HUMAN-ENVIRONMENT RELATIONSHIP STUDY OF WAITING AREAS IN HOSPITALS

Wan Mariah Wan Harun [1] and **Fuziah Ibrahim** [2]

[1]*Senior Lecturer, School of Housing, Building and Planning, Universiti Sains Malaysia, Penang, Malaysia, mariah@usm.my*
[2]*Senior Lecturer, School of Housing, Building and Planning, Universiti Sains Malaysia, Penang, Malaysia, fuziah@usm.my*

Abstract: Human, their feeling and emotions and the possibility of transforming its knowledge in the design of efficient and effective built environment has been undermined. This paper presents the study of human environment relationship in waiting areas of hospitals. It identifies the interaction of the physical character or attributes of the space to the emotion and perception of the users. The study used the free association method for data collection, and borrowed the feeling dimensions from the "*Kansei*" engineering to associate with design intervention. The study was conducted at 2 hospitals in Penang involving four waiting areas and interview of 40 participants. The results show that there are significant differences for the perceived effective qualities of the selected waiting areas. The most desired feeling for creating affective values is the pleasant quality with design attributes contributed by pleasant colour schemes, natural materials finishes and plantings.

Keywords: hospital environment, human feelings, emotion, comfort, affective values.

1. Introduction

Built environment created based on the priority of speed, economics, technology, image and status have gradually dulled our sensitivities and our senses. Unconsciously we are becoming immune to the negative forces of our built environment. The immunity may harm us in the long run. We end up feeling helpless in choice, in the lack of fit, accepting incongruence in the speculatively built environment offered by a small group of privileged actors who are not the immediate users of the building and the spaces created, internal or otherwise. Fast delivery, profit, technology, image and status have become the prime motivators of the built environment in place of health, safety and comfort of the end users. Unless and until we design environment that is nourishing for the people with less priority on material gains, the concept of affective design qualities may be far fetched. To achieve an effective built environment, it is important to address the subjective needs and preferences of the users especially in buildings of anthropozemic character and service oriented buildings such as in hospitals.

To be sustainable, places, buildings and spaces must be nourishing to people. One way to achieve this is for these built environments to function as a supporter for effective communication among individuals; individuals and environment; and individuals and the Creator. At the same time, it should also be able to avoid imposing

unwanted communications. According to Day [1], we associate spaces which allow effective communication with healthy spaces and the concept of health presupposes sickness.

Viewing environment as nourishing requires us to address the issues between living and lifeless spaces, life-renewing and life sapping spaces. The question is what kind of environment is appropriate to meet the needs of human emotions, feeling, behaviour and interaction. Research in design of quality products have recognized that quality goes beyond function and usage. It involves satisfying the users' subjective quality needs and values [2, 3]. To fulfill these needs, researches have applied affective design resulting in emotions referred to as "*Kansei*". This study borrowed the approach to carry out research on human-environment relationship study of waiting areas in hospitals.

2. Aim and Objective

The overall aim of the study was to manage the psychological experiences of the hospital users waiting experiences in the waiting area by creating a comfortable, pleasant and cozy environment for users while waiting to see the doctors. It required the exploration of users' emotional responses, their desired responses and the relationship between the physical attributes of the waiting areas and the emotional responses.

The research strategy to achieve the aim above focused on human environment relationship, investigating the users' experience and involved the patients, staff and visitors to determine their needs, experiences and opinions. The objectives were:

1. To reveal the different emotional responses of users in hospital waiting areas.
2. To determine the desired affective value of the waiting area environment by the users from the design point of view.
3. To identify interactions between the attributes of the hospital waiting areas and the emotional responses and how their influence should be changed if necessary.

3. Methodology

The study was conducted as a preliminary study to a prospective cohort study. It investigated the human environment relationship, analyzing the different attributes of the design of the waiting areas in hospitals against the response from the users, their feeling and perception of the place. Main methods of investigation comprised of:

- Reviewing previous research.
- Conducting literature reviews.
- Observation and information gathering of the sites.
- Interviews with patients, visitors and staff.

Observations of the physical attributes of the waiting areas were taken. Notes and photographs were documented to describe and show the conditions of the waiting areas. These data were used to correlate with the responses of the users gathered in the interview sessions. Ten adult respondents/users in each of the waiting areas of the hospitals were randomly interviewed based on their willingness to participate.

