

# The Impact of Hospital Environment on Patient Recovery: A Mixed-Methods Study of Psychological and Sociological Perspectives

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## Abstract

**Background:** The hospital environment plays a critical role in patient recovery, influencing both physical and psychological well-being. This study examines how environmental factors, including physical design, noise levels, natural light, and social interactions, impact patient outcomes in a tertiary hospital setting.

**Methods:** A mixed-methods study was conducted in a tertiary hospital, incorporating quantitative assessments (length of stay, pain levels, anxiety, depression, sleep quality, and patient satisfaction) and qualitative interviews with patients and healthcare providers. Statistical analysis was performed to compare recovery outcomes between standard and enhanced hospital environments, while thematic analysis identified key psychological and sociological influences on patient well-being.

**Results:** Patients in enhanced hospital environments had shorter hospital stays (6.1 vs. 7.8 days,  $p < 0.01$ ), lower pain scores (3.8 vs. 5.4,  $p < 0.01$ ), reduced anxiety and depression ( $p < 0.01$ ), better sleep quality ( $p < 0.01$ ), and higher satisfaction scores ( $p < 0.01$ ). Qualitative findings revealed that natural light, reduced noise, positive healthcare interactions, family presence, and patient control over their space contributed to a more positive recovery experience.

**Conclusion:** Hospital environments significantly impact patient recovery. Incorporating patient-centered design elements, improving staff-patient communication, and optimizing hospital settings for comfort and well-being can enhance both clinical and psychological outcomes. These findings support the need for evidence-based hospital design and policy changes to improve patient recovery and satisfaction.

**Keywords:** Hospital Environment, Patient Recovery, Hospital Design, Psychological Well-Being, Sociological Factors, Mixed-Methods, Healthcare Settings, Patient Experience

**Introduction:**

A patient's recovery is greatly impacted by the context and environment in which he or she is most exposed to, especially the hospital. It is known that the social and physical features of a hospital's environment can either foster healing or inflict distress which ultimately impacts the rate of recovery and level of satisfaction obtained by the patient (Lourenço et al., 2022).

Natural elements, noise level, light, and the general environment of a room are all part of the hospital's environment. Studies suggest that there is patient space anxiety which can be easily alleviated by natural light being made available to them actively (Schweitzer et al., 2004). Loupa noted that poor infrastructure including overhead noise can also lead to several patient complications such as worsened stress levels or sleeping problems (Loupa, 2020).

The primary caregivers, supportive family members, and even the people in charge of the institution are all part of the social structure and play a role in helping activity that has the potential to aid recovery. The amount and quality of interactions a patient is exposed to while in a healthcare facility has an impact on the level of satisfaction and wellbeing of a patient (Douglas & Douglas, 2004). In addition, employing recovery-oriented concepts in caring for patients produces better psychological and emotional responses from patients (Ayres et al., 2014).

The current research utilizes a multi-strategy approach in understanding the psychological and sociological impacts that recovery from illness has within the hospital context. In the quantitative part patient's stress, duration of hospital stay and recovery ratios in terms of different environmental conditions will be analyzed. In the qualitative part, a greater understanding of how the healthcare personnel and the patients view hospitals and how it affects the recovery process will be analyzed. This study intends to furnish more holistic suggestions regarding hospital construction and policy frameworks that enhance recovery by merging both viewpoints.

**Literature Review:****1. Summary of Hospital Context and Patient Healing Out Comes**

With the rise of new advancements, the correlation between a patient's recovery with the hospital context has been an area of focus for researchers in the past few years. With this focus, the importance of social and physical aspects of a patient's wellbeing is of utmost importance. According to Lourenço et al. (2022), in a systematic review regarding the impacts that environmental aspects have on patient recovery, it was clear that illumination, noise levels, and the way the hospital is organized plays a crucial role in the healing processes of patients (Lourenço et al., 2022). The review called attention to suggesting that the patient's comfort and psychological wellbeing is put into consideration when designing the new model of the hospital.

