A "Positive" Approach Towards Understanding Patients' and Staff's Perceptions of a Clinic Waiting Area

1   Introduction

In the recent decades, research on healthcare design and planning has been highlighting the considerable relationships between physical environmental factors and wellness (Monti et al., 2012). The understanding that physical environment can impact human health and well-being has been a pivotal principle that underscores the beneficial design of healthcare facilities (Salonen et al., 2013).

In addition to the fostering of wellness, physical environment also serves a corporate purpose: it helps create a more positive first image for the healthcare organisation. To sum up, the role of a pleasing healthcare environment should not be underplayed (Leather, Beal, & Santos, 2003).

2   Literature Review

There is a wide collection of literature on environmental design in healthcare facilities. However, the emphasis tends to lean towards inpatient wards. Therefore, the literature review for this paper was conducted with conscious effort to extract the more relevant contents that are suited for a waiting area.

Among all the clinical zones, the waiting area is an especially important site for refurbishment - it is the venue where first impressions are formed, where anxiety and worry are likely to build up (Ingham & Spencer, 1997; Leather et al., 2003).

As the first point of contact, the waiting space (usually comprising the reception) functions to convey empathy, warmth and friendliness before the other care encounters. A waiting area that is designed without much consideration sends a message that patients are of low priority in the system. On the other hand, if the waiting area appears to have been designed with patients in mind, then at the onset, there is an already positive image about the entire process (Arniell & Devlin, 2002; Zimring, Carpman, & Michelson, 1987).

2.1   Impacts of Physical Environment

Research findings have produced considerable support that the healthcare environment influences both patients and staff: patients' safety and satisfaction, as well as staff's well-being and service efficiency (Strivastava, 2017; Trochelman, Albert, Spence, Murray, & Slifcak, 2012).

Impacts on Patients

As far back as the 19th century, it was already acknowledged that the quality of space (in which care is delivered) has a therapeutic dimension that aids healing process (Horsburgh, 1995; Kirkbride, 1854, as cited in Leather et al., 2003).

Professor Roger Ulrich, notably the most frequently cited researcher internationally in healthcare design, asserted that poor designs are linked to physiological and psychological discomfort (Ulrich, 1992).

His comment has been reiterated by other researchers who opined that the physical environment plays a significant role on patients' care outcomes – re-assuring them, reducing their pain, anxiety and stress, while promoting their comfort and safety (Douglas & Douglas, 2005; Laursen, Danielsen, & Rosenberg, 2014).

In addition, it was found that attractive, pleasantly designed environments that indicate a caring intent could result in patients' positive responses, including their willingness to engage in self-disclosure to healthcare workers (Campbell, 1979; Reizensten, 1976).

In one study, Tsai et al. (2007) found that the satisfaction levels with healthcare environment differed among demographic groups. For example, women were less satisfied with cleanliness, and older patients were more satisfied than younger patients. In another study by Srivastava (2017), patients in New Delhi, India placed more value on the interactions with healthcare providers over the design of the space, as compared to patients in California, USA.

Studies that illustrate such differences among patients were not very common. Most studies such as the one by Douglas and Douglas (2004) found there was much similarity in patients' priorities, issues and concerns with regard to the healthcare environment.

Impacts on Staff

Staff who feel supported by their physical work space were also reported to be happier and more motivated, resulting in more productivity and lower turnover rates (Mroczek, Mikitarian, Vieira, & Rotarius, 2005; Srivastava, 2017). For example, the amount and type of light can affect staff's feelings and performance, even the views to the outside can decrease boredom and increase job satisfaction.

Besides benefitting the existing staff, a health-enhancing and well-planned design has been found to be effective toward attracting new staff too (Iyendo, Uwajeh & Ikenna, 2016).

2.2.   Elements of Well-Designed Healthcare Environment

A long time ago, Florence Nightingale (1860) already suggested that patients would recuperate faster if their recovery environment had natural light, ventilation, cleanliness and basic sanitation.

