Silent Architecture: Designing For Stillness, Noise Reduction, And Mental Calm in Hospice Spaces

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Abstract - Hospice and palliative care environments require a shift in architectural priorities from clinical efficiency to comfort, dignity, and emotional well-being. Among environmental factors, sound remains one of the most under-addressed parameters despite its measurable impact on stress, sleep, and patient experience. This study investigates the concept of Silent Architecture, defined as a design approach that minimizes unwanted noise while enhancing calm and perceptually balanced environments.

Keywords: Silent Architecture, Hospice Design, Acoustic Comfort, Healing Environments, Biophilic Design

I. INTRODUCTION

Healthcare environments are often defined by urgency, movement, and continuous sound. While such conditions are necessary in acute care settings, they can be distressing in hospice environments, where patients are physically and emotionally vulnerable. Hospice care focuses on improving quality of life by prioritizing comfort, dignity, and emotional support during end-of-life stages.

Sound plays a critical role in shaping spatial experience. According to the World Health Organization (2018), recommended hospital noise levels should not exceed 30–35 dB, yet observed levels frequently range between 45–70 dB. This gap significantly impacts sleep cycles, increases stress levels, and affects communication between patients, caregivers, and families.

II. AIM

This study explores Silent Architecture as an approach that does not eliminate sound completely but instead shapes it. The aim is to reduce harsh, mechanical noise while enhancing softer, natural, and meaningful sounds. In the Indian context, where healthcare facilities are often dense and active, achieving such environments requires thoughtful planning and design sensitivity.

III. LITERATURE REVIEW

Noise and Health in Care Environments

Research indicates that excessive noise in healthcare settings leads to sleep disturbance, increased heart rate, and higher stress levels. Patients in noisy environments are more likely to experience anxiety and discomfort. Staff performance and communication are also affected, leading to reduced efficiency.

Sensory Experience in Architecture

Architecture is not experienced visually alone; it engages multiple senses, including sound, touch, and temperature. Spaces that are acoustically balanced contribute to a feeling of calm and stability. Silence, in this context, is not the absence of sound but a controlled and meaningful acoustic environment.

Healing Environments

Healing architecture emphasizes the importance of natural elements, light, and sensory comfort. Studies have shown that exposure to nature, controlled lighting, and reduced noise can significantly improve emotional well-being and reduce stress in patients.

IV. OBJECTIVES

1. To analyze the impact of environmental noise levels (30–70 dB) on patient comfort, stress, and sleep quality in hospice environments through literature and secondary data.
2. To define silence as an architectural parameter by establishing its role as a measurable and experiential design element through review of relevant scholarly sources.
3. To evaluate selected case studies- Karunashraya Hospice & Palliative care (Bengaluru), Bagchi Karunashraya (Odisha), and V Golden Age Hospice & Palliative care (Pune)- based on spatial zoning, material use, and landscape integration.
4. To identify and categorize key architectural strategies (minimum 5) that contribute to noise

reduction and acoustic comfort in hospice spaces.

5. To compare the effectiveness of different design approaches across case studies in achieving mental calm and reduced noise levels.
6. To examine the role of biophilic elements such as vegetation, water bodies, and natural ventilation in enhancing acoustic comfort.
7. To develop a set of practical design guidelines (6–8 strategies) for integrating silence and acoustic comfort into hospice design.
8. To propose the integration of acoustic considerations at the early stages of architectural design for better real-world application.

V. SCOPE

This research focuses on the role of architecture in creating acoustically comfortable and emotionally supportive hospice and palliative care environments. It examines how spatial planning, material selection, and landscape integration influence noise levels and contribute to mental calm.

The study is limited to a qualitative analysis of selected case studies- Karunashraya Hospice (Bengaluru), Bagchi Karunashraya Palliative Care Centre (Odisha), and V Golden Age Hospice (Pune)- to understand practical applications of Silent Architecture. It explores design strategies such as zoning, transitional spaces, biophilic elements, and passive techniques for noise reduction.

The research does not include detailed acoustic measurements, engineering calculations, or clinical treatment aspects. Instead, it focuses on architectural design approaches and experiential qualities related to sound and silence.

The findings aim to develop general design guidelines that can be applied to future hospice and healthcare projects, particularly within similar socio-cultural and climatic contexts.

VI. METHODOLOGY

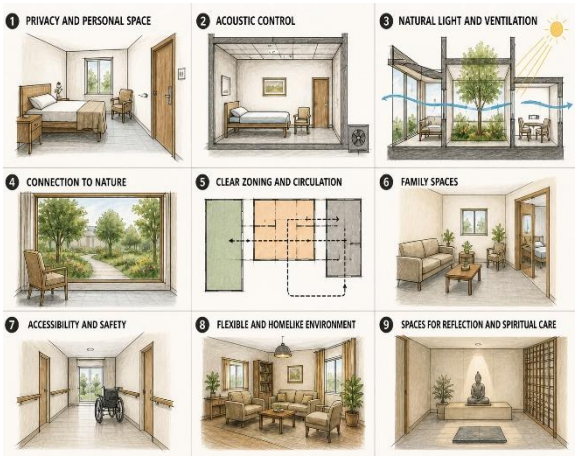
The research adopts a qualitative approach combining:

- Review of existing literature on healthcare acoustics and healing environments
- Case study analysis of selected hospice projects
- Comparative assessment of design strategies

Data has been interpreted through spatial, material, and experiential parameters rather than purely quantitative measurement.

VII. ARCHITECTURAL REQUIREMENTS IN HOSPICE AND PALLIATIVE CARE

In addition to medical and emotional care, hospice facilities must be designed to support comfort, dignity, and mental well-being through the built environment.



1. Privacy and Personal Space

Single-occupancy rooms with controlled access are essential to maintain dignity, confidentiality, and a sense of personal control.

2. Acoustic Control

Noise reduction is critical in hospice settings. Use of sound-absorbing materials, insulated walls, and minimized mechanical noise helps create a शांत and restful environment.

3. Natural Light and Ventilation

Access to daylight and fresh air improves mood and reduces stress. Large windows, courtyards, and cross-ventilation are important design strategies.

4. Connection to Nature

Views of greenery, healing gardens, and outdoor spaces promote mental calm and emotional relief for both patients and families.

5. Clear Zoning and Circulation

Separation of public, private, and service areas reduces disturbance and ensures smooth movement for staff without disrupting patients.

6. Family Spaces

Provision of waiting areas, overnight stay rooms, and quiet lounges supports family involvement while maintaining patient privacy.

7. Accessibility and Safety

Barrier-free design, handrails, non-slip flooring, and easy navigation are necessary for patients with limited mobility.

8. Flexible and Homelike Environment

Spaces should feel less clinical and more residential, using warm materials, soft colors, and adaptable layouts.

9. Spaces for Reflection and Spiritual Care

Quiet rooms, meditation spaces, or prayer areas should be included, designed to be calm, simple, and free from disturbance.

VIII. DATA COLLECTION

Table 1. Recommended vs Observed Noise Levels

Parameter	Recommended (dB)	Observed (dB)
Hospital Day	30–35	45–68
ICU Peak	35–40	70–85

(Source: WHO, 2018)

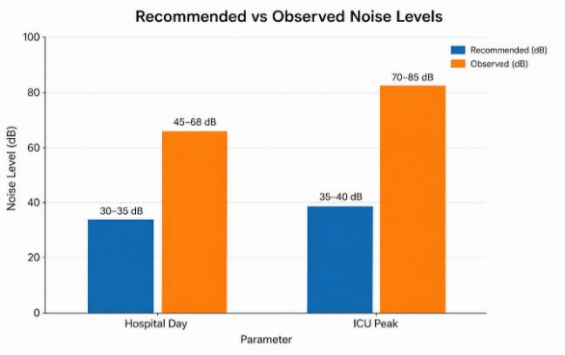


Table 2. Effects of Noise on Patients

Impact	Approx. Observed Range
Sleep disturbance	60–70%
Increased stress	50–65%
Communication issues	40–50%
Reduced comfort	45–60%

(Based on compiled healthcare studies)

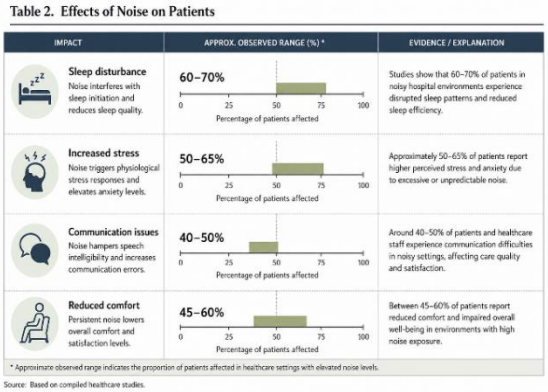
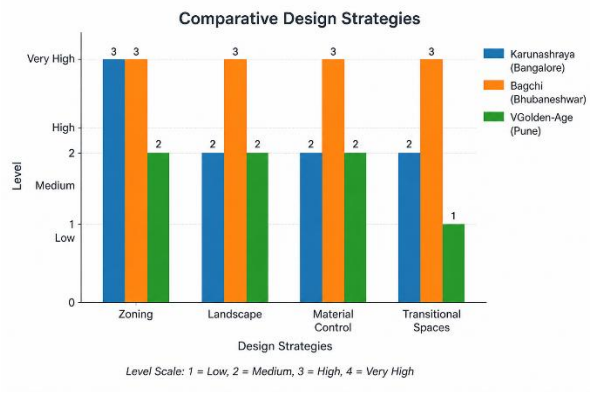


Table 3. Comparative Design Strategies

Strategy	Karunashraya (Bangalore)	Bagchi (Bhubaneshwar)	VGolden-Age (Pune)
Zoning	High	Very High	Medium
Landscape	Medium	High	Medium
Material Control	Medium	High	Medium
Transitional Spaces	Medium	High	Low



IX. DISCUSSION

The analysis indicates that acoustic comfort is not achieved through a single strategy but through a combination of spatial, material, and environmental approaches. Projects that integrate landscape and transitional spaces show significantly better performance in reducing perceived noise.

X. CASE STUDY

BAGCHI KARUNASHRAYA PALLIATIVE CARE CENTRE, ODISHA

Bagchi Karunashraya Palliative Care Centre, located in Bhubaneswar, Odisha, is a purpose-built hospice facility designed by Mindspace Architects. Completed in 2024, the project spans approximately 130,000 sq.ft. and is situated on a 20-acre site previously used as a laterite quarry.

The design strongly integrates architecture with natural terrain. Existing depressions in the site have been transformed into water-retaining ponds,

contributing to both environmental sustainability and a calming landscape experience.

The campus is organized through functional zoning, where spaces such as inpatient wards, outpatient facilities, administrative blocks, and staff housing are distributed based on privacy requirements and site conditions. At the core of the project are six L-shaped inpatient wards, each accommodating approximately 16 beds, arranged around a central water body that acts as a visual and psychological anchor.

Wide verandahs and semi-open spaces function as transitional zones, allowing gradual movement between indoor and outdoor environments. These spaces are used for counseling, family interaction, and quiet reflection. The use of laterite stone, sourced from the site itself, provides contextual identity while also contributing to thermal and acoustic performance.

Passive design strategies such as natural ventilation, evaporative cooling, and landscape integration reduce dependence on mechanical systems, thereby lowering ambient noise levels.

Key Observations:

- Strong zoning based on privacy and function
- Central water body acting as a calming focal point
- Use of verandahs as acoustic and spatial buffers
- Integration of landscape for environmental and sensory comfort
- Use of local materials enhancing acoustic and thermal performance

KARUNASHRAYA HOSPICE & PALLIATIVE CARE, BENGALURU

Karunashraya Hospice, located in Bengaluru, is a pioneering palliative care facility developed by the Bangalore Hospice Trust. It is a 73-bed inpatient hospice that provides free-of-cost care for patients with advanced-stage cancer.

The facility is widely recognized for its architectural quality and has been acknowledged in international publications such as *20th Century World Architecture – The Phaidon Atlas* as one of the well-designed hospice buildings.

The campus is characterized by a green, open, and serene environment, which plays a significant role in enhancing patient comfort. The design emphasizes a non-institutional atmosphere, aiming to create a sense of familiarity and dignity. Landscape elements such as gardens and open spaces are integrated throughout the campus, contributing to a peaceful setting.

While detailed architectural drawings and zoning strategies are not extensively documented in public sources, the facility is known for its human-centered planning approach. The environment supports not only physical care but also psychological, social, and spiritual well-being of patients and their families.

Key Observations:

- Strong emphasis on green and serene environment
- Non-institutional, home-like spatial character
- Integration of landscape contributing to calmness
- Focus on holistic care including emotional and psychological support
- Recognized architectural quality at an international level

VGOLDENAGE HOSPICE AND PALLIATIVE CARE, PUNE

VGoldenAge Hospice and Palliative Care, located in Pune, Maharashtra, is a healthcare facility providing hospice and palliative care services within a semi-urban residential context. The site has good accessibility to major transport networks and essential amenities.

The project is developed on a converted plain land with slight contour variation and covers a total site area of approximately 2565.15 m², with a built-up area of about 793.11 m². The building follows a simple, functional planning approach with clear zoning across floors. The ground floor accommodates public and administrative functions such as reception, waiting area, offices, and dining,

while upper floors consist of patient suite rooms organized along corridors.
The design incorporates balconies on both front and rear sides to facilitate natural ventilation and openness. Recreational spaces are provided on upper floors to support patient interaction and mental well-being. The building is oriented along the North–South axis, with openings designed to maximize daylight and airflow. Basic landscape elements such as gardens and vegetation are included to enhance the environment.

Key Observations:

- Functional zoning separates active and patient areas, reducing disturbance
- Balconies and openings support cross ventilation, lowering indoor noise buildup
- Recreational spaces contribute to mental calm and social interaction
- Gardens and vegetation create a relatively quieter and soothing environment
- Smaller building scale and controlled circulation reduce noise intensity

XI. CONCLUSION

The Analysis of Bagchi Karunashraya Palliative Care Centre, Karunashraya Hospice, and VGoldenAge Hospice and Palliative Care highlights the significant role of architecture in achieving acoustic comfort and mental calm in hospice environments.
Bagchi Karunashraya demonstrates how silence can be effectively designed through zoning, transitional spaces, materials, and landscape integration. Karunashraya Hospice reflects how environmental quality and a non-institutional setting contribute to a sense of stillness and emotional comfort. VGoldenAge shows that basic planning strategies can support calmness, though with limited integration of specialized acoustic design.
Overall, the study concludes that silence in hospice architecture is achieved not only through noise reduction but through a balanced integration of spatial planning, environmental elements, and user experience, supporting dignity and well-being in palliative care settings.

XII. ACKNOWLEDGEMENT

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