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# EVOLVING HOSPITAL DESIGN IN INDIA

Healthcare landscape in India is undergoing a substantial transformation with an emphasis on modern hospital design to meet the evolving needs of ecosystem

**By Kalyani Sharma**



The healthcare landscape in India is undergoing a significant shift and is in the middle of a transformative evolution. The demand for quality healthcare is on the rise which is directly related to the environments in which healthcare is delivered. And hence hospital design stands as a critical domain in shaping the overall healthcare experience. Well planned and designed infrastructure hold the power to directly enhance patient outcomes, boost staff contentment, and optimise operational efficiency.

Sharing his views on this, Debasis Kole, GM- Engineering, PSRI Hospital New Delhi said, "In India, the healthcare landscape is undergoing a remarkable transformation, re-shaping the way hospitals are designed and structured. As the demand for high-quality healthcare services continues to grow, there is an increasing focus on creating healthcare environments that are not just sterile, but also therapeutic. Hospital design now plays a pivotal role in shaping the overall healthcare experience, and it's undergoing profound changes to meet the evolving needs of the healthcare sector."

### Current state of hospital design in India

With a focus on improving patient outcomes, enhancing efficiency, and promoting sustainability, the current state of hospital design in India looks innovative and experimental in nature.

Modern hospital design principles in India prioritise a variety of factors to ensure that healthcare facilities are equipped to meet the evolving needs of patients, medical professionals, and the healthcare system as a whole.

Kole also shares, "The present state of hospital design in India reflects a departure from traditional norms. Design principles are evolving to create healthcare facilities that prioritise functionality while also providing therapeutic benefits. Hospitals are moving away



In this dynamic era of healthcare, hospital architecture plays pivotal role in shaping the entire patient journey

**Dikshu Kukreja**  
Managing Principal,  
CPKA Kukreja Architects



Healthcare in India requires a holistic approach that explores new possibilities within architecture and design with government policies and initiatives

**Alpana Gupta**  
Partner,  
Vijay Gupta Architects



Sustainability is gaining traction, with green design principles taking center stage. To further encourage this trend, the government should provide incentives such as extra FSI or electricity tariff rebates for achieving green ratings. This will promote more sustainable and equitable healthcare infrastructure in India

**Nandini Bazaz**  
Director-Architectural Services, HOSMAC



By incorporating nature, flexible spaces, privacy, healing art, technology, accessibility, family-centred care, and proper lighting and acoustics, hospitals can enhance healing, reduce stress, and empower patients

**Kuntal Vyas Aggarwal**  
Founder and Design Head,  
Resaiki interiors and architecture design studio

from the traditional centralised nursing stations and shared wards, opting for decentralised models that enhance patient privacy and reduce noise levels. Furthermore, the integration of biophilic design, emphasising natural light, soothing colours, and elements from the natural world, is gaining momentum. These changes are more than just aesthetic upgrades; they are focused on creating environments that foster healing."

On current state of hospital design, Dr Aashish Chaudhry, Managing Director, Aakash Healthcare said, "Hospital design in India is undergoing a significant change with a blend of innovative design principles and advanced technologies. Patient centricity is one of the key aspects shaping the contemporary hospital design. The concept is focused on creating spaces that prioritise patient comfort, privacy and emotional well-being. Hospitals are increasingly concentrating on incorporating natural lighting, soothing aesthetics, working to reducing the risk of cross infection and facilitating a nurturing atmosphere for optimal outcomes. Flexibility and adaptability are another key consideration in hospital design that involves adapting hospital infrastructure as per changing healthcare needs. Multi use spaces and modular design usage is gaining momentum, ensuring adaptability to evolving requirements."

Dikshu Kukreja, Managing Principal, CPKA Kukreja Architects believes that in this dynamic era of healthcare, hospital architecture plays pivotal role in shaping the entire patient journey. It goes beyond bricks and mortar; it's about creating environments that facilitate healing, enhance operational efficiency, and ultimately, elevate the overall patient experience.

### Concept of patient-centric hospital design

Patient-centricity is the most prominent trend in modern design, prioritising patient

comfort and well-being.

Hospitals are increasingly designed with a focus on enhancing the patient experience. This includes considerations for patient privacy, comfort, and convenience. Single-patient rooms, soothing aesthetics, and well-designed waiting areas are becoming more prevalent.

“In today’s era of healthcare, the paradigm of hospital design has undergone a remarkable transformation, placing patients at the very heart of the architectural narrative. Gone are the days of stark, clinical spaces; instead, we find a renaissance in the way hospitals are conceived-as sanctuaries of healing. Patient-centricity takes centre stage, with layouts meticulously crafted to prioritise not only medical needs but also the comfort and well-being of those under care. Within these thoughtfully designed spaces, one finds a symphony of elements working in harmony - from soothing aesthetics to an abundance of natural light, each element weaves into the fabric of hospital architecture”, added Kukreja

Nandini Bazaz, Director-Architectural Services, HOSMAC opines that a patient-centric hospital design is all about making patients feel safe, comfortable, and at ease. It helps improve their healing and emotional well-being.

She shares, “Considering the vulnerability of people within its premises, healthcare structures require a lot more caution while designing. Nosocomial infections, also known as Hospital-Acquired Infections, are a significant concern in healthcare facilities worldwide. Even simple changes like elbow-operated taps, waiting areas with proper air circulation, safe exit routes and designing the space in such a way so as to avoid overcrowding, can help to provide a safer space. Indoor air quality also plays a very important role in the overall healing journey of patients. Airborne illnesses may spread quickly putting patients and healthcare



Hospitals form a crucial part of the public health and social welfare system, and the increasing emphasis on sustainable and eco-friendly hospital design is much needed – for our environment and our communities. A comprehensive understanding of sustainability can pave the way forward

**Sarika Shetty**

Partner,  
SJK Architects



By integrating digital health solutions seamlessly into architectural design, hospitals can achieve energy efficiency, reduce their carbon footprint, and provide patients with a healing environment that enhances their overall experience

**Ravideep Singh**

Associate Director,  
Creative Designer Architects



Hospital design now plays a pivotal role in shaping the overall healthcare experience, and it's undergoing profound changes to meet the evolving needs of the healthcare sector

**Debasis Kole**

GM- Engineering,  
PSRI Hospital New Delhi

professionals in danger. And hence comes the idea of making Airborne Infection Isolation (A.I.I) rooms that are kept at negative pressure compared to the surrounding space, preventing the dissemination of potentially infectious airborne particles within the hospital.”

“Furthermore, Neuroaesthetics, which links beauty and brain processing, shows that

hospital design affects emotions and health. Indian hospitals are adopting this approach. Nature elements like adding greens or ensuing natural light, can help reduce stress and uplift moods”, she added.

Giving her views on patient-centric approach to hospital design, Kuntal Vyas Aggarwal, Founder and Design Head, Resaiki interiors and architecture

design studio said, “Healthcare facilities have long been places associated with illness, stress, and anxiety. However, recent developments in hospital design are changing that perception. A patient-centric approach to hospital design improves the physical environment and fosters a sense of comfort, empowerment, and support for patients.”

“Patient-centric hospital design represents a significant shift in healthcare architecture, focusing on improving patient recovery, experience, and overall well-being. By incorporating nature, flexible spaces, privacy, healing art, technology, accessibility, family-centred care, and proper lighting and acoustics, hospitals can enhance healing, reduce stress, and empower patients. In an era where patient outcomes and experiences are paramount, patient-centric hospital design is a critical step towards improving the quality of healthcare”, she added.

**Increasing emphasis on sustainable and eco-friendly hospital design**

Apart from patient-centricity, modern Indian hospitals are more environmental conscious now and there is an increase as far as embracing sustainability is concerned. There is greater incorporation of eco-friendly practices and materials into designs, reducing the ecological footprint of these healthcare facilities.

Talking about increasing emphasis on sustainable and eco-friendly hospital design, Sarika Shetty, Partner, SJK Architects shares, “Hospitals form a crucial part of the public health and social welfare system, and the increasing emphasis on sustainable and eco-friendly hospital design is much needed – for our environment and our communities. A comprehensive understanding of sustainability can pave the way forward.”

Shetty mentions about some of the ways in which hospitals can be designed sustainably like optimising natural light and ventilation, designing the building envelope for thermal comfort, incorporating nature into the design, reducing operational and embodied energy and designing for environmental, economic, and social sustainability.

To further encourage the green design principles, Bazaz suggests, “Notably, sustainability is gaining traction, with

green design principles taking center stage. To further encourage this trend, the government should provide incentives such as extra FSI or electricity tariff rebates for achieving green ratings. This will promote more sustainable and equitable healthcare infrastructure in India.”

The energy requirement of Indian hospitals is diverse since they are marked by distinct heterogeneity. In terms of ownership, there are public or government hospitals, municipal hospitals, railway hospitals, defence hospitals, private hospitals, etc. In terms of size, healthcare facilities range from small clinics to large multi-specialty hospitals with varying air-conditioned areas, medical services, comfort levels, patient privacy, etc. An accurate characterisation of the energy used in different types of hospitals across geographies is a prerequisite for mainstreaming energy efficiency and renewable energy in them. This requires reliable energy consumption and other granular data to help envision a roadmap for low-carbon interventions. The National Centre for Disease Control (NCDC), Alliance for an Energy Efficient Economy (AEEE), and Centre for Chronic Disease Control (CCDC) released the results of a recently concluded National Hospital Energy Consumption Survey on 24 August 2023, which plugs this data gap.

