement render and ceramic tiles type with size of 300 mm x 300 mm and skirting tiles at 100 mm height applied in almost all low-cost housing. Non-slip ceramic nosing tiles is used for floor in bathroom and toilet. Ceiling finishes in low-cost housing must be asbestos free board cement board or equivalent with class 'O' fire rating.

Method of Construction

Next issue is about method of construction for PPR housing. Traditional method of construction seems to bring problems such as defect. The new method of construction which is the Integrated Building System (IBS) should be used in order to reduce the defect of house and cost of construction. Since the PPR housing is constructed in large volume, so the IBS concept is an appropriate technique in order to save budget and to cut the construction cost. By using IBS concept, the period of construction is shorter than traditional method.

Design Benchmarking

Last issue is the issue regarding on design benchmarking. According to architects in the Ministry of Urban Wellbeing, Housing and Local Governments, there is no benchmarking regarding on design in PPR housing. This study suggested that the design of low-cost housing in Malaysia need to undergo benchmarking procedure with design of low-cost housing in other countries in order to improve the existing design and meet the quality of life among occupants in low-cost housing.

CONCLUSIONS

This paper examined reported internal layout features in relation to occupants' satisfaction among low-cost high rise housings in Kuala Lumpur. The findings showed that occupants in Perumahan Awam Putra Ria have higher level of satisfaction on the internal layout of the house, compared to the PPR Kampung Limau. Although the sizes of both houses are similar, the size areas, internal layout design and arrangement of Perumahan Awam Putra Ria seems to be more favourable.

Findings also showed that the level of occupants' satisfaction depend upon the internal layout features in their house unit. It can be concluded that the existing internal layout of low-cost housing in Malaysia need to be revised and improved for future development. By examining the characteristics of internal layout design of the house, it will lead to harmonious society and promoting sustainable living environment for occupants of low-cost housing in the future. This study recommended for the design of low-cost high rise housing in Malaysia to be improved in terms of:

1. Size of the house is improved from 650 square feet to 700 square feet.
2. Location and orientation of room functions are revised especially for the location of dry yard.

3. Architectural finishes are compulsory in every low-cost house unit especially floor tiled and skirting tiles at least 100mm height.
4. Improve material used for windows and replace existing louvered window with casement window.
5. Increase sound insulation and water proofing systems in every low-cost house unit.
6. Install metal grilles in every window and main door.

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