Since then, more healthcare environmental aspects have been examined. Nowadays, interior spaces in healthcare settings are defined to include architectural elements consisting of floors, ceilings, walls, windows, doorways, stairways, materials, and technology (Ching, 2005).

These are the tangible environmental aspects that were frequently discussed in research studies, even when patients verbalised vague responses such as "what the place is like to be in, how it feels" (Douglas & Douglas, 2004, p. 65). All these physical aspects aggregate to make the spaces functional, aesthetic and psychologically satisfying for both patients and staff.

Natural Light and Views of Outside

After examining more than 600 studies, Trochelman et al. (2012) recommended the adoption of several design features, amongst which are natural light and views of nature that have garnered nearly unanimous support.

It has been noted that natural light serves to decrease fatigue, reduce depression, and lessen the need for pain medication (Beauchemin & Hays, 1996; Beauchemin & Hays,1998; Verderber, 1986; Wilson, 1972).

Besides benefitting patients, enough daylight in rooms is highly important for the well-being of staff too (Edwards & Torcellini, 2002; Robbins, 1986; Ulrich, 2001). Staff respondents had chosen daylight over electric lighting for the advantages of psychological comfort, spatial pleasantness, general health, and work performance (Joseph, 2006).

If natural light is facilitated by large windows, that could also avail a soothing, serene distraction in terms of the external views, especially if there are scenes of nature (Diette, Lechtzin, Haponik, Devrotes, & Rubin, 2003; Heerwagen & Heerwagen, 1986; Kaplan, Kaplan, & Wendt, 1972; Lawson, 2007).

These findings are aligned with the evolutionary theory that nature can best restore well-being and improve wellness if it consists of tranquil water, luxuriant greenery, flowers, foreground spaciousness, park-like properties, and birds or other harmless wildlife (Ulrich, 1999; Verlarde, Fry, & Tveit, 2007). It is noteworthy that physiological restoration was evident even with short duration of exposure to gardens with calming

and pleasant views (Laumannn, Garling, and Stormark, 2003; Joye, 2007). The short durations of three to five minutes still provide momentary opportunities to escape from stressful clinical settings.

Plants and Artwork

Where windows and views of external environments are not feasible, some equally beneficial options are plants, artwork pieces and even nature video that can deliver therapeutic value, comfort and delight to both patients and staff (Berman, Jonides, & Kaplan, 2008; Iyendo et al., 2016; Kjellgren & Buhrkall, 2010; Lawson, 2007; Ulrich, 2000; Ulrich et al., 2008).

Besides boosting well-being, artworks serve as 'branding' and 'de-institutionalisation' tools. They help to minimise the 'intimidating' look of healthcare facility (Hathorn & Upali, 2008). Ulrich (1999) recommended that art pieces consist of naturalistic theme – it has been found that abstract art with emotionally challenging or confrontational presentations are consistently disliked by patients.

Colour

The use of appropriate colours has the functionality to elicit positive emotional and physiological responses (Dalke, Littlefair, Loe, & Camgoz, 2004; Dijkstra, Pieterse, & Pruyn, 2006; Leather et al., 2003). While responses to colour could vary due to age, gender, culture and personal preferences (Tofle et al. 2004; Manav, 2007), there was consensus that warmer colours such as red and pink tend to stimulate, excite, and energise, while cooler colours such as green and blue generally soothe and calm (Ampt, Harris, & Maxwell, 2008; Birren, 1979).

Sounds

Among the ambient environmental features, noise is one item that is most frequently complained about. Recommendations to mitigate noise include installation of high-performance sound-absorbing ceiling tiles or introduction of music (Berman, Jonides, & Kaplan, 2008; Ulrich, et al., 2008).

Though music may be subjective, the use of nature is likely to be more acceptable as it spans across linguistic, social and cultural boundaries (Harikumar & Kumar, 2007). Applications of pleasant natural sounds such as those of fountains and chirping birds were found to be therapeutic and could decrease psychological stress (Alvarsson, Wiens, & Nilsson, 2010; Iyendo et al., 2016).