**2. Social Factors of The Environment**

Various scholars have dealt with the topic of social factors of the environment and its impact toward patient recovery. The analyzed impact of exposure to sunlight, decoration of the room as well as the availability of vegetation in the surrounding premises as the basis for improvement of a patient's health (Huisman et al., 2012). In the same way, Laursen & Danielsen (2014) reported that during recovery

surgical patients that had access to nature and natural lighting were placed in rooms that had elements of decor which allowed for a view of the outdoors had shorter recovery periods than those placed in standard hospital conditions Uh (Laursen& Danielsen, 2014).

Recovery of patients in medical facilities can be impacted by noise. In the work of Loupa (2020), it was noted that excessive noise in the hospitals increases stress, results in sleep problems, and causes delayed healing especially in ICUs and postsurgical wards (Loupa, 2020). Dijkstra et al. (2006) also noted that other elements like a patient's color, and sound, also affect the patient's stress levels and therefore the rate at which recovery is accomplished (Dijkstra et al., 2006).

### 3. Sociological and Psychological Aspects of Hospital Environments

Patients are thought to recuperate better when there is social interaction within the hospital structures, which comprises nursing staff and familial support. Waldemar et al. (2016) examined recovery-oriented practices within the framework of mental health inpatient units with focus on the: recovery self-management, staff recovery – supportive engagement, and therapeutic milieu work as components of mental health (Waldemar et al, 2016).

Ayres et al. (2014) looked at the perceptions of patients and staff of high security hospitals and concluded that respect, safety and recovery engagement participation improved psychological wellbeing (Ayres et al, 2014).

### 4. Implications for Hospital Design and Policy

It appears from the literature that the change would lead to better recovery of patients, which is why hospitals should adopt more of an evidence based design. Devlin and Arneill (2003) examined the healthcare environments and their influence on the patient's health and argued that an increase in noise control, privacy, and social interaction spaces as well as the use of single patient rooms significantly improves recovery processes (Devlin &Arneill, 2003).

Furthermore, Van de Glind et al. (2007) studied the advantages of single patient rooms and their findings showed that the rooms helped in the prevention of nosocomial infections, enhancement of sleep, and privacy for better recovery (Van de Glind et al., 2007).

### 5. Conclusion

Research studies and surveys reveal that a patient's recovery is dependent on the hospital's environment. Social factors, like the interactions of the patient with the staff and provided social assistance, as well as physical features, such as the illumination, noise level, and the general layout of the room, all have an impact on the patient's health. Further studies should be undertaken to assess how the integration of patients' recovery experiences could be improved by changing hospital design and health policies.

## Methodology

### Study Design

This study employed a mixed-methods design to explore the impact of the hospital environment on patient recovery in a tertiary hospital setting. A quantitative approach was used to assess measurable

health outcomes related to different environmental conditions, while a qualitative approach explored patient and healthcare staff experiences to understand the psychological and sociological factors influencing recovery.

## Study Setting and Participants

The study was conducted at Tertiary Hospital, a healthcare facility providing specialized medical care. Participants included patients admitted to general medical and surgical wards, healthcare professionals (doctors, nurses, and allied health staff), and hospital administrators. The inclusion criteria for patients were:

1. Adults 18 years and older) admitted for at least five days.
2. Diagnosed with a medical or surgical condition requiring inpatient care.
3. Cognitively able to provide informed consent.
4. Not admitted to critical care units (ICU) to ensure consistency in environmental exposure.

A total of 200 patients and 50 healthcare professionals were recruited using stratified random sampling, ensuring representation across different hospital wards.

## Quantitative Data Collection

### 1. Environmental Assessment:

Hospital environments were categorized into two conditions:

- Standard hospital rooms (n=100 patients): Rooms with limited access to natural light, higher noise levels, and standard hospital design.
- Enhanced healing environments (n=100 patients): Rooms with optimized lighting, noise control measures, and therapeutic design elements (e.g., nature views, single occupancy, and patient-centered décor).

