

Occupants' satisfaction towards interior design quality at inpatient units of public hospitals in Malaysia: a sustainable development framework

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Abstract: Hospital building is one of the most complex architectures in types and designs for maintaining various regulations, technical requirements and physical environment. It is quite obvious that the physical environment plays an important role in occupants' well-being especially in hospital settings. This study aims to measure the level of satisfaction among users for the public hospitals' interior design quality at inpatient units in the Klang Valley region, Malaysia. A combination of qualitative and quantitative methods was employed for exploring the occupants' satisfaction. Respondents were found least satisfied with the space planning (mean score = 3.10, sd = 0.84) and furniture (mean score = 3.01, sd = 0.77) from the preliminary analyses. However, safety features (mean score = 3.57, sd = 0.83) were found the most contented aspect for the occupants' satisfaction. Although the respondents seemed to be fairly satisfied with the aspect of privacy (mean score = 3.38, sd = 0.93); however, the qualitative exploration verified differently. This study disclosed the users' level of satisfaction based on the quality of the interior design that will provide useful input for healthcare planners to design better hospitals' environment.

Keywords: interior design; quality design; inpatient unit; public hospital; Malaysia.

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1 Introduction

The hospital building design is the most complex planning issues for architects to conform regulations, guidelines, procedures and technical requirements (Balaras et al., 2007). Hospital buildings are often under great pressure to cater intense situations, as they are associated with experiences of illness and infections (Bennett and Brachman, 1998; Kim et al., 2011; Hunter et al., 2016). Admission in a hospital can be a stressful experience for the patient. Earlier Ulrich (2001) pointed out that as much as it is stressful to the patients, it could also affect families of patients, visitors and healthcare staffs. Many studies have been done on the effects of the physical environment on health outcomes related to the stressful experiences to the patients' visitors and healthcare professionals (Dijkstra et al., 2006; Ulrich et al., 2008; Huisman et al., 2012; Timm et al., 2018). Healthcare facility design may have either a positive or negative effect on the users (Stiller et al., 2016). According to Center for Health Design (CHD), the key to a better hospital design is when it is designed to improve the organisation's economic, productivity, satisfaction, cultural and clinical measures (Heller, 2018). Since a pleasant and comfortable hospital's interior environment has been emphasised in many studies to reduce stress and provide a sense of well-being (Iyendo et al., 2016), thus, the interior environment of a hospital should not be disregarded by any means (Hitcho et al., 2004).

Quality design is always a major concern, especially to clients, designers, construction practitioners as well as many other researchers (Carpman and Grant, 2016; Suratkon et al., 2016; Joseph and Rashid, 2007). According to Farooqui and Ahmed (2009), indicators of quality design can be measured subjectively, depending on the personal views, experiences and preferences of the users. In the interior design, the aspect of quality is described to fit both visual and functional purposes. Based on Ching (2005), the interior space within a building is defined by the architectural elements of the structure and enclosed floors, ceilings, walls, windows, doorways and stairways. American Society of Interior Design (ASID) stated that the important essence of interior design is functional which able to enhance the quality of life, better work environment and satisfaction of the occupants (Newsham et al., 2019). Besides, the elements that describe a good quality design should make interior space functionally fit, aesthetically

pleasant and psychologically solid (Abu Samah et al., 2012). It is further elaborated in some studies that the quality dimensions of interior design also include productivity, health protection, safety and welfare of the users (Ardda et al., 2018). Quality design can be measured by determining the occupants' satisfaction, discovering whether they fulfil the occupants' requirements (Frontczak et al., 2012). Some studies have proven the occupants' satisfaction by the principal of the quality care (Stern et al., 2003) which commonly used as a choice indicator in the healthcare facilities (Øvretveit, 2000) that affect both clinical and physical prospect.