The function of plants is re-visited under this "Sounds" section because Lohr's (2010) study found that plants can reflect, diffract or absorb sounds of different frequencies,

arguably as effectively as adding carpets. Thus, plants could be instrumental in acoustics management.

Flooring

Different materials (carpet, hard or glossy materials) offer diverse benefits. Even for carpet only, there are various studies that listed the advantages and disadvantages of this floor option: ease of cleaning, minimisation of bacteria, noise decrease, glare reduction, dust accumulation, etc. (Salonen, et al., 2013). While there may be ongoing debate about the pros and cons of different flooring types, it has been established that the choice of floor selection does affect patients' well-being and comfort (Ulrich, 2000).

Way-finding

Way-finding is an aspect of indoor design that that is associated with the legibility of a place, whether there are easy, logical and clearly guided routes (Carpman & Grant, 1993). Way-finding can result in patients' improved satisfaction and reduced stress as they perform successful spatial navigation, and gain a certain sense of control over their situation (Brown, Wright, & Brown, 1997; Lawson, 2007; Trochelman et al., 2012)

Layout, Furnishings and Atmosphere

A healthcare facility can further improve its healing index through safety features, ergonomics, furniture and furnishing (Ghazali & Abbas, 2011). It was established that patients valued secure and welcoming space that has considerations for all, including the physically disabled persons (Douglas & Douglas, 2004; Springer 2007).

When overall atmosphere was more hotel-like and furniture arrangements promote social interactions, most patients reported that they felt happier, more relaxed and more comfortable (Bakos, Bozic, Chapin, & Neuman, 1980; Hiatt, 1981; Trochelman et al. 2012).

In addition to physiological and psychologically well-being, professionally furnished healthcare facility also influences cognitive response. When the interiors are tasteful and inviting, with lots of positive distractions (plants, magazines, posters, artwork), patients perceived the care quality to be higher, just based on the physical attributes alone (Arneill & Devlin, 2002).

2.3 Cost of Healthcare Physical Environment Improvements

It was found that it is possible to create improved physical environment without requiring any structural changes to the existing buildings, but by simply and quickly making interior design changes (Leather et al., 2003).

As for the cost factor, only a comparatively small sum of additional capital cost might be required to achieve a very sizeable amount of benefits from physical enhancements (Berry, et al., 2004).

More specifically, when Sadler, Hamilton, Parker, and Berry (2006) analysed one-time capital expense as compared with benefits (e.g. reasonable operational savings, increased market share), they found that the initial additional capital costs would be recovered in two to three years.

This result was supplemented by Lawson and Phiri (2000) who suggested that operational savings might be around 20 percent annually. The combined outcomes of patients' quality experience and staff's improved effectiveness can be cost-effective if the entire life-cycle costing is observed.

3 SATA CommHealth and Research Objectives

This particular study was conducted in collaboration with SATA CommHealth. Established in Singapore in 1947, this organisation provides primary healthcare services (e.g., health screening and doctor's consultations) via its medical centres and mobile units. Its eight medical centres are located throughout the island-state, serving in excess of 200,000 consumers (SATA CommHealth, 2020).

Upon discussion with SATA CommHealth, the research fieldwork took place at its clinic in Bedok. The decision was pivoted on the manageable visitor volume as well as the available spaciousness.

The clinic has two waiting areas: a big general one and a smaller one (at the Wellness Centre). Nearly all the research fieldwork was conducted in the big waiting area (Figure 1) that has a floor space of 133.45 square metres.

The air-conditioned space has windows that offer a view of the entrance driveway. The seats consist of individual wooden chairs on aluminium frames, all in linear rows. There is one counter for all administrative functions: queue number ticketing, registration, payment and inquiry. The colour scheme is predominantly off-white for the ceiling, walls and floors. There is a TV that screens documentary shows, without any audio. Next to the TV is another screen that displays queue numbers for all

purposes: registration, medical services, and payment. The only ornament was a Christmas tree, and the single amenity is a water dispenser.

