

SPACE DEFICIT IN LOW COST HOUSEHOLDS OF PENINSULAR MALAYSIA

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Space deficit is one of the problems faced by the low cost housing dwellers because of its minimum floor size and cost. This study examines the space deficit experienced by households residing in three types of low cost public housing, namely, single story terrace houses, walk-up flats and high rise flats. A total of 914 low cost housing dwellers in Peninsular Malaysia were randomly selected and interviewed in this study. The results of the study show that the majority of the households experienced space deficit, with the deficit more severe when the family was larger. The highest deficit was very evident in the case of bedrooms. Occupancy per bedroom was moderately high, i.e. between two to three persons per bedroom. The occupancy ratio was the highest among the residents of high rise flats, followed by walk-up flats and terrace houses. The occupants in the terrace houses had the opportunity to build additional rooms when the economic conditions permit and were thereby able to reduce the room deficit. A question arises as to whether terrace houses are a better alternative to other types of houses because this type of structure can be adjusted to meet family needs.

Kekurangan atau defisit ruang adalah salah satu masalah yang dihadapi oleh penghuni yang tinggal di kawasan perumahan kos rendah awam. Masalah ini timbul kerana rumah-rumah tersebut dibina dengan keluasan dan kos yang minimum. Kajian ini bertujuan untuk meneliti defisit ruang yang dialami oleh penghuni yang tinggal di tiga jenis rumah awam iaitu rumah teres satu tingkat, rumah pangsa jalan tangga dan rumah pangsa bertingkat tinggi. Kajian telah dijalankan ke atas 914 orang penghuni rumah awam di beberapa buah negeri di Semenanjung Malaysia. Hasil kajian menunjukkan kebanyakan isirumah mengalami defisit ruang, terutama di kalangan mereka yang mempunyai saiz keluarga yang besar. Bilik tidur menglamai defisit paling tinggi berbanding dengan bilik lain. Purata bilangan orang bagi setiap bilik tidur adalah sederhana iaitu antara dua hingga tiga orang. Sementara itu, penghuni yang tinggal di rumah pangsa bertingkat tinggi mengalami defisit ruang paling teruk, diikuti dengan penghuni di rumah pangsa jalan tangga dan rumah teres setingkat. Penghuni di rumah setingkat berpeluang membesarkan rumah dan menambah bilik apabila keadaan ekonomi keluarga bertambah baik. Oleh itu, defisit ruang dapat dikurangkan. Persoalan timbul sama ada rumah teres merupakan alternatif

terbaik untuk menempatkan golongan berpendapatan rendah memandangkan rumah jenis ini boleh diubahsuai untuk memenuhi keperluan keluarga.

INTRODUCTION

Individuals and families continue to periodically assess their housing needs as they aspire to improve their living standards. Housing needs also change as the family undergoes change. Housing deficits exist when current family housing conditions deviate from the housing norms prescribed by culture, family and the community (Morris and Winter, 1978). Housing deficits may be manifested in different forms such as in space, structure, neighbourhood and many others. Whenever a deficit occurs the potential for a state of housing 'disequilibrium' (Morris and Winter, 1978) or pressure follows which warrants action for change.

Many studies have shown that serious space deficits, if not overcome, are sources of social, psychological and physiological imbalances to the residents (Mitchell, 1971; Hassan, 1977 and Smith et. al, 1969). Space deficit is defined as shortage of space or living space. It can be measured by such concepts as square feet per person, persons per sleeping room and bedroom deficit (Morris and Winter, 1978). Space deficit is always associated with lack of privacy and crowding. According to Smith et. al (1969) space deficit inhibit the formation of certain desired values and priorities. Roske (1983) described crowded housing may have its most severe effects on children. Parents can become irritable and but this problem may not occur in less crowded housing. Thus, space deficit is often a major concern, especially for those living in small houses such as low cost housing.