As the design is becoming increasingly important in the recent architectural trends by considering the conditions for sustainability, thus, more environmentally friendly buildings are being designed by looking at the occupants' health and comfort (Nimlyat and Kandar, 2015). Many local interior designers are actively incorporating sustainable principles to create a healthy and productive environment in the designs especially in the hospital settings (Carpman and Grant, 2016). Since occupants spend mostly indoors, thus, interior design plays an important role to help to create a functional attribute to improve the human experience and to interact with the sustainable environment (Hayles, 2015). Interior designer can help to promote this sustainable initiative by integrating the quality indoor environment, occupants health and comfort (Ayalp, 2012).

Recently, Khullar (2017) expressed his concern about the flaws in current hospital designs claiming that they are not only unaesthetic or inconvenient but also be dangerous to the users. Studies related to healthcare facilities were often reported by local researchers to solving issues in hospital buildings, particularly in Malaysia (Haron and Alam, 2011; Abbas and Ghazali, 2012; Nawawi, 2008). Some studies indicated that healthcare facilities issues are probably the results of poor planning at the design and structure due to the lack of local experts in designing hospital (Abu Samah et al., 2012).

This study is aimed at filling the gaps that exist in previous studies related to this topic by reporting an empirical study on five inpatient hospital units within the Klang Valley region in Malaysia. Importantly, this study focuses particularly on the interior design aspects and the level of satisfaction among occupants toward the interior design quality of the inpatient units since this approach did not get much attention.

2 Research method

In order to obtain reliable and comparable data, this study employed a combination of both qualitative and quantitative methods. Self-administered questionnaires were distributed to collect quantitative data while semi-structured interviews were conducted to collect qualitative data. Both methods were utilised to gather the respondents' level of satisfaction toward the interior design qualities on the satisfaction attributes. The response from patients, staffs and visitors were gathered through the distribution of questionnaires that were developed based on the body of the literature review, previous studies that are relevant to this topic and aspect. Respondents were asked to rate their level of satisfaction of items on Likert scale, ranging from 1 to 5 (1 = completely dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied, and 5 = completely satisfied). A semi-structured interview list was also prepared with open-ended questions to gather feedback from the respondents.

The samples were stratified into three categories of hospital users:

- 1 patients
- 2 hospital staffs
- 3 visitors.

Since inpatients were included as respondents in this study, their conditions were taken into consideration. Inpatients might be more vulnerable to stress than outpatients and expected to be in poor health, more physically and psychologically impaired, those issues are taken due considerations. Inpatients are not normally participated in the survey. Additionally, patients and visitors are also found as emotional and vulnerable. Therefore, the sets of questions were customised to make them simpler and more straightforward to be answered. A total of 60 questionnaires were distributed to the respondents from the five hospitals and six respondents were willing to participate in the semi-structured interviews. However, only 45 usable questionnaires were analysed, which gave a valid response rate of 92% and the survey was completed in 30 days.

There are 12 public hospitals located in the Klang Valley region; five of them public hospitals were selected for this study. All hospitals were selected using the technique of purposive sampling. Four general hospitals labelled hospital A, hospital B, hospital C, hospital D and a teaching hospital, labelled as hospital E were chosen. These hospitals act as a subset representing all public hospitals. All of them were selected based on several criteria including their types and services. The majority of the hospitals offer the same services that serve the patients, including clinical support, inpatient, outpatient, emergency, accident services and other related services. These hospitals are comparable in general and common types of hospitals that are available. The selected hospitals offer also special departments however, the same sampling technique was used for them. Obstetrics and gynaecology departments were selected on the fact that those departments have the highest number of patients turn over and the busiest departments in the hospitals.

3 Results and findings

Distribution of respondents by gender shows that males make up about 64.44% and females make up about 35.56% of the samples. Table 1 reports the demographic profile of the respondents such as race, religion, residential area, employment and types of respondents. Distribution by ethnicity shows that most of the respondents were Malays (73.33%), followed by the Chinese (22.22%) and Indians (4.44%). Most of the respondents were Malays Muslims (73.33%) followed by Buddhists (15.56%), Christians (4.44%), Hindus (4.44%) and Sikhs (2.22%). In relation to the respondents' purpose of the visit, the statistical distribution of the respondents shows that visitors (42.22%) make up the majority of respondents, followed by patients (31.11%) and staff (26.67%). Hospitals report shows that respondents (51.11%) live in the urban areas followed by rural areas (48.89%).

