

Biophilic Design in Healthcare Centre

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Abstract

The human affinity towards nature is innately genetic and has a strong correlation with human well-being. This innate affiliation towards nature has been coined as “biophilia”, which focuses on the growing need for human interaction with nature, nature-like elements, and the natural environment in and around the built form for improving human well-being. Biophilic design can also provide physical opportunities offered through its design considerations in the realization of the sustainable built form and environment. Biophilic design is crucial in creating a connection between nature and the built environment as the globe continues to become more urbanized. Biophilic design can relieve stress, encourage human creativity, and make people feel more at ease. It improves well-being and speeds up healing. The advantages of biophilic design have been proven in several contexts, including bettering the working environment, promoting learning in children, and enhancing health. This paper attempts to explore and comprehend the implications of biophilia and biophilic components in healthcare facility design to improve the quality of the environment as well as the health and well-being of the users, and how advantages can be obtained in terms of users' experiences as well as the improvement in the quality of the built environment.

Keywords: Biophilia, biophilic design, hospitals, built environment, natural landscapes

INTRODUCTION

Biophilia is the belief that humans have an intrinsic need to be attracted to nature. Introduced by Erich Fromm in 1964, biophilia suggests that humans are predisposed to be interested in all living things, including nature according to Wilson's book [1].

Recent scientific studies have shown that humans have an innate ability to connect with nature, which is evident by how the construction and design sector incorporates it into their projects or is integrated into the built environment (Figure 1). This opens up possibilities for better living and working environments with a focus on reconnecting with nature.

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Figure 1. Bringing nature from outside to inside.

The medical facilities must integrate therapeutic medicine into a more serene setting to create a setting where the offer of a longer stay is as hospitable to patients, the general public, and the medical personnel. The next stage in healthcare design may involve implementing biophilia in settings like healthcare facilities to influence people's health and well-being through their unconscious or subconscious reactions to these efforts. A thorough investigation is needed to determine the implications of biophilia in the design of better healthcare facilities. When biophilia is incorporated into healthcare environments, it can help to promote the well-being of patients and staff.

BIOPHILIA AND THE HUMAN WELL-BEING

Nature is an important part of human life, and the way we design our buildings reflects this. Studies have shown that humans are deeply affected by the natural environment, both physically and emotionally. Building designs that are in contact with nature can have positive effects on performance and well-being, while buildings that are disconnected from nature can have negative consequences (Figure 2). The modern built environment has become "natural" territory for most people, but this has serious implications for their health and well-being. Reasons include a lack of contact with nature [2], such as critical environmental features that helped humans evolve and dominate in a sense.



Figure 2. Relationship between biophilia and human well-being.

In addition to the benefits of natural light and views of nature on patients' comfort and healing, stress reduction increased sociability, and improved measures of physiological stability and health. Research on the relationship between nature and health over the past several decades has shown that biophilic engagement has a significant impact on the body, mind, behaviour, and social interaction.

BIOPHILIC PATTERNS

Biophilic patterns are not laws, they are meant to guide, support, and inform the design process. They serve the function of articulating links between elements of the built and natural surroundings and how people respond to them and should be viewed as an additional tool in a designer's toolset [3]. It explains how nature, human biology, and built environment design are related so that we can experience the advantages of biophilia in our design practices.

Nature in Space

Representing the proximity of nature in space or place, such as vegetation, water, and, fragrances, nature inside space is an immediate reminder.

Visual Connection with Nature

Images of indoor and outdoor nature, ecosystems, and changes are available on the site (Figure 3).

Non-Visual Connection with Nature

We can influence user behaviour by offering natural sensory experiences that are auditory, olfactory, tactile, and gustatory (Figure 4). Both natural and artificial environments offer a shifting variety of these stimuli to prompt an intended response from the person.



Figure 3. Space visually connected with nature.



Figure 4. Fountains act as a non-visual connection with nature.

Dynamic and Diffused Light

Creating an environment that closely resembles nature can be done by using a variety of lights and shadows (Figure 5). Doing this makes it easier for the user to become absorbed in the site. Various lights and shadows can help create a sense of life, whether it is natural or artificial.



Figure 5. Diffusion of natural light.

Connection with Natural Systems

Keeping a garden provides an environment where healthy changes in nature can be felt, such as seasonal variations (Figure 6). Gardening is a great way to enjoy nature's beauty, and it is also great for getting exercise. Many different types of gardens can be created, and there's always room for a new project.



Figure 6. Natural system like gardens incorporated in a space.

Presenting Nature

The instances of nature's inspiration that are frequently highlighted are non-living, inerrant, natural things like furniture, artifacts, and other non-living elements.

Biomorphic Forms and Patterns

Representing natural phenomena with symbolic form, patterns, materials, and ratios is an age-old tradition (Figure 7). Humans can create art, symbolism, and even scientific theories by observing the repeated patterns found throughout nature. By noting repeated patterns in nature, humans can craft beautiful art, encode complex messages, and develop ground-breaking scientific theories.



Figure 7. Symbolic or biomorphic forms of nature in a built form.

Material Connection with Nature

By minimizing processing, incorporating ecological features of the region, and presenting necessary information practically, connection with nature is made easy (Figure 8).



Figure 8. Natural material used in the space.

Complexity and Order

Focusing on the hierarchy of natural elements provides an environment that receives various sensory information from the natural world (Figure 9).



Figure 9. Complexity and order.

Spatial Characteristics

It frequently takes the form of natural spatial designs, such as sensitivity to ambiguity or danger, gloomy vistas, and beautiful moments.