There are a number of psychological tools created to formally analyze people's feeling and tools to formally analyze the physical attributes of a place and how these different tools are linked together [4]. Semantic evaluation of products and environment is one subjective technique which relies specifically on users' perception, which uses Semantic Differential Method (SDM) to identify the semantic of space. Another tool which measures the subjective needs of users in an environment involving preferences, behaviour and result in emotions referred to as "*Kansei"* in Japanese is the *"Kansei"* Engineering. Cited from Ayas et al., 2008, "Kansei" is defined as "individual's psychological feeling and image resulting from a series of information processes from a certain artifact, environment, or situation" [5]. Ayas study of hospital waiting areas proposed free association to provide a deeper understanding of meanings of design attributes for human feelings. The study borrowed the adjectives which describes attributes applied in the *"Kansei"* method.

3.1 Conducting the Study

The study selected two main public hospitals' waiting areas based on the criteria of willingness to participate, practicality and representativeness, one representing the public hospital located in Penang Island, Hospital Pulau Pinang, an old building in the city centre which underwent renovation and refurbishment works; and the other a public hospital in the Peninsula Penang, Hospital Seberang Jaya which is a relatively new building compared to the former, located in the suburb. Waiting areas from each of the hospital, inclusive of the entrance, the reception, the general waiting and the outpatient waiting areas of these to hospitals were observed. Table 1 shows the characteristics of the two waiting areas.

Table 1. Characteristics of Waiting

Hospitals	**Waiting Areas**	**Design Characteristics of the Waiting Areas**
A. Hospital Pulau Pinang	AA. General/public waiting areas.	Wide open long corridor, creamy white terrazzo floor finishes, light coloured ceramic tile wall finishes; low flat ceiling finished with suspended asbestos free ceiling board; blue plastic and timber strip benches linearly arranged in rows against walls; naturally ventilated with additional randomly placed ceiling and wall fans, ceiling fluorescent lighting; notices and information randomly placed; no interior design input.
	AB. Outpatient waiting areas.	Separated from the general waiting areas; light coloured finishes, blue plastic and timber strip benches arranged in sociofugal form.
B. Hospital Seberang Jaya	BA. General/public waiting areas.	A long open corridor; light coloured ceramic floor tiles; a combination of flat and slope ceiling with timber strip ceiling finishes below fluorescent lighting; blue plastic and modern metal benches; laminated timber and plaster and paint wall finishes, gift shop and stationeries along corridor next to the waiting areas.
	BB. Outpatient waiting areas.	Separated from the general waiting areas; pastel coloured plastic seating, wall, screens and curtain; adjustable windows; benches arranged in sociofugal form; flat ceiling with suspended asbestos free ceiling board; linoleum/rubber base floor finishes. Air-conditioned environment.

Fig. 1a.

Fig. 1b.

Fig.1c.

Fig. 1a-1c: Hospital Pulau Pinang: Main Public Waiting Areas AA. Waiting areas lack interior design input. The waiting areas were part of an ambiguously wide and lengthy corridor with low ceiling height and randomly placed posters and information bulletins. Haphazard signage and paraphernalia can create visual noise and stress from clutter.

Fig. 1d.

Fig. 1e.

Fig. 1f.

Fig. 1d-1f: Hospital Pulau Pinang: Outpatient Waiting Areas AB. Enclosed outpatient waiting area with seats arranged linearly in rows which does not encourage social interaction among users. The interior was purely functional and lack aesthetic and coziness.

Fig. 2a.

Fig. 2b.

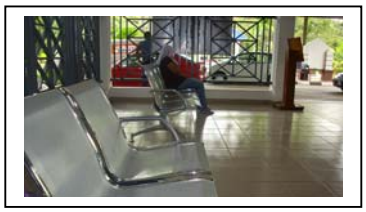

Fig. 2c

Fig. 2a-2c: Hospital Seberang Jaya: Main Public Waiting Area BA.
There was an attempt to design the interior space but still lacks aesthetic input and coziness to the feel. However comparatively more comfortable that the public waiting areas in Hospital Pulau Pinang.

Fig.2d.

Fig.2e.

Fig. 2d-2e: Hospital Seberang Jaya: Outpatient Waiting Area BB.

The study witnessed an attempt to create a comfortable waiting area with the play of soft and pastel colours for the walls, seats, curtain and screen. Mini artificial garden corner, though the attempt is admirable but it created a lifeless environment due to the artificial plants used and its non strategic location.

3.2 Data Collection

A face-to-face interview method of collecting data was used to investigate the emotional responses of the patients, visitors and the staff using the waiting areas of the hospitals. Respondents were encouraged to extensively express their feeling towards the waiting areas while waiting to see the doctor, or just accompanying a member of the family or friends to see the doctor or while on duty, giving services to the patients and visitors respectively. The interviews were conducted only with those who were willing to participate. The study recorded the responses by taking notes and documented it in Microsoft Excel form in view of the relatively small number of respondents (n = 40) involved, since the research was conducted as a preliminary study. Approval was requested and obtained from the hospital authority before commencing with the data collection activities. Table 2 presents the main interview questions.