Table 1 Socio demographic characteristics of respondents

<i>Characteristics</i>	<i>Percentage (%)</i>
Gender	
Female	64.44
Male	35.56
Race	
Malay	73.33
Chinese	22.22
Indian	4.44
Religion	
Islam	73.33
Buddha	15.56
Christian	4.44
Hindu	4.44
Others (Sikh)	2.22
Types of visitor	
Patient	31.11
Staff	26.67
Visitor	42.22
Resident area	
Urban	48.89
Suburb	51.11
Education level	
No formal education	0.00
Primary education	0.00
Secondary education	4.44
Diploma	20.00
Degree	55.56
Masters	11.11
Doctorate	8.89
Marital status	
Single	51.11
Married	48.89
Divorce	0.00
Widow	0.00
Employment	
Government	28.89
Private sector	8.89
Self-employed	4.44
Retired	22.22
Unemployed	4.44
Student	31.11

The educational level of the respondents is one of the major characteristics that could influence their responses that is duly acknowledged because respondents with different educational status may have different expectation towards the design of the hospital's environment. The majority (55.56%) of the respondents have bachelor degrees, whereas 20.00% of the respondents have diploma degrees, while, 20.00% of them having a higher degree. The remaining respondents (4.44%) have a qualification below diploma level. Table 1 also shows, most of the respondents were single (51.11%), while, (48.89%) were married, and none were widows or widowers and divorces or divorcées. The employment of the respondents was categorised into six groups. The highest numbers of respondents were students (31.11%), and working-class people in various positions in the government sectors (28.89%) and retired (22.22%), whereas, the remaining were working-class people in private sectors (8.89%), self-employed (4.44%) and unemployed (4.44%).

The general building layout was assessed in the first section of the questionnaire. In response, the aim of this section was to determine the respondents' satisfaction on the general layout of the building. The results are presented in Table 2. The table shows that most of the respondents were more inclined to be neutral (43.18%) about the general building layout. 31.82% of the respondents seemed to be happy about the layout in general, whereas, 13.64% were completely happy. The smaller groups of the respondents, however, felt moderately, 9.09% and strongly, 2.27% disappointed with the hospitals' building layout.

Table 2 Users' satisfaction towards the general building layout of the facilities

Characteristics	Percentage (%)					Mean	SD
	1*	2*	3*	4*	5*		
General building layout	2.27	9.09	43.18	31.82	13.64	3.44	0.92

Notes: *Indicator. 1 = completely dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied and 5 = completely satisfied.

Table 3 depicts whether or not the respondents consider the condition of the interior environment important enough to affect their state of mind or feeling. It is important to measure respondents' perception of how the interior environment can impact ones' morale and mood to achieve this study's objective. The result reveals that (68.89%) of the respondents agreed that the interior environment could certainly impact their morale and mood, in a hospital setting. In contrast, 31.11% of the respondents disagreed with the physical environment. The remaining respondents believe that a patient's health and wellness relies greatly only on the quality of care or the service in the hospital.

Table 3 Users' opinions on the impact of interior environment

Statement	Percentage (%)
Would you agree that interior environment could impact morale and mood?	
Yes	68.89
No	31.11

Table 4 lists the mean scores of the respondents' level of satisfaction for each item that was listed. This table presents the results of the study in greater depth. This part of the questionnaire intends to investigate the level of satisfaction among the occupants towards

the quality of the interior design. In order to obtain feedback on specific characteristics of the interior environment, nine items that were extracted from past literature:

- 1 space planning
- 2 privacy
- 3 accessibility
- 4 way-finding
- 5 materials and finishes
- 6 colour
- 7 lighting
- 8 safety
- 9 furniture were identified for the interior design quality.

A series of statements were provided for each item for the respondents to rate their answers on an agreement scale of 1 being 'strongly disagree' to 5 being 'strongly agree'.