Figure 1: Views of the waiting area

Photos: by research team

The research objective was to examine the perceptions of visitors (i.e. patients and their companions) as well as staff about the clinic's waiting area. The intended outcome was to culminate the findings into an interior design 'playbook' comprising recommendations on colours, materials, lighting, ventilation and technological features. The managerial purpose is to merge the research outcome with SATA CommHealth's ongoing branding exercise towards elevating the levels of service experience and satisfaction.

4   Research Methods

Qualitative research methods consisting of face-to-face (semi-structured) interviews and on-site observations were used. Over three days (25 to 27 November 2019), a total of 50 visitors and 13 staff were interviewed, and three observation sessions were conducted.
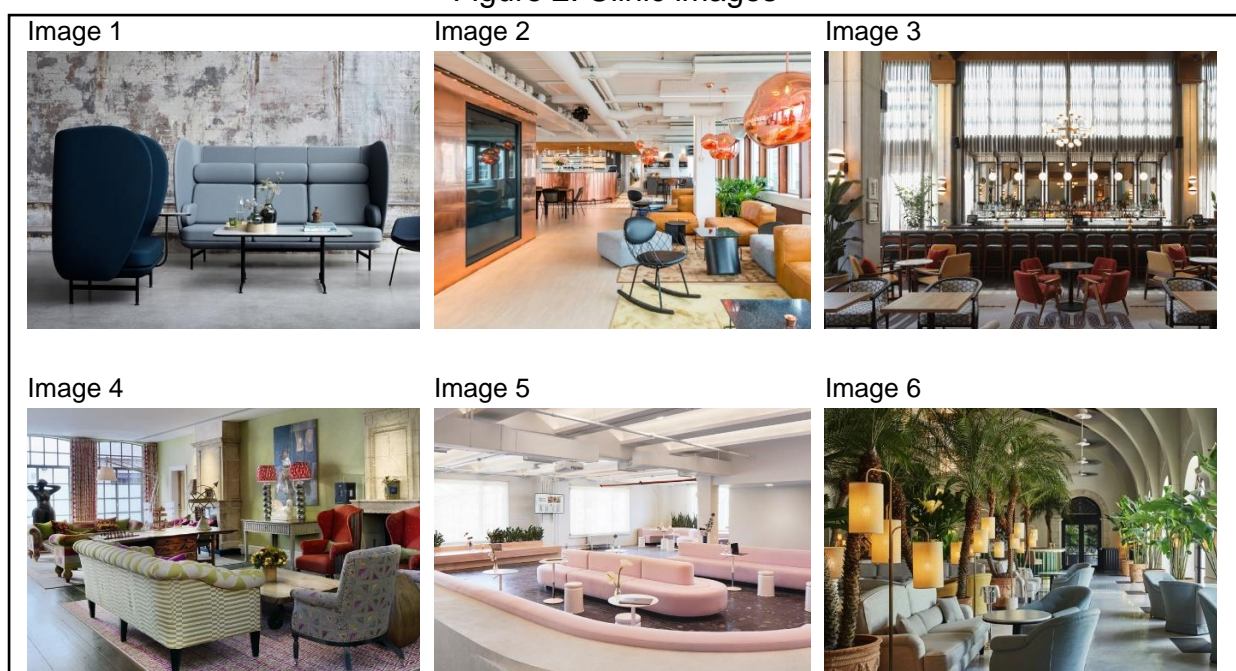
4.1   Interviews

For visitors, the selection criteria of potential interviewees were their availability, ability to converse in English or Mandarin, general well-being, and the wiliness to participate in the survey. As for staff, the clinic's management helped to facilitate their availability for the interviews.

For both groups of interviewees, they were handed Participant Information Sheet at the start of the interviews. There was no collection of personal data that could identify any individual. Thus, there was no visual or audio recording. Interviewees' comments were noted manually by the research team. Demographical details (gender, estimated age group, ethnicity) were gathered based on the research team's observations. The demographical data were coded numerically at the earliest point of compilation.

The interview consisted of three phases. At the start, interviewees were encouraged to highlight existing satisfactory aspects of the waiting area. The "positive" approach was adopted to set the session on a constructive tone, and not let the interview morph into a complaint session.