In Malaysia, the low cost public housing program is an important channel for low income groups to own or rent a house. This programme is aimed at fulfilling the needs of housing for families that have an income of less than M\$750 per month. According to Fourth Malaysia Plan, the main targeted group for this program are households with incomes of less than \$750 per month for those in Sabah and Sarawak and less than \$500 per month for those in Peninsular Malaysia. Most of the low cost housing have two bedrooms and other limited spaces like living, dining, kitchen and bathroom. Husna and Nurizan (1987) found that the majority of low cost housing residents in Kuala Lumpur have an average of 6 members per household; thus, severe crowding was prevalent. In relation to crowding, Kirmeyer (1978) mentioned that some parents attempted to increase privacy and reduce crowding by encouraging children to spent more time outside the home, thus diminishing their

supervision and control of children's activities.

The same result was found in Singapore, where Riaz (1977) showed that crowding brought about some unpleasant experiences for families with children. In these cases, the children were given a lot of freedom to spend time outside the house in an effort to reduce crowding. As a consequence, it was difficult to supervise them and there were cases where they were engaged in some unhealthy social activities. In the low cost housing project, outdoor space for children may not be enough for children activities, for example, Tan and Hamzah (1980) found that one of the major problem of low rise flat housing in Penang was an inadequate playground for the children. As a result, most of the children had to play in the open space in between blocks. The same finding was reported in Singapore (Yeh, 1975) where it was found that children aged 4 to 12 years old spent most of their time on the pavement in between blocks.

This brief overview shows that adequate space is important for families, especially large ones. Inadequate space, or space deficit, can result in many major social problems related to housing.

OBJECTIVES AND METHODOLOGY

The major objective of this study was to assess and understand deficits of low cost housing in Peninsular Malaysia, namely: (1) to determine types of space available and the space needed by households (2) to determine space deficits of low cost housing (3) to differentiate spaces faced by households in three different types of low cost housing structures, namely: terrace houses, walk-up flats, and high rise flats.

The data were obtained through personal interviews of respondents conducted between November and December of 1988. The respondents were chosen using stratified multistage random sampling design. Using this technique, the 11 states in Peninsular Malaysia were grouped into 5 zones, namely (1) The Northern Zone which comprised the states of Perlis, Kedah, Pulau Pinang and Perak; (2) The Middle Zone which consisted of the states of Selangor and Negeri Sembilan; (3) The Southern Zone (Malacca and Johor); (4) The Eastern Zone (Pahang, Terengganu and Kelantan) and (5) The Metropolitan Zone (The Federal Territory). A state was chosen by polling from each zone and subsequently two districts were chosen randomly from each state. Then, two housing estates from each district which have been occupied for more than 5 years were randomly chosen. Finally, using the list of occupants in

each housing estates, 914 respondents were selected at random for the study. The respondents lived in three types of low cost housing: single story terrace houses (593 units), low rise flats (220 units), and high rise flats (101 units). Most of these housing units have two bedrooms, living area cum dining, a kitchen, a bathroom and toilet with a maximum size of 550 square feet.

In this study, the measurement of space deficit was based on the evaluation of needed space by the occupants. It was calculated by subtracting current available space or number of rooms from the family's needed space or number of rooms. The aim was to determine the direction and magnitude of the difference between family norms compared with the current housing situation. Deficit was negative if the space is less than what was said to needed by the family, while deficit was positive if space was in excess of what was required. Deficit was zero if the needed space was equivalent to what was available to the family. The housing space under study included: living room, bedroom, dining area, kitchen and toilet as well as bathroom. The respondents were asked what they needed compared to the available space in their present housing unit.

The reliability test was first conducted to check the utility of the questions pertaining to space deficits. The results showed an Alpha value of 0.7. The Anova Test (analysis of variance) was utilised to determine whether there was a significant different among groups of variables and the Duncan Multiple Range Test was used to indicate groups differences.