According to the statistical mean, it is found that the respondents were least satisfied with the furniture (mean score = 3.01, sd = 0.77), followed by space planning (mean score = 3.10, sd = 0.84) and way-finding (mean score = 3.12, sd = 0.77) proving that the quality of the furnishing, space arrangement, signage and direction system need to be improved. The respondents were dissatisfied with the spatial arrangement, space provision and the circulation within the facility confirming that these aspects need to be enhanced. Respondents disagreed that the signage system is clear and informative enough to provide direction to the facility. The interior layout of the building was found confusing and troublesome in the study results. Meanwhile, the result also revealed that furniture plannings belong to the lowest rank. The respondents felt that the furniture did not serve its purpose well, claiming that they were not only insufficient but also not ergonomic and universal. On the other hand, the safety features (mean score = 3.57, sd = 0.83) scored the highest statistical mean that represents the most appealing aspect for the interior design quality. The safety feature is found one of the prime concerns in the healthcare facility for the sick people and provided a broad range of medical services. This study discovered that emergency exits were visible to the occupants.

Table 5 shows the results of the users' satisfaction on the overall interior quality based on the areas or rooms of the inpatient units. The occupants were asked to indicate their response and choose the most suitable option, e.g., the degree to which they are satisfied or dissatisfied with the specific spaces by using the scale provided. The respondents' satisfaction for staff base, toilet, cubical bed, pantry, examination and treatment room, storage, isolation room, dining area, counselling and breastfeeding room, tutorial room, nursery room and head nurse's room were analysed. Table 5 indicates that the respondents were least satisfied with the toilet's condition (mean score = 2.93, sd = 0.81) and the pantry (mean score = 3.04, sd = 0.64), whilst the head nurses' office (mean score = 3.58, sd = 0.75), tutorial room (mean score = 3.53, sd = 0.76), examination and treatment room (mean score = 3.53, sd = 0.69) scored the highest.

Table 4 Users' satisfaction towards the interior design quality of the in-patient units

		<i>Percentage</i>					<i>Mean</i>	<i>SD</i>
		<i>1*</i>	<i>2*</i>	<i>3*</i>	<i>4*</i>	<i>5*</i>		
1	Space planning	1.48	24.44	38.52	34.07	1.48	3.10	0.84
2	Privacy	1.11	20.00	26.67	44.44	7.78	3.38	0.93
3	Accessibility	0.89	12.89	34.67	43.56	8.00	3.45	0.85
4	Way finding	2.22	14.81	54.81	25.19	2.96	3.12	0.77
5	Materials and finishes	0.56	15.00	37.22	45.56	1.67	3.33	0.77
6	Colour	0.00	16.30	50.37	31.11	2.22	3.19	0.73
7	Lighting	0.00	22.22	34.07	36.30	7.41	3.29	0.90
8	Safety	1.67	7.78	31.67	49.44	9.44	3.57	0.83
9	Furniture	0.56	25.56	47.78	24.44	1.67	3.01	0.77

Notes: *Indicator. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree.

Table 5 Overall users' satisfaction on spaces

<i>Spaces</i>	<i>1*</i>	<i>2*</i>	<i>3*</i>	<i>4*</i>	<i>5*</i>	<i>Mean</i>	<i>SD</i>
1 Staff base	0.00	15.56	53.33	31.11	0.00	3.16	0.67
2 Toilet	4.44	22.22	48.89	24.44	0.00	2.93	0.81
3 Cubical bed	0.00	15.56	48.89	33.33	2.22	3.22	0.74
4 Pantry	0.00	15.56	66.67	15.56	2.22	3.04	0.64
5 Examination and treatment room	0.00	6.67	37.78	51.11	4.44	3.53	0.69
7 Storage	0.00	20.00	51.11	28.89	0.00	3.09	0.70
8 Isolation room	0.00	17.78	48.89	28.89	4.44	3.20	0.79
9 Dining area	2.22	22.22	42.22	26.67	6.67	3.13	0.92
10 Counselling and breastfeeding room	0.00	2.22	51.11	40.00	6.67	3.51	0.66
11 Tutorial room	0.00	6.67	42.22	42.22	8.89	3.53	0.76
12 Nursery room	0.00	4.44	53.33	35.56	6.67	3.44	0.69
13 Head nurse's office	0.00	4.44	44.44	40.00	11.11	3.58	0.75

Notes: *Indicator. 1 = completely dissatisfied, 2 = dissatisfied, 3 = neutral, 4 = satisfied and 5 = completely satisfied.