Next, interviewees were requested to suggest one change to the waiting area, and to recall any other physical environment that they rated highly. Finally, interviewees were invited to select one preferred clinic image out of six images (Figure 2). The collection of coloured images was printed on A3 size paper.

Figure 2: Clinic images

The duration of each interview with staff was more permitting than the approximately 10-minute with visitors. That was because queue numbers were displayed arbitrarily for registration, consultation or treatment, and that led to several disrupted or aborted interviews.

4.2   Observations

The three observations were conducted on 25 and 26 November 2019, with each lasting about 15 minutes. The observational data consisted of crowd size, seating capacity adequacy, visitors' familiarity in the environment, waiting behaviour and non-verbal language. Counter staff's actions were also observed; for example, whether they had to announce queue numbers manually or give directions.

5 Research Findings and Discussion

This section consists of the findings for visitors and staff, as well as a comparison between the two groups. The observational data will also be described.

5.1 Visitors

Among the 50 visitors who were interviewed, there was a nearly equal distribution of male (48%, n=24) and female (52%, n=26). Majority were Chinese (62%, n=31), followed by Malay (18%, n=9), Indian (14%. N=14) and Others (6%, n=3). Only 26% (n=13) were seniors (above 60 years old). As mentioned in the earlier 4.1 section, all these demographical data were physically observed and concluded by the research team.

Among the aspects of the clinic waiting area that visitors found to be satisfactory, layout was the most frequently mentioned. The other aspects that were perceived favourably included seating, environmental ambience, as well as cleanliness and hygiene (Table 1).

Table 1: Top five positive aspects (visitors)

Rank	Aspects	Number of mentions
1	Layout	11
2	Seating	10
3	Environment (e.g. temperature, brightness, noise level)	10
4	Ambience	7
5	Cleanliness and hygiene	7

In general, the visitors evaluated the waiting area to be spacious and well-organised. They liked that it is bright, welcoming, relatively quiet, and has ample seating consisting of individual chairs.

As for the aspects to be improved, visitors found signage, specifically the number display screen to be too small (Table 2). The difficulty to decipher was compounded by all the numbers being shown on the same panel regardless of the purpose (registration, consultation or treatment), complete with redundant decimal places.

While there was adequate seating, visitors would like more comfortable seats, preferably with cushion. Visitors also proposed distinctly separate counters for queue ticketing, registration and payment. It was suggested that self-service kiosk could be installed to replace the counter(s).

Table 2: Top five aspects for improvement (visitors)

Rank	Aspects	Number of mentions
1	Signage	7
2	Seating	7
3	Layout	6
4	Environment (e.g. temperature, brightness, noise level)	4
5	Automation	2
	Entertainment	2

With regard to other physical spaces that they rated highly, visitors' responses could be grouped into a few main categories, with Changi Airport at the top of the list (Table 3).

The comments exhibited consistency in the preferences for ambience, quietness, lighting, comfort, seats, spaciousness, easy navigation and external views. Upon comparison, certain items that are absent from SATA CommHealth's space include free Wi-Fi and scent.

Table 3: Highly rated physical spaces (visitors)

Number of mentions	Category / venue
11	Changi Airport
8	Healthcare facilities *Changi General Hospital, Mt Elizabeth Novena, Raffles Medical, polyclinics*
5	Shopping malls *ION, Nex, Suntec, Waterway*
5	Hospitality facilities *Artestiq café, Mandarin Oriental Hotel, NUSS Guild House, Raffles Hotel, Starbucks*
4	Library

Among the six images from which visitors selected their favourite one, images 5 and 6 were the most popular.

Image 5 was chosen for its brightness, neatness, openness, relaxing index, simplicity, spaciousness and seating capacity. Though it features a pink hue, it was preferred by similar number of males (16%, n=8) and females (18%, n=9). More Chinese (22%, n=11) selected it as compared to the other three races (each 4%, n=2). It was the top choice among the younger, non-senior group (26%, n=13).