Prospect

Supplying a clear space for observation, viewing, and environmental monitoring (Figure 10).

Refuge

Offering a place where people may feel safe and sheltered from environmental change (Figure 10).

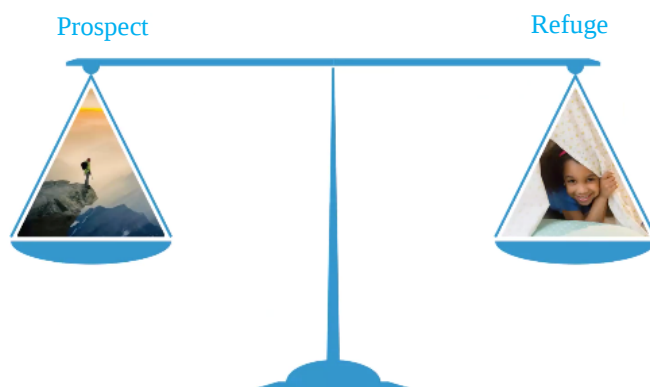


Figure 10. Prospect and refuge pattern of biophilia.

HUMAN BIOLOGICAL RESPONSE

Biological patterns affect human well-being in various ways. The table shows that the reduction of stress, cognitive abilities, sensitivity, environment, and preference are all benefits for the patients and hospital staff (Table 1).

Table 1. Human biological responses concerning biophilic pattern.

<i>Biophilic Design Pattern</i>	Biological response		
	<i>Stress Relief</i>	<i>Cognitive Skills</i>	<i>Sensitivity, Atmosphere, and Preference</i>
Visual Connection with nature	Lowering blood pressure and decreasing heart rate	Increasing work engagement and concentration	Positive effect on spatial preference
Non-Visual Connection with nature	Lowering systolic blood pressure and relieving stress	Positive effect on cognitive skills	Promoting mental health and psychological composure
Dynamic and Diffuse light	Increasing comfort, happiness, and productivity	Positive effect on increased concentration	Improving spatial preference and perception
Connection with Natural Systems	Relieving stress	-	Changing the perception about environment and promoting health
Biomorphic Forms and Patterns	-	-	Increasing preference for view
Material Connection with Nature	-	Lowering diastolic pressure	Promoting relaxed feeling
Complexity and Order	Relieving psychological stress	-	Increasing preference for view
Prospect	Relieving stress	Reducing boredom and fatigue	Improving ability to perceive comfort and safety
Refuge	-	Improving concentration and ability to perceive safety	Improving ability to perceive stability and safety

BIOPHILIA AS A DESIGN TOOL AND ITS IMPLICATION

The realization of biophilic design elements is required when considering the biophilic approach. These aspects can be seen at many levels of the built environment, from the macro level of integrating green networks into urban planning systems to the micro level of giving natural light to interior spaces for human comfort. It is essential to experience nature on a variety of scales to sustain a sense of connection with the environment in an urban setting. The addition of biophilia traits to design tools or elements to deliberately alter behaviour necessitates the strategic manipulation of "inbuilt memory" and human perception to drive performance in the built environment [4].

The following is a summary of several biophilic efforts and design considerations for enhancing the quality of the environment and space in healthcare facilities.

Views and Windows

Large windows with views of the outdoors should be present in places designated for sitting, especially in stressful locations like staff rooms, waiting areas, and emergency rooms (Figure 11). The benefits of these perspectives of nature in reducing stress and promoting healing should be carefully considered. To reduce stress, avoid looking at views of hardscapes, parking lots, and busy roadways. To provide depressed patients with plenty of natural light, healthcare buildings should be angled to receive as much sun as possible. However, windows should be supplied to avoid glare patches.

Plan and Layouts

Healthcare facilities should also avoid having deep plans because the absence of sunshine would impair the patient's condition and lower staff morale, creating an unpleasant and dismal atmosphere in the room (Figure 12).



Figure 11. Large windows with views of nature.



Figure 12. Open and green plans.

Gardens

Gardens should be available for workers, family members, and patients in healthcare facilities. These gardens would have natural elements (such as vegetation and water), moveable seats for interaction, private spaces, clear wayfinding, and chances for exercise or physical activity with easy access to shady areas (Figure 13). In contrast, if the garden is intended for children [5], a separate section with play features and a tranquil retreat for the adults should be given. Adults and office employees should be able to rest and engage in sedentary activities if the garden is intended for them. Larger healthcare centres should consider introducing decentralized gardens.



Figure 13. Gardens in healthcare facility.

Art and Technology

Technology and visual art can both be used to integrate biophilia. It is possible to integrate nature into high-stress areas and in buildings where it could be challenging to provide vistas or gardens using paintings, photographs, prints, television screens, eyeglass displays, etc., but it may not be confined to visual context (Figure 14). In places like rooms for therapies, imaging, and other operations, providing natural simulations like the sound of trees rustling, water falling, and birds tweeting can be an option.



Figure 14. Art representing biophilia in a space.

BIOPHILIA IN HEALTHCARE CENTRES

The hospitals' size and complexity prevent them from having access to green places, which causes them to function as an island that is surrounded by urban areas. Patients need to connect to nature as a result of their increased sense of confinement, isolation, and deprivation from the outside world [6–11]. Access to green spaces has therapeutic benefits, speeding up recovery and improving the patient experience.

Biophilic Design Impact on Hospital Staff

When they have little access to views of nature or contact with the outdoors, nurses and