PRESENT AND NEEDED SPACE

Families often evaluate their housing conditions based on their present housing situation. Housing deficits occur when there are conditions which do not fulfill their housing needs in the form of space, comfort, security and quality. Faced with housing deficits a family may choose one of these three options (a) residential mobility, (b) residential alteration or (c) family adaptation either through change in family structure or change in family norms.

Bedrooms:

Analysis showed that the respondents needed more bedrooms than what they presently have. The majority of the respondents (85.7%) live in two-bedroom houses. In terms of family size, about 60.2% of them had family members between 5 to 8 persons and the average family size was 6 persons. About

74.2 percent of respondents indicated they needed three bedrooms while only 13.3 percent needed two bedrooms. The need for additional bedrooms is related to the family size and needs for growing children. Separate bedrooms for sons and daughters reaching puberty was seen as necessary.

The Dining Room:

Data show that there was little difference between the amount of dining space needed compared with the present space available. It was found that 49.9 percent failed to answer the question, because many of the low cost houses did not have specified dining areas. Instead, part of the living area was used as their dining area. However, results revealed that the majority of the respondents (97.6%) wanted a separate dining area from the living and the food preparation area.

Bathroom:

Low cost housing is designed with only one bathroom and the majority of the respondents (85.7 percent) believed that one bathroom was sufficient for their need. A total of 13.5 percent however believed an additional bathroom was necessary, while only 0.8 percent of respondents indicated the need for three bathroom. According to APHA (1950) the requirement for additional space for personal cleanliness and sanitation is related to the family size. Additional space is required if a family has 5 or more members. This study showed that all families had at least one toilet. However the need for an additional toilet was indicated by only 12.4 percent respondents while 0.5 percent of the respondents would like to have three toilets.

OTHER SPACE NEEDS

Other space needs identified in the study included the need for kitchen, storage room and separate toilet and bathroom. While the majority of respondents (97.5%) only needed one kitchen, there were 2.5% respondents who needed more than one kitchen. For those who needed more than one kitchen, it may be because they wanted a separate area for preparation and cooking. The analyses of data also showed that only 3.5 percent of the respondents had a storage room. Nevertheless, about 75.9% percent of the respondents expressed a need to have a storage room in their house.

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Table 1: Present Number Available to Respondents and Types of Room

Types of Room	Number of Room					
	1	2	3	4	Not applicable	Total
	n	n	n	n	n	n
Dining	448 (49.0)	12 (1.3)	- (-)	- (-)	454 (49.9)	914 (100.0)
Bedroom	104 (11.4)	800 (87.5)	4 (0.4)	3 (0.3)	3 (0.3)	914 (100.0)
Bathroom	912 (99.8)	2 (0.2)	- (-)	- (-)	9 (1.0)	914 (100.0)
Toilet	913 (99.9)	1 (0.1)	- (-)	- (-)	- (-)	914 (100.0)
Kitchen	914 (100)	- -	- -	- -	- -	914 (100.0)
Store Room	32 (3.5)	- -	- -	- -	882 (96.5)	914 (100.0)
Toilet and Bathroom	412 (45.6)	5 (0.5)	7 (0.8)	- (-)	485 (53.1)	914 (100.0)

() percentage

Table 2: Number and Types of Rooms Needed by Respondents

Types of Room	Number					
	1	2	3	4	Not applicable	Total
	n	n	n	n	n	n
Dining	892 (97.6)	13 (1.4)	- -	- -	9 (1.0)	914 (100.0)
Bedroom	8 (0.9)	165 (18.1)	678 (74.2)	52 (5.7)	11 (1.2)	914 (100.0)
Bathroom	784 (85.7)	123 (13.5)	7 (0.8)	- (-)	- (-)	914 (100.0)
Toilet	721 (87.1)	113 (12.4)	5 (0.5)	- (-)	- (-)	914 (100.0)
Kitchen	891 (75.9)	- (-)	- (-)	- (-)	- (-)	914 (100.0)
Store Room	694 (75.9)	- (-)	- (-)	- (-)	220 (24.0)	914 (100.0)
Toilet and Bathroom	218 (23.9)	12 (1.3)	1 (0.1)	- (-)	683 (74.0)	914 (100.0)