Table 2. Interview questions used in the study and their corresponding research objectives.

Interview Questions (Adopted from Ayas, 2008)	Research Objectives
1. How do you feel in the waiting area?	1
2. What important feelings would you like to get from a waiting area?	2
3. How do you relate your important feelings to design features in a waiting area?	3

4. Results

Two field assistant researchers managed to interview 40 adult users inclusive of patient, visitors and staff from the four waiting areas of the two chosen hospitals over 3 weeks. 22 of the users were male and 18 of them were female. The study chose not to categorize respondents according to gender and status whether patients, visitors or staff, since the response from both gender and the various statuses, patients, visitors and staff do not differ in their feelings towards the condition of the different waiting areas. Non responses to participate in the interview were minimal, below 5%. The reason for non response was lack of time.

15 out of 20 responses from waiting area BA and BB (Hospital Seberang Jaya) were positive. They found the waiting areas comfortable. 2 respondents found it boring, 1 quiet, 1 felt hot and 1 said there was limited space. Only 7 out of 20 respondents in waiting area AA and AB found the waiting areas comfortable, 7 respondents felt that the waiting areas were uncomfortable, 2 said that they had to be patient and wait for a long queue, 1 felt crowded and another 1 felt the waiting area gloomy. Overall 22 out of 40 respondents (55%) were comfortable with the waiting areas provided in the hospitals.

Looking at the condition of the waiting areas, one of the attributes that gave rise to the feeling of comfort in the waiting areas was the use of natural interior material finishes. The counter of both the main waiting areas in the hospital used timber finishes in its design. In design, it is thought that wood is natural to residents which gives a natural feelings that helps in the ways the patient handle stress in the waiting area. The same feeling is true for natural stone finishes.

Fig 4.1a

Fig 4.1b

Fig 4.1a & 4.1b: The use of natural material and colour at counters and ceiling area of reception area gave warmth and pleasant environment making the respondents felt comfortable.

It is recommended that wood finishes be employed in moderation. According to Broman [6], preferences are for knotty wood, and pointed out that higher lightness and the grain of wood are important, and the vitality of wood surfaces have an effect. Previous research concluded that offices in which more wood was used gave immediate impressions such as "comfort" and "calmness." Sak uragawa [7] claimed that wood finishes stimulates geater desire for calmness. His research reveals further that when there is greater proportion of wood finishes, it would induced low desire for activities. On the other hand when there is absence of wood finishes, the ambiance would stimulate greater desires for activities. The negative responses received were probably due to the openness of the corridor used for the waiting areas; the lack of design and inappropriate arrangement of seat/benches and the materials used; adhoc placement of notices; advertisements, reading materials and medical informations.

The floor finishes and colour used for the waiting area also contribute to the feeling of comfort. The floor used a lighter shade of colour using white, cream and light gray tone. The effect is a pleasing and comfortable feeling without too much of a distraction to the eyes for the people waiting to be seen by the doctors. The texture was smooth but not slippery. People were observed to walk comfortably on the surface. This is in accordance to Akalin-Baskaya and Yildrin [8] who showed that wrong materials choice will harm all the advantages aspects of an interior since interior finishing materials affect the users by their visual, aural and thermal qualities [9].

However, the study is of the opinion that the responses on the comfort of the waiting areas is on a high side. Malaysians are humble, polite and contented people who readily expresses gratitude with the free facilities provided for them. Their responses might be on the polite side. Or they might not have been expose to a much better health service facilities than the ones they had already experienced.

Factors that may contribute to discomfort responded by the users of the waiting areas may be due to the typical seating/bench arrangement. The injection moulded plastic chairs were used in the hospitals waiting areas, chosen due to its cheaper alternative in the market. In terms of the design outlook the semantic of the waiting chair is quite simple and boring but yet to some extent practical in use. The dark blue colour was a bit toned down and gave a dull look to the waiting area although it is a cool colour which could calm down the worried patients and families. Cool colours bring relaxation, calmness and assist in reducing blood pressure.

Comfort was the last thought in the choice of seats. It was observed that the least waiting time for a patient was 15 minutes and the waiting time could go up to 1 hour to 2 hours. Patients would change posture several times to ease the discomfort. The discomfort was resulted from lack of postural variation permitted by a particular design [10]. The chair certainly does not have any postural variation to reduce discomfort. Some patients would fold arms or cross their legs in trying to ease the discomfort. Usually after 15 minutes patients start to feel uncomfortable and their reaction is to stand up and walk for a few steps.

When their names were called, the patients seating in the middle row experience difficulty standing up and walking because they have to walk sideways in front of the other seated patients. Lack of space allowances in between the rows was the problem. The intended affordance was not met. Poor design according to Blumberg and Devlin [11], can lead to psychological stress which contributes to the feelings of hopelessness, anxiety and frustrations in patients. Supportive design of physical features could reduce the stress. The arrangement of the chairs and their influences on users experiences from the observation carried out in the waiting areas strongly supported their findings.

Another major point in the observation was that users tend to find a seat where there is nobody in the nearest seat. They would choose an alternate seat. When and only that is the available seat, the seat would then be taken reluctantly. Lawson [4] attributed this behaviour as a stranger seated next to someone which actually within each other intimate's distance. The seating arrangements are forcing strangers to 'interfere' with another stranger's intimate distance.

Other factors of discomfort may be due to the lighting design, openness of the corridor ways, lack of privacy and social interaction.

When interviewed on the important and most desired feelings that respondents would like to experience in a waiting area, majority of the respondents responded to pleasant quality which relates to feeling of being pleasant, comfortable, warm home feeling, attractive and coziness quality (50.0%), technical quality which relates to security-safety, functional and privacy (37.5%), and feelings for interaction quality including customer services (12.5%).

A descriptive analysis for emotional responses to explore perceived effective values [2, 12] was carried out on the design attributes of the waiting areas. Simple descriptive analysis was assumed to be sufficient at this stage to explore the affective qualities. Table 3 summaries the frequency of responses according to the affective

quality dimensions [2, 12]. It shows the corresponding waiting areas, the classification of responses according to the overall perceived affective qualities (n = 110), the frequencies of responses, percentage to the total responses and examples of the verbal expressions. The table shows the different responses received according to the affective quality dimensions on the corresponding characteristic and design features of the four waiting areas.

Table 3. Frequency of responses according to affective quality dimensions.

Corresponding Waiting Areas	Affective qualities	Frequencies	%	Verbal Expression
AA, AB, BA, BB	Arousing	8	7.2	Fresh, inviting, cheering
S	leepy	0	0.0	-
AA, BA, BB	Relaxing	29	26.4	Calming, cozy, quiet
AA, AB	Distressing	5	4.5	Unsecure, worried, stressful
BA, BB	Exciting	12	11.0	Interesting, exciting
AA, AB	Gloomy	3	2.7	Cold, not personal, negative
AA, BA, BB	Pleasant	29	26.4	Nice, home feeling, home comfort
AA, AB	Unpleasant	24	21.8	Hopeless, boring, monotonous
		110	100	

The dominant frequencies of responses on the waiting areas were in the relaxing and pleasant affective qualities (both 26.4% respectively) found in waiting areas AA, BA and BB. Waiting areas BA and BB received exciting (11.0%) affective quality. Waiting areas AA, AB rate the highest responses on the negative affective qualities where it received unpleasant (21.8%), distressing (4.5%) and gloomy (2.7%) responses. Although low in percentage, all the waiting areas received responses on the arousing affective quality (7.2%). The study concludes that waiting areas BA and BB in Hospital Seberang Jaya received more positive emotions that the waiting areas AA and AB in Hospital Pulau Pinang, although both have lots of design improvement made to increase the emotional satisfaction of the users.

5. Discussions and Conclusion

The preliminary study attempted to explore the condition of the waiting areas of hospitals based on an affective design perspective. The descriptive nature of the study carried out manually might be exposed to simplification of the conclusion of the research work. Further research work using statistical tool to analyze the data is very much recommended to better handle complex and numerous environments.

The respondents should be exposed to various design alternatives of waiting areas by showing images of these alternatives before embarking in the discussion and interview session to investigate their inner feelings and desired needs and emotions towards the waiting area experienced. Although the responses were over 50% positive, however due to the lack of exposure to different alternative design environment of hospital waiting areas, the responses may be questionable. Generally users of the hospital waiting areas desire a pleasant environment which is comfortable; warm, homely, attractive and cozy while getting the medical services from the hospitals.

The findings of the research make original contribution to the status of the waiting areas in the two hospitals and understand the affective values towards the physical environment of hospital environment.

The environment is a powerful means, either negatively devastating or potentially health giving. It has profound affects on their emotions and their consciousness. The choices are for us, the actors to decide the possible outcomes of the environment we create. The hospital waiting areas become critically important when we view the environment as a healing environment. It can alienate and desensitize people, causes physical, psychological and social problems. However it can have equally profound positive effects on us [1]. Further research should be carried out to find out these positive effects on different age groups, gender and cultural differences.

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