### 2. Patient Recovery Metrics:

To measure the impact of hospital environment on patient outcomes, the following variables were recorded:

- Length of hospital stay (LOS) in days)
- Pain levels measured using a Numerical Rating Scale, (NRS 0–10)
- Anxiety and depression scores assessed using the Hospital Anxiety and Depression Scale, (HADS)
- Quality of sleep measured using the Pittsburgh Sleep Quality Index, (PSQI)
- Patient satisfaction scores (Hospital Consumer Assessment of Healthcare Providers and Systems, (HCAHPS survey))

Data was collected at three time points: admission (baseline), discharge, and one-month post-discharge follow-up.

## Qualitative Data Collection

### 1. Patient Interviews:

Semi-structured interviews were conducted with 40 patients (20 from each environmental condition) to explore their experiences regarding:

- Perceived comfort and healing within the hospital environment.
- Impact of room design on emotional well-being and recovery.
- Interactions with healthcare staff and perceived social support.

## 2. Focus Groups with Healthcare Staff:

Three focus groups (n=10 per group) were held with doctors, nurses, and hospital administrators to understand:

- Their perspectives on how environmental factors influence patient outcomes.
- Observations of patient behaviors and recovery differences between standard and enhanced hospital environments.
- Challenges in implementing patient-centered environmental modifications.

All interviews and focus groups were audio-recorded, transcribed verbatim, and thematically analyzed.

## Data Analysis

### Quantitative Analysis:

- Descriptive statistics (mean, standard deviation) were used to summarize patient recovery metrics.
- Independent t-tests and ANOVA were performed to compare differences in recovery outcomes between standard and enhanced hospital environments.
- Multiple regression analysis was conducted to determine the predictive effect of environmental variables on recovery rates, adjusting for patient demographics (age, gender, comorbidities).

### Qualitative Analysis:

- Thematic analysis was conducted using NVivo 12 software.
- Two independent researchers coded the transcripts using inductive thematic coding to identify key themes related to environmental perceptions and psychological experiences.
- Inter-coder reliability was assessed using Cohen's kappa coefficient ( $\geq 0.80$ ) to ensure consistency in coding.

## Ethical Considerations

The study was approved by the ethics committee, and written informed consent was obtained from all participants. Confidentiality was maintained by assigning unique codes to participants, and data was stored securely in password-protected databases. Participants were allowed to withdraw from the study at any time without any impact on their treatment.

## Limitations

While the study provided valuable insights into the role of hospital environments in patient recovery, some limitations must be acknowledged:

1. Single-center study—Findings may not be generalizable to other healthcare settings.
2. Short-term follow-up—The long-term effects of hospital environment modifications on patient well-being were not assessed.
3. Potential for response bias—Patients aware of the study objectives may have provided socially desirable responses in interviews.

## Conclusion

The mixed-methods approach allowed for a comprehensive understanding of how hospital environments affect patient recovery from both clinical (quantitative) and experiential (qualitative) perspectives. The findings underscore the need for hospital design policies that prioritize patient-centered environments, enhancing both psychological well-being and clinical outcomes.

## Findings

### Quantitative Findings

The study examined the differences in recovery outcomes between patients in standard hospital environments and those in enhanced hospital environments. The following table summarizes the key findings:

**Table 1: Comparison of Recovery Outcomes Between Standard and Enhanced Hospital Environments**

Variable	Standard Environment Mean $\pm$ SD	Enhanced Environment Mean $\pm$ SD	p-value
Length of Stay (days)	7.8 $\pm$ 2.3	6.1 $\pm$ 1.9	<0.01
Pain Score (0-10)	5.4 $\pm$ 1.8	3.8 $\pm$ 1.5	<0.01
Anxiety Score (HADS)	9.2 $\pm$ 3.1	6.5 $\pm$ 2.7	<0.01
Depression Score (HADS)	8.5 $\pm$ 2.9	6.2 $\pm$ 2.4	<0.01
Sleep Quality Score (PSQI)	10.1 $\pm$ 2.5	7.3 $\pm$ 2.1	<0.01
Patient Satisfaction Score (HCAHPS)	6.8 $\pm$ 1.4	8.9 $\pm$ 1.2	<0.01

### Key Findings:

#### 1. Length of Hospital Stay:

Patients in enhanced environments had a significantly shorter length of stay (6.1  $\pm$  1.9 days) compared to those in standard environments (7.8  $\pm$  2.3 days,  $p < 0.01$ ).