() percentage

SPACE DEFICIT

Space deficit occurs when the family's need for space is not met. Any deficit can potentially lead to dissatisfaction which, if allowed to prolong, could negatively affect the family socially, mentally and physically. Feelings of dissatisfaction may be felt not only among adults but also among young children. They may express their space need behaviourally rather than verbally. In this study space deficit was measured by determining the difference between the number of available space/rooms and the space needed. The space deficit experienced by respondents is shown in Table 3.

Table 3: Distribution of Space Deficits

Deficit Value	Living n	Dining n	Bedroom n	Bathroom n	Toilet n	Kitchen n
2	- (-)	- (-)	- (-)	3 (0.3)	- (-)	- (-)
1	1 (0.1)	12 (1.3)	3 (0.3)	59 (6.5)	- (-)	- (-)
0	876 (95.8)	436 (47.7)	137 (15.0)	428 (46.8)	441 (48.2)	861 (94.2)
-1	31 (3.4)	11 (1.2)	662 (72.4)	- (-)	53 (5.8)	23 (2.5)
-2	- (-)	- (-)	91 (10.0)	- (-)	2 (0.2)	- (-)
-3	- (-)	- (-)	6 (0.7)	- (-)	- (-)	- (-)
-4	- (-)	- (-)	2 (0.2)	- (-)	- (-)	- (-)
Not applicable	6 (0.7)	455 (49.8)	13 (1.4)	424 (46.4)	418 (45.7)	30 (3.3)
	914 (100.0)	914 (100.0)	914 (100.0)	914 (100.0)	914 (100.0)	914 (100.0)

() percentage

The results of the analyses showed that the bedroom has the highest space deficit as compared to other rooms. A total of 83.3 percent households indicated they experienced negative bedroom deficit i.e. the lack of bedroom space, out of which 72.4 percent needed an additional bedroom, 10.0 percent could get by with two bedrooms, 0.7 percent needed three bedrooms and 0.4 percent needed four bedrooms. Only 0.3 percent of the respondents scored a positive bedroom deficit i.e. an excess of one bedroom.

Besides the bedrooms, a total of 6.0 percent of respondents experienced deficit with the number of toilets, 3.4 percent with the living area, and 2.5 percent with the kitchen. It was found that none of the respondents experienced negative deficit with the bathroom and store room. These findings indicate that the inadequate number of bedrooms is a major complaint among low cost housing residents.

SPACE DEFICITS ACCORDING TO TYPES OF HOUSES

The Anova Test was utilized to determine the difference in space deficit experienced by respondents living in the three different types of low cost houses under study, namely: single story terrace, low rise flats and high rise flats. The results showed that there was a significant difference in space deficits between the types of houses at $F = 89.0203$, $p < 0.001$ (Table 4).

Table 4: Anova Test on Total Space Deficit and Type of Houses

Source	Degree of freedom	Total square	Mean square	F ratio	F probability
Between groups	2	693.4682	326.7341	89.02	.0000
In groups	911	3343.6740	3.67		
Total	913	3997.1422			

$p < 0.001$

Using the Duncan Multiple Range Test it was shown that the respondents in the high rise flats faced the most serious space deficit compared to those living in the walk up flats and terrace houses. The mean deficit was 4.7 for high rise flats, 3.6 for low rise, and 2.3 for the terrace houses. It was also found that the deficit for high rise flats was significantly different (at $p < 0.001$) from those of terrace and low rise flats while the deficit for low rise flats was significantly different from terrace houses. Although most of the flats have two rooms as do the terrace houses (as in the original plan), occupants in the terrace houses have the option to add rooms when the economic conditions permit. Therefore, the room deficit for terrace houses could be reduced.