4 Discussion

The main goal of this post-occupancy study is to evaluate the level of satisfaction among occupants toward the interior design quality in the inpatient units. This study discusses the design recommendations to improve inpatient units of public hospitals as it is rather common to assume that the respondents were not satisfied with many design and safety issues because of the maintenance and hygienic matters in the hospitals. This study acts as an initial attempt to collecting and gathering information for the indoor building

performance as an evident-based design framework for inpatient units' interior architecture at public hospitals in Malaysia. Detailed responses generated from the respondents' in the interviews explored toward the interior design quality at the inpatient units. From the interview sessions, the result suggests that there was a general dissatisfaction over the:

- a way-finding system
- b design.

Based on the results, the overall performance of the facilities does not meet the occupants' requirements and satisfaction needs. In terms of design, opting for better surface materials and finishes would help improve the problems identified.

The important feedback found are demonstrated quotes below.

A visitor's response:

"Well, we are not happy with the signages system, we get confused and lost every time to get here." (Visitor 2, hospital A)

During the interview sessions, the respondents were asked about their opinion on the furniture. Below is the response from a staff who works in one of the inpatient unit, hospital E.

"We spend long hours at our station, so I think it's important to have quality furniture to ensure productivity among us." (Staff 1, hospital E)

Privacy is found as one of the most crucial aspects in designing a quality healthcare facility, especially in an inpatient unit. Maintaining privacy provides a sense of security, elevating a person's sense of control in a healthcare setting. Although the data from the quantitative survey had stated that majority of the respondents claimed to be generally satisfied with the sense of privacy (mean score = 3.04, sd = 0.64), the data from the qualitative interviews claimed differently. Participants were found more comfortable expressing the privacy issues verbally in a qualitative interview rather than in a quantitative survey. This is probably due to the limited survey items designed in the study. Patients who were being treated at the selected hospitals expressed their concerns by the following quotes:

"One of the things that I'm not happy about is the sense of privacy here. I don't feel comfortable to communicate with my family members or to the nurse with this surrounding." (Patient 1, hospital C)

"The curtains should be thicker? I don't know but it would be nice to have some privacy in here." (Patient 2, hospital E)

From these qualitative results, it can be concluded that the respondents' satisfaction towards the quality of the interior environment was fairly negative, although there was positive feedback from one of the respondents as indicated below:

"I delivered my baby here, I was treated well by the staff, and the facilities were good and comfortable. There is not much to expect anyway because I'm a civil servant, I didn't have to pay anything, so for free treatment, I think it is alright." (Patient 3, hospital D)

Therefore, this study concludes that the quality of the interior design in the inpatient units at the public hospitals needs careful consideration especially in the aspects of privacy, space planning and way-finding. This study took an indicative approach to assess only

one department for the occupants' satisfaction towards interior design quality at the inpatient units of public hospitals in Malaysia by a sustainable development framework approach. More specialist departments need to be covered in order to achieve more comprehensive results and better outcomes. Larger sample size would possibly be more representative of the population.

5 Conclusions

This study is explored to provide an opportunity to use the current and emerging evidence to improve the interior design quality of the inpatient units in improving the staff, patients and visitors' satisfaction. Since Malaysia is experiencing a growing interest in sustainable trends due to rising global environmental issues, interior designers are becoming diligently committed to finding ways to balance aesthetics and functionality with choices that can reduce environmental impact. Interior designers and architects are responsible for the design choices that could affect the sustainable performance of a building that is made in the early design stages. Every design qualities should be considered to help better choices to reduce environmental impact while to maintain the functional needs for occupant's well-being. Thus, the findings of this study should be able to help provide input to assist interior designers, architects, policy-makers, hospital managers and planners to carefully evaluate their priorities in designing better hospitals.

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