#### 2. Pain Levels:

Patients in enhanced environments reported lower pain scores (3.8  $\pm$  1.5) than those in standard environments (5.4  $\pm$  1.8,  $p < 0.01$ ).

#### 3. Anxiety and Depression:

Psychological well-being improved in enhanced environments, with lower anxiety scores (6.5  $\pm$  2.7 vs. 9.2  $\pm$  3.1,  $p < 0.01$ ) and lower depression scores (6.2  $\pm$  2.4 vs. 8.5  $\pm$  2.9,  $p < 0.01$ ).

#### 4. Sleep Quality:

Patients in enhanced environments had better sleep quality with a PSQI score of 7.3  $\pm$  2.1 compared to 10.1  $\pm$  2.5 in standard environments ( $p < 0.01$ ).

## 5. Patient Satisfaction:

Higher satisfaction scores were reported by patients in enhanced environments  $8.9 \pm 1.2$ ) compared to standard settings  $6.8 \pm 1.4$ ,  $p < 0.01$ ).

### Qualitative Findings

The qualitative component of the study explored patient and healthcare provider perceptions of how the hospital environment influenced recovery. Using thematic analysis, three major themes emerged, each with corresponding sub-themes. Below is a structured presentation of the findings with themes, sub-themes, and representative participant responses.

#### Theme 1: The Healing Effect of the Physical Environment

##### Sub-theme 1.1: Natural Light and Views of Nature

###### Findings:

Participants housed within rooms furnished with sizable windows granting them an unobstructed view of nature expressed a sense of calmness during the recuperation process as well as displayed a more favorable attitude towards the recovery process. Staff members also reported an improvement in patient's mood and compliance with treatment in bright environments.

###### Participant Responses:

- "The window, which showed me all the trees outside, made me feel less anxious and confined. It helped me to cope with the day." (Patient 07)
- "Patients in the rooms harnessing natural light seem to be more calm and are actively participating in their care." (Nurse 03)

##### Sub-theme 1.2: Noise and Sleep Disturbances

###### Findings:

An overly cacophonous milieu, most notably from medical machinery in addition to disengagement staff chatting, proved detrimental to a patient's sleeping patterns as well as their health. Many of the patients expressed anger in not being able to rest comfortably.

###### Participant Responses:

- "I suffered from lack of sleep because, almost every night, there were new machines that at the same time talked to each other and people who poured in the hall and talked. The day left me feeling tired and cranky, which is not how I would want to feel." (Patient 15)
- "It is essential to reduce noise levels around patients, especially those with already fragile conditions. It is very important to emphasize that sound or noise interferes with almost every person's sleep which leads to their recovery being prolonged and intensified." (Doctor 05)

#### Theme 2: The Social Environment and Emotional Well-being

##### Sub-theme 2.1: Interaction with Healthcare Staff

###### Findings:

Patients in enhanced environments underlined the positive experiences with regard to staff interactions, pointing out how the attitudes and communication patterns of the personnel affected them emotionally.

## Participant Responses

- "The nurses in my ward made a real effort to check up on me and follow up with conversations. It made me feel like I was more than just a patient." (Patient 22)
- "Patients do feel more in control of their health when doctors give them explanations and attend to their concerns." (Nurse 12)

## Sub-theme 2.2: Presence of Family and Support Systems

### Findings:

Respondents who had consistent family support reported feeling more emotionally supported and less stressed. Some voiced worries about how restrictive visits might negatively impact their mental health.

### Responses from Participants Shared Include:

- "My family visiting every day motivated me and brought hope into my life. Without them, I don't think I would have coped well." (Patient 30)
- "There is a need to restrict visitor hours, but extending them too much can lead to patient isolation. We Notice emotional suffering in people who have fewer visitors." (Hospital Administrator 01)

## Theme 3: Psychological Impact of Hospital Design

### Sub-theme 3.1: Sense of Control and Personal Space

#### Findings:

The individuals placed in single-occupancy rooms exhibited a greater sense of agency during the recovery process compared to those placed in shared rooms who have reported feeling vulnerable and uncomfortable.

#### Responses Obtained from Participants:

- "I felt much more at ease in my private room. I could control the lighting, the temperature, and I didn't have to worry about disturbing anyone." Patient 12)
- "There tends to be disagreements amongst patients because of shared accommodations. The absence of privacy is a great source of stress." Nurse 08)

### Sub-theme 3.2: Hospital Environment as a Healing Space

#### Findings:

Aesthetic modifications within the healthcare sector have the capability to transform the atmosphere of recovery spaces such as hospitals from being purely clinical to emanating a more comforting approach, which in turn positively enhances healing processes.

#### Participant Comments:

- "Small changes in design, like the introduction of warm colors to walls or the renovation of harsh lighting, could serve to heighten the welcoming nature of the environment. Such changes would also imbue hospitals with a humane touch." (Patient Respondent 05)
- "doctors would treat their patients better if their hospitals did not look so robotic and cold. The more soothing and homely the hospital environment is, the less anxious the patients will be and the quicker they will get healed." (Doctor Respondent 09)



## Discussion

### 1. Interpretation of Key Findings

This investigation sought to demonstrate factors within both the physical and social elements in a patient's environment, such as the hospital, which critically impact patient outcomes. As nurses, the key professional takeaway from this study was how the patients within enhanced environments manufactured:

- Optimized environments appeared to expedite the amount of time which patients spent recovering in the hospital, thus resulting in a lower length of stay.
- Improved conditions in the accompanying environment appeared to achieve significantly lower scores when it came to pain, anxiety, and depression.
- Comfort, especially the amount of noise control afforded to patients, directly impacted the quality of sleep achieved.
- Improved environmental conditions increased the quality of care received; this was further substantiated by higher patient satisfaction scores.

This is in line with studies that demonstrated the consequences of hospital layout design on patient wellbeing (Lourenco et al., 2022), and the other study on the effects of hospital sights such as windows and less noise on the recovery experience (Huisman et al., 2012).

These extracts illustrate that the enhanced environments reported by the patients had a more positive psychological state both during their visit and after leaving the facility. It was further noted that patients who stayed in boosted environments experienced feeling less lonely, and more importantly, feeling increasingly in charge of their social surroundings, portraying a more supportive staff.

### 2. The Role of Physical Hospital Design in Recovery

One noteworthy result from this research is that changes in building designs positively correlates with health outcomes. Persons who received more natural light, had nature scenes to look at and had better noise control recovered more quickly and had better mental health. These results are in line with previous research showing that patients' recovery and stress levels are improved when their surroundings are warm, inviting, and integrated with nature (Schweitzer et al., 2004).

On the other hand, patients in so-called average hospital settings, where there was little natural light, were exposed to a lot of noise, having very sterile and cold looking places, reported higher levels of stress which hindered their recovery. These findings add to the support of evidence-based design measures that improve the emotional wellbeing and comfort of patients in hospital settings.

### 3. The Social Environment: The Impact of Staff and Family Interactions

Patients' recovery is influenced not only by the surrounding environment, but also by interpersonal relationships within the hospital. The qualitative interviews underscored that identification of the patient's primary needs is imperative in providing effective healthcare. Patients who had supportive contacts with family members and caregivers manifest lower tension and greater contentment.

These findings are consistent with prior studies suggesting that supportive relationships staff control patients' emotions and foster greater compliance to treatment (Ayres et al., 2014). In addition, more controlled policies limiting visits and poor communication by staff were found to be associated with greater emotional distress amongst patients. This information suggests that hospitals should adopt policies which promote and expand social contacts for the benefit of patients' emotions.

#### 4. Implications for Hospital Design and Policy

Our analysis brings forward a number of useful insights that can be put in action by hospital administrators and policymakers:

##### 1. Create a Patient-Centered Design of the Hospital

- o Promote natural light and combine elements of nature into the relaxation areas.
- o Enhance the use of noise mitigation measures, particularly in busy and critical care regions.
- o Add more single occupancy patient rooms to enhance comfort and control.

##### 2. Improve Communication Between Staff and Patients

- o Teach healthcare personnel empathic communication to increase patient trust and satisfaction.
- o Foster a wider approach to the practice that attends to both physical and psychological aspects.

##### 3. Help Patients Receive Social Support

- o Change the hospital's rules to permit greater participation of families, especially for patients who stay longer.
- o Allow families to spend time with patients in recovery in specially arranged rooms to create a healing environment.

##### 4. Enhance the Sleep Quality of Patients in the Hospitals

- o Introduce restricted activities during night hours to reduce disturbances.

o Use noise insulation in patient areas to protect them from sounds from medical apparatus and staff conversations with each other.

## 5. Study Limitations and Future Research

This study sheds light on the effects of the physiology of the setting of a hospital on recovery, but there are notable limitations:

- Single-center study. The results could differ in hospitals with different architectural policies and structural designs.
- Short follow-up period. The research was concentrated on recuperation during hospitalization without considering eventual outcomes after the patients' discharge.
- Any response bias. Patients may have provided biased answers during qualitative interviews if they knew the goals of the study.

Further studies should longitudinally assess the impacts of these hospital environments on recovery. This includes observation of whether the advantages of improved environments endure outside the hospital settings. In addition, research should study how to apply inexpensive patient-centered designs in areas with insufficient resources.

## Conclusion

The research indicates with reasonable confidence that hospital settings do have an impact on a patient's recovery both physically and mentally. Physical alterations to the hospital- windows, less noise, more social interaction and overall better design of the hospital- positively influenced the rate of recovery as well as level of satisfaction amongst the patients. These conclusions reinforce the necessity of policy and structural changes within the hospitals to increase the quality of care using modern approaches. Shifting focus toward the environment and more respectful treatment can improve clinical and psychological health, health outcomes and the quality of care provided overall.

## References

1. Lourenço, A., Ribeiro, M., & Lemos, M. (2022). *Hospital environment and patient recovery—a review*. European Psychiatry.
2. Schweitzer, M., Gilpin, L., & Frampton, S. (2004). *Healing spaces: Elements of environmental design that make an impact on health*. Journal of Alternative and Complementary Medicine.
3. Loupa, G. (2020). *Influence of noise on patient recovery*. Springer Link.
4. Douglas, C. H., & Douglas, M. R. (2004). *Patient-friendly hospital environments: Exploring the patients' perspective*. Health Expectations.
5. Ayres, J., Fegan, T., & Noak, J. (2014). *The recovery orientation of patients and staff in a high secure hospital*. Mental Health Practice.



6. Huisman, E. R. C. M., Morales, E., & Van Hoof, J. (2012). *Healing environment: A review of the impact of physical environmental factors on users*. ScienceDirect.
7. Laursen, J., & Danielsen, A. (2014). *Effects of environmental design on patient outcome: A systematic review*. SAGE Journals.
8. Waldemar, A. K., Arnfred, S. M., & Petersen, L. (2016). *Recovery-oriented practice in mental health inpatient settings: A literature review*. Psychiatric Services.
9. Dijkstra, K., Pieterse, M., & Pruyn, A. (2006). *Physical environmental stimuli that turn healthcare facilities into healing environments through psychologically mediated effects: Systematic review*. Journal of Advanced Nursing.
10. Devlin, A. S., & Arneill, A. B. (2003). *Health care environments and patient outcomes: A review of the literature*. SAGE Journals.
11. Van de Glind, I., de Roode, S., & Goossensen, A. (2007). *Do patients in hospitals benefit from single rooms? A literature review*. ScienceDirect.