Tying at the top spot was image 6 that has a different look. The indicated reasons for its popularity were comfortable chairs, cosiness, greenery, lighting, possibility for privacy, tranquility, refreshing feel and space (for walking too). Image 6 was preferred by more males (24%, n=12) than females (10%, n=5). There were similar number from the different races that opted for this: Chinese (12%, n=6), Malay (12%, n=6), and Indian (10%, n=5). Similar to image 5, It was the top choice among the non-senior group (26%, n=13).

The third popular choice was image 2 that was described as cheerful, lively, vibrant and modern while still offering privacy. Notably, more females (12%, n=6) than males (2%, n=1) liked this image. All 7 interviewees (14%) who chose this were Chinese.

Those who liked image 4 spoke about the hotel look that is simple, different and minimalistic. Image 3 was labelled to be a quiet place with comfortable seats. The least favourite was image 4 which was selected by only one visitor who liked the chairs.

In general, visitors appeared to gravitate towards the aesthetically pleasing, modern look – the kind that makes people "feel less sick". While positive distractions such as plants or pictures were welcomed, there was concern about safety, referring to plants that might topple.

In addition, there were repeated comments about the suitable type of seats. The concerns included how joined seats would discourage sharing, and how low seats are difficult for elderly to get up.

5.2 Staff

A total of 13 staff were interviewed, with majority being female (nearly 85%, n=11). Among the entire group, 46.2% (n=6) are Chinese, 23.1% (n=3) were Malay, 15.4% n=2) were Indian, with 15.4% (n=2) belonging to Others. Only two (15.4%) were above 60 years old.

The staff found the layout of the waiting area to be efficient, orderly and legible. They liked the spaciousness and the abundance of natural light which collectively constitute a pleasing environment (Table 4).

Table 4: Top five positive aspects (staff)

Rank	Aspects	Number of mentions
1	Layout	5
2	Natural lighting	3
3	Colours	1
4	Furniture	1
5	Air-conditioning	1

In terms of improvements that could be made, staff opined that if the queue system could be revamped to reduce waiting time, the experience would be enhanced, especially if Wi-Fi and newspapers are availed. It was commented that the overall planning of the clinic was still inefficient, leading to the difficulty of locating some rooms and services. Staff suggested that the waiting area could have more differentiated spaces to offer more privacy to patients (Table 5).

Table 5: Top five aspects for improvement (staff)

Rank	Aspects	Number of mentions
1	Waiting time	7
2	Queue system	6
3	Layout	3
4	Privacy	3
5	Entertainment	2

As for other physical spaces that they rated highly (Table 6), staff's responses were similar to the visitors'. They valued comfortable seating, cosy ambience, lighting and work area spaciousness. Some of these highly rated features that are absent at SATA CommHealth's clinic include amenities and entertainment options (e.g., beverages, phone charging point, massage service, reading materials and Wi-Fi).

Table 6: Highly rated physical spaces (staff)

Number of mentions	Category / venue
6	Hospitality facilities Intercontinental Hotel, Temasek Shophouse, banks, restaurant, SIA Customer Service Centre at ION
3	Healthcare facilities *Bedok Polyclinic, Khoo Teck Puat Hospital, Singapore Heart Centre*
2	Changi Airport

The most popular picture among staff was also image 5 for its spaciousness, comfort and lighting. All the staff (53.8%, n=7) who chose this image were female.

Staff's next favourite was image 2. It was selected by 23.1% (n=3), all male. Staff were ambivalent towards images 1, 3 and 6 that were singled out for either the seats or the greenery. The least popular was image 4 with nil vote. There was no significant choice pattern that is linked to staff's ethnicity.

5.3   Comparison between Visitors and Staff

It was highlighted in another study that there was difference between patients and staff about the value of certain design features (Srivastava, 2017). In this study, both visitors and staff seemed to have similar views about the aspects that are positive and the aspects that could be improved at SATA CommHealth's clinic. Other physical spaces that they rated highly also belonged to the same categories. Even their preferred clinic images had a high amount of overlap, as shown in Table 7.