BEDROOM DEFICIT

As shown in Table 3, a total of 761 respondents faced a deficit of 1 to 4 bedrooms. The Anova Test showed that there was a significant difference at $F = 3.8975$, $p < 0.05$, for the deficit of bedrooms in between the types of houses studied (Table 5). The Duncan Multiple Range Test showed that the bedroom deficits for high rise flats and low rise flats were significantly different from those of terrace houses. It was also found that the highest mean deficit was recorded for the high rise flats (Table 6).

Table 5: Anova Test on Bedroom Deficits and Types of Houses

Source	Degree of freedom	Total square	Mean square	F ratio	F probability
Between groups	2	2.4157	1.2079	3.89	.02
In groups	898	278.3012	.3099		
Total	900	280.7170			

$p < 0.05$

Table 6: Duncan Multiple Range Test on Bedroom Deficit and Types of Houses

Types of houses	Mean	Terrace houses	Low rise flats	High rise flats
Terrace houses	.9240			
Low rise flats	1.0299	*		
High rise flats	1.0481	*		

$p < 0.001$

TOTAL NUMBER OF ROOMS

The space deficit experienced by the households was related to the total number of rooms available. The Anova Test on the total number of rooms showed that there was a significant differences in the number of rooms among the types of houses studied ($F = 359.18$, $p < 0.001$) as shown in Table 7.

Table 7: Anova Test on Number of Rooms and Types of Houses

Source	Degree of freedom	Total square	Mean square	F ratio	F probability
Between groups	2	588.40	294.20	359.18	.0000
In groups	911	746.19	.8191		
Total	913	1334.60			

$p < 0.001$

Results of the Duncan Multiple Range Test indicated that the high rise flats had the lowest mean total of rooms available (4.7), followed by low rise flats (5.0), while the terrace houses had the highest mean of rooms (6.6).

PERSONS PER BEDROOM RATIO

The study also took into account the total number of occupants for each bedroom. The number of occupants per bedroom was calculated by dividing the number of family members living in the house with the number of available bedrooms. Table 10 showed that 36.0 percent of these families had between 2.1 to 3.0 person per bedroom (Table 8). Overcrowding is associated with lack of bedroom space (85.7% with two bedrooms) and large family size (60 percent with 6 members per family). The average occupancy for each bedroom was between 2.1 to 3.0 person. This study shows that households with young children face less severe overcrowding when compared to those with adolescent age children since parents can more readily share their bedroom space with young children. There were also cases where the living room and dining area were used as sleeping areas for family members. Problems are more apparent when adolescent children of different gender have to share the same bedroom due to lack of bedrooms.

Table 8: Number of Members per Bedroom

No of members per bedrooms	No of families	
	n	%
< 1.0	3	0.3
1.0 - 2.0	236	25.8
2.1 - 3.0	330	36.0
3.1 - 4.0	197	21.5
4.1 - 5.0	114	12.5
> 5.0	31	3.3
Total	914	100.0

Analysis of the distribution of members per bedroom according to type of house, showed that 38.1 percent of the respondents in terrace houses and 32.4 percent of respondents from the low rise flats had between two to three

persons per bedroom. About 37.5 percent of the respondents in the high rise flats had between two to four persons per bedroom (Table 9).

Table 9: Distribution of Members per Bedroom According to Type of Houses

Type of house	Total No. of Members per Bedroom				
	< 1.0	1.0-2.0	2.1-3.0	3.1-4.0	> 4.0
	n	n	n	n	n
High Rise Flats	- (-)	11 (10.6)	33 (31.7)	39 (37.5)	21 (20.2)
Low Rise Flats	3 (1.4)	55 (25.1)	71 (32.4)	42 (19.2)	48 (21.9)
Terrace Houses	2 (0.3)	174 (29.5)	225 (38.1)	118 (20.0)	71 (12.2)

() percentage

Using the Anova Test, a significant differences was found in the total number of occupants per bedroom in the three types of houses at $F = 17.1938$, $p < 0.001$ (Table 10). While the Duncan Multiple Range Test showed that the total number of occupants per bedroom for high rise and low rise flats was different from terrace houses. The mean number of occupants per bedroom for high rise flats was the highest (3.6 occupants) compared to other type of houses in this study (3.4 for low rise flats and 2.9 for terrace houses). This clearly show that high rise flats were more crowded than the other two types of housing.

Table 10: Anova Test on Number of Occupants per Bedroom and Type of Houses

Source	Degree of freedom	Total square	Mean square	F ratio	F probability
Between groups	2	74.1184	37.0892	17.19	0.000
In group	908	1957.0844	2.1554		
Total	910	2031.2027			

$p < 0.001$

CONCLUSION

The findings from this study shows that most families living in low cost housing have experienced space deficit, with the deficit more severe when the family size was large. The highest deficit was found in bedrooms. More than 80 percent of the respondents experienced bedroom deficits and most of them expressed a need for additional bedrooms. This condition was related to large family size (an average of 6 members). Only 6 percent were dissatisfied with the space of other rooms in the house. The study indicates that family need should be taken into account when projecting the number of suitable bedrooms for them.

Space deficit was greatest among the dwellers of high rise flats compared to the other two types of houses. Occupancy per bedroom was moderately high, i.e. between two to three persons per bedroom. The need for bedrooms was greatest when adolescent age children of different gender required separate space for various activities and for privacy. The occupancy ratio was highest among the residents of high rise flats. This situation was related to the structure of the flats which had fewer number of rooms. Furthermore, extension of space by remodeling was not possible unlike in the case of terrace houses. Prolonged space deficit tends to exert negative effect on the well being of the family (Morris and Winter, 1978). Future research should be done to determine what negative effects could be. A question also arises as to whether terrace houses are better a alternative to other type of houses judging from the possibility of adjusting this type of structure to fulfill family needs.

Some policy implications can be deduced from this study. It is crucial that housing authorities consider alternative designs at affordable price for low income households at varying stages of their life cycle. Alternative housing designs that improve the present set-up can also help reduce space deficit, especially among those families who have no other choice for housing except to stay in their present abode.

REFERENCES

APHA., American or Public Health Association, Committee on the Hygiene of Housing. *Planning the Home for Occupancy*. Public Administration Service, Chicago, 1950.

Government of Malaysia, Fourth Malaysia Plan. 1981-1985.

- Hassan, R., *Families in Flats: A Study of Low Income Families in Public Housing*. Singapore University Press, Singapore, 1977.
- Husna, S. and Nurizan, Y., "Housing Provision and Satisfaction of Low Income Households in Kuala Lumpur" *Habitat International* II 4 27-38, 1987.
- Kirmeyer, S.L., "Urban Density and Pathology: A Review of Research" *Environment and Behavior* 10 247-69, 1978.
- Mitchell, R.E., "Some Implications of High Density Housing" *American Sociological Review* 36 18-29, 1971.
- Morris, E. and Winter, M., *Housing, Family and Society*. John Wiley and Sons, New York, 1978.
- Riaz, H., *Families in Flats: A Study of Low Income Families in Public Housing*, Singapore University Press, Singapore, 1979.
- Roske, M.D., *Housing in Transition*. Holt, Rinehart and Winston, New York, 1983.
- Smith, R. Downer, D. Lynch, M. and Winter M., "Privacy and Interaction within the Family as Related to Dwelling Space" *Journal of Marriage and the Family* 13 559-566, 1969.
- Tan, H.B. and Hamzah, S., *Public and Private Housing in Malaysia*: Heinemann Educational Books (Asia) Ltd, Kuala Lumpur, 1980.
- Yeh, H.K., *Public Housing in Singapore: A Multi-Disciplinary Study*, Singapore University Press, Singapore, 1975.