Talking about this survey, Akash Goenka, Associate Fellow, AEEE and Dr Poornima Prabhakaran, Senior Research Scientist, CCDC shares, “Unprecedented in scale and depth, this survey covered more than 600 public and private hospitals of 10 typologies across 18 states/UTs and all climate zones of India. The survey results have presented the first-ever baseline of the energy used by hospitals in India based on primary data, estimated their carbon footprint, and helped identify several areas of energy efficiency and renewable energy interventions. For example,



Hospitals are increasingly concentrating on incorporating natural lighting, soothing aesthetics, working to reducing the risk of cross infection and facilitating a nurturing atmosphere for optimal outcomes

**Dr Aashish Chaudhry**  
Managing Director,  
Akash Healthcare



Hospitals and healthcare institutions have undergone a profound transformation, shifting from a traditional approach to one that prioritises the patient. These institutions are now incorporating technology at every level of their infrastructure, addressing India's specific challenges related to healthcare accessibility, affordability, and quality

**Dr Manisha Karmarkar**  
CEO, DPU Private Super Specialty Hospital, Pune

there is scope to increase the uptake of solar refrigerators in small public hospitals in rural and semi-urban areas where the grid connectivity is unreliable.”

“Similarly, there is considerable potential for adopting solar thermal or electric hybrid water heating systems. The survey found that 30 per cent of public and 50 per cent of private hospitals had a high penetration of energy-efficient LED lighting. The remaining ones can still benefit from relatively simple and inexpensive lighting retrofits. The survey also provided insights on existing onsite solar PV systems at different levels of the public healthcare system and how they are maintained, indicating that deploying and maintaining solar PV at hospitals need novel governance and financing mechanisms”, they added.

### Advanced technologies in hospital design

Technology has been playing an important role in healthcare, acting as a catalyst for transformative change. This is also evident in the design and construction of modern hospitals in India. The integration of advanced technologies has become paramount in ensuring that healthcare facilities are equipped to meet the evolving needs of patients, medical professionals, and the healthcare system as a whole.

Ravideep Singh, Associate Director, Creative Designer Architects shares that digital health and technology also offer promising solutions for creating climate-friendly hospital designs prioritising human health and environmental sustainability. By integrating digital health solutions seamlessly into architectural design, hospitals can achieve energy

efficiency, reduce their carbon footprint, and provide patients with a healing environment that enhances their overall experience.

Dr Manisha Karmarkar, CEO, DPU Private Super Specialty Hospital, Pune also said, “The merging of healthcare and technology has created a multitude of opportunities, unlocking new possibilities that were once challenging. Consequently, hospitals and healthcare institutions have undergone a profound transformation, shifting from a traditional approach to one that prioritises the patient. These institutions are now incorporating technology at every level of their infrastructure, addressing India's specific challenges related to healthcare accessibility, affordability, and quality. Although still in its early stages, the adoption of this technological shift is

happening rapidly. Given the immense scope and influence of the healthcare industry, the potential for impact is substantial.”

This visionary fusion of technology with architectural blueprints transcends the realm of mere functionality. Kukreja mentions, “It is a holistic approach that not only amplifies the efficacy of medical services but also cultivates an environment of perpetual innovation and adaptability. The hospital of tomorrow is not merely a physical structure; it is a dynamic ecosystem where the convergence of technology and design sets the stage for a new era of healthcare excellence.”

The pandemic accelerated the adoption of telemedicine in India, making it a fundamental component of hospital design. Hospitals are now integrating telehealth facilities seamlessly, enabling remote consultations and monitoring. The Internet of Things (IoT) plays a pivotal role in this integration, connecting medical devices, patient records, and healthcare professionals to create a seamless and data-driven care environment.

Kole highlights that the IoT enables continuous monitoring of equipment and patient health, leading to more efficient resource management and improved patient safety. Additionally, telemedicine is revolutionising the concept of hospital space, as consultations are increasingly conducted remotely, reducing the need for expansive waiting areas and administrative sections. Electronic Health Records (EHRs) are also contributing to the transformation by necessitating the development of secure and accessible data centres within hospitals, influencing the physical layout and infrastructure of healthcare facilities.

Artificial Intelligence (AI) and Virtual Reality (VR) are also some of the most prominent trends in hospital design.

Explaining the role of AI, Singh said, “In an age dominated by the relentless

progression of technology, AI stands at the forefront of transformative change, disrupting industries across the spectrum. In healthcare design, AI proves to be a transformative force for the better when used as a tool. The architecture and design industry, including healthcare design, can benefit immensely from streamlining AI and other advanced technologies.”

“AI-driven predictive maintenance leverages data from various sensors, such as occupancy and daylight sensors, integrated with a centralised Building Management System (BMS). This integration enhances energy efficiency and prolongs the lifespan of critical healthcare infrastructure. AI algorithms process vast datasets, providing architects with critical insights into patient needs and preferences. This intelligence empowers architects to craft spaces that transcend functionality and embrace therapeutic attributes, optimising natural light and privacy. Predictive maintenance improves energy efficiency, reduces costs, and prevents unexpected breakdowns, a critical factor in healthcare where downtime can be life-threatening. AI’s influence extends into the foundations of the hospitals, mitigating potential pitfalls and errors, resulting in more efficient and cost-effective construction.”

Advanced technologies are

reshaping hospital design in India, offering patients more comfortable and efficient care environments and providing medical professionals with tools to enhance patient outcomes. As the healthcare sector continues to evolve, the integration of cutting-edge technologies is crucial to meeting the ever-changing needs of the Indian population. The future of healthcare design in India is an exciting journey into innovation and progress.

### The future of hospital design

Bazaz shares some interesting future projections for hospital architecture. She said, “Smaller nursing homes might become extinct as larger, comprehensive hospitals gain prominence. Statutory compliance requirements and the pursuit of economies of scale will drive this transition toward hospitals offering “all under one roof” capabilities.”

“Informed and discerning consumers will demand higher standards of hygiene and aesthetics in healthcare facilities. Hospitals will need to invest in designs that not only ensure clinical excellence but also create a comfortable and visually pleasing environment for patients”, she added.

According to Singh, the future of hospital design can be elevated by using advanced technologies, including AI, IoT,

telemedicine, and EHRs, focusing on efficiency, patient-centricity, and sustainability. Architects, healthcare professionals, and technology experts must work together to create healthcare environments that promote healing and reduce the carbon footprint, ensuring a greener and more patient-friendly future.

### Challenges and roadblocks in evolving hospital design in India

The healthcare sector in India is currently undergoing a substantial transformation, placing a strong focus on contemporary hospital design to cater to the changing demands of its population. However, the path to creating cutting-edge healthcare facilities is riddled with challenges and roadblocks that require careful consideration and strategic solutions.

Experts scrutinise the challenges that architects, healthcare professionals, and policymakers must overcome to secure a more promising future for healthcare infrastructure.

Alpana Gupta, Partner, Vijay Gupta Architects believes that healthcare in India requires a holistic approach that explores new possibilities within architecture and design with government policies and initiatives. She mentions, “The shift towards private clinics expanding into hospitals, particularly through refurbishment as

brownfield projects, presents an opportunity to efficiently utilise existing resources and infrastructure to bridge the urban-rural healthcare gap. A noteworthy roadblock in evolving hospital design is the concept of integrated campuses. We must consider having essential facilities like oxygen plants, medical waste disposal units and other critical components on the hospital campus. The COVID-19 pandemic underscored the importance of preparedness and self-sufficiency within healthcare facilities. Another pressing challenge is the limited availability of funds for greenfield projects, which significantly hampers the development of healthcare infrastructure.”

“To revamp healthcare infrastructure comprehensively, architects and planners must take an active role. Hospital design can significantly impact the efficiency and effectiveness of the healthcare system. Improved natural lighting, indoor air quality and a connection with nature in hospital spaces contribute to patient well-being. The well-being of patients is not just a physical concern; it also extends to mental and social well-being”, she added.

Singh said, “Architects and healthcare planners may face several challenges when designing climate-friendly and technologically advanced facilities. Limited awareness among

healthcare providers regarding digital health solutions could lead to slow adoption. The scarcity of trained personnel to operate and maintain advanced technologies could hinder their effective implementation. More data and evidence-based design studies may help architects substantiate design decisions and demonstrate potential return on investments linked to patient experience and sustainability.”

Dr Chaudhry considers cost constraints as a significant roadblock, especially for resource-strapped healthcare providers, making it difficult for them to adopt the latest design trends. He added, “the regulatory and bureaucratic processes can slow down the implementation of innovative designs. There is also a shortage of skilled architects and healthcare planners with expertise in hospital design. Striking a balance between integrating advanced technologies and accommodating the diverse healthcare landscape of India can be a challenging feat.”

The challenges in evolving hospital design in India are complex. But careful planning, collaboration and innovative solutions can help India in building healthcare infrastructure that is affordable, accessible and flexible for the entire ecosystem.

*Kalyani.sharma@expressindia.com  
journokalyani@gmail.com*

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