Table 7: Preferred images among visitors and staff

Rank	Visitors	Rank	Staff
1	Image 5	1	Image 5
1	Image 6	2	Image 2
3	Image 2	3	Image 6
4	Image 1	4	Image 1
5	Image 3	5	Image 3
6	Image 4	6	Image 4

5.4 Observations

Observations were carried out on 25 and 26 November 2019, starting from 10am till 12pm and 2pm, respectively. The seating capacity on both days were more than adequate for the number of visitors that was 20, maximum.

On 25 November 2019 (Monday), patients were observed to have a low amount of difficulty with the service flow, upon entry to the clinic. However, this was not observed on the next day.

In general, visitors appeared cool-headed while waiting. They either occupied themselves with their phones or books, or looked at the TV screen while waiting for their number to be displayed.

It was noted that loud noises could be amplified rather easily throughout the clinic. A child's crying inside the smaller waiting area (at the Wellness Centre) was disturbingly audible throughout the entire clinic.

6   Proposed Design Ideas for the Clinic Waiting Area

6.1   Ideation Process

The ideation commenced with the consolidation of data; namely, primary data through interviews and observations, as well as secondary data from literature review. The quality of space was thus defined and the data were further categorised into insights. Then, a series of "How might we?" statements were employed to formulate the design strategies. The process is depicted in Figure 3.

Figure 3: Data collection and analysis process
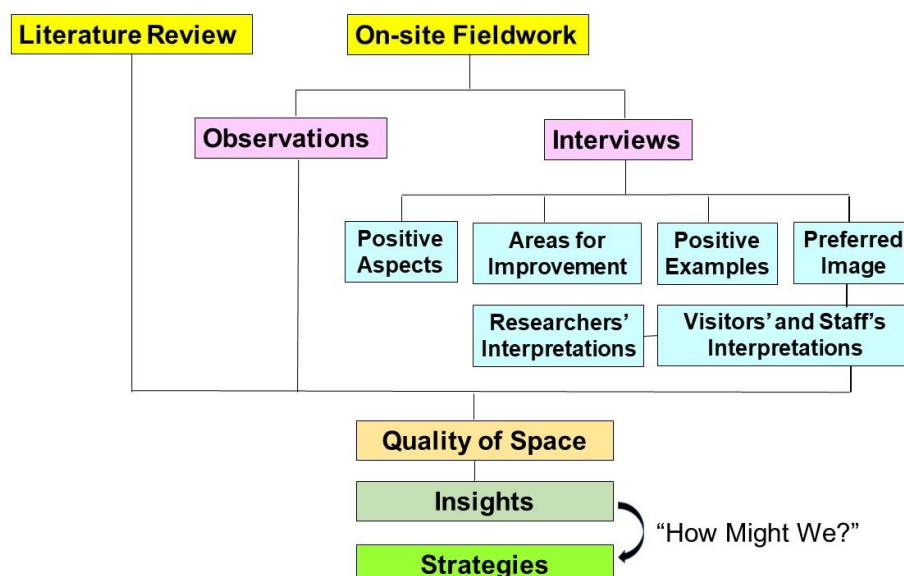
6.2   Insights and Strategies

Using the 10 key spatial qualities that interviewees valued and the four organised categories of insights, four corresponding sets of recommendations/strategies are proposed. The summary is in Figure 4.

Figure 4: Insights and strategies

Quality of Space	Inviting Refreshing	Relaxing Personal	Quiet Private	Comfortable Lively	Classy Approachable
Insights	01 Natural Lighting and Greenery	02 Physical Design	03 Way-finding and Signage	04 Automation and Technology	
Strategies	Use of natural light Inclusion of indoor greenery	Amenities (e.g. Wi-Fi, beverages, reading materials, entertainment) Variety of seating and spaces (for different group sizes and degrees of privacy) Artwork and decorations	Coherence between physical layout and procedural sequence Clear sight lines to counters Signage – coherence, size, visibility	Self-registration kiosks for queue numbers App to that might be able to address: • Waiting time and sequence • Booking of appointment • Payment	

Insight 01: Natural Lighting and Greenery

According to interviewees and past research findings, natural light is an important aspect that is valued, as much as the view of the surroundings (especially outdoor greenery). Both elements enable visitors and staff to be in a better state of mind. *Hence, how might we design a clinical environment that encourages the adoption of natural lighting and greenery?*

The recommendation is to integrate natural light as far as possible. The highly preferred choice of image 6 lent support that some form of indoor greenery could increase the comfort for both visitors and staff.

Insight 02: Physical Design

Literature highlighted that the physical design of healthcare space can produce both positive and negative experiences for visitors and staff alike. *So, how might we design a clinical environment that caters to the needs of the two groups of users, and create a good impression?*

SATA CommHealth could adopt the feedback from visitors and staff to avail amenities to make the stay at the waiting area more pleasurable. The suggested amenities included free Wi-Fi, beverages, reading materials (such as health educational pamphlets) and entertainment programmes on TV.

SATA CommHealth could also heed the emphasis that interviewees placed on the seating. Comfortable and different types of seats (for single persons and small groups) were preferred. A bonus would be the provision of privacy, especially when communication sometimes involved the revelation of personal details. As interviewees seemed to gravitate towards comfort and feel-good ambience, artworks and decorative pieces could be added to create a less sterile and "less-hospital look".

Insight 03: **Way-finding and Signage**

Both primary and secondary data in this study pointed towards the integral role of way-finding and signage in a positive clinic experience. Sensible way-finding can result in a good clinical experience for visitors and staff: it impacts visitors' perception of the healthcare quality and it affects staff's efficiency in the delivery of care. *Hence, how might we design a clinical environment that is intuitive and efficient through easy, functional way-finding features?*

The current layout of SATA CommHealth's clinic is in alignment with its administrative and clinical procedures. Staff shared that while it might make sense to the internal personnel, it might cause confusion for the visitors. It is a balancing act to increase the legibility of the layout and achieve dual purposes: a stress-free experience for visitors and an efficiency-enabling work space for staff.

Visitors reiterated that sight-lines towards the service counters and the queue numbering system are important. In response to that, one strategy is to create a coherent system that encompasses service counters, rooms and queue number display. Another associated recommendation is to design and install signage (in a logical series) that is both highly visible and easily understandable.

Insight 04: Automation and Technology

Related to the above pointer on way-finding and signage is the expressed frustration with the current queue system. Interviewees proposed self-service kiosks as an alternative. They had mentioned positively about the use of kiosks at other healthcare setting. *Therefore, how might we design a clinical environment that leverages the use of automation and technology, while prioritising the presence of human interaction between visitors and staff?*

For visitors' easy access, an automated kiosk (for queue numbers) might be considered, at the entrance of the clinic. However, a note of caution is that the entire system has to be a coherent whole.

To augment the seamlessness of the system, a mobile application could be implemented to facilitate the booking of appointments, tracking of queue situation and making of payment. Besides alleviating internal workload, such an application could also meet visitors' expectations of being informed about the flow of services and the estimated waiting time.

7   Research Limitations and Future Research Recommendations

One limitation was the level of engagement with interviewees who were patients. As mentioned earlier in the section 4.1, interviews were disrupted when patients' queue numbers were displayed. Most of the time, interviewees were focussing on the progress of the queue numbers, and that inadvertently resulted in compromised attentiveness.

The other limitation was that the fieldwork was conducted at a single venue. It was learnt that SATA CommHealth's consumer demographics vary across its eight centres. Thus, the findings from this study might not be totally generalisable to its entire consumer base.

In response to these above-mentioned limitations, more and separate fieldwork could be carried out at SATA CommHealth's other medical centres, and interviews could be performed at the end of the visits instead. If the duration is kept short and there are incentives, visitors' participation and engagement may be better controlled and harnessed.

8   Conclusion

It is evident that improved healthcare facility design can yield many advantages, alongside cost-effectiveness. Thus, besides creativity and innovativeness, any endeavour in healthcare environment enhancement would then require one crucial factor: the willingness to re-think the way that patients and staff are treated in an environment (Lawson & Phiri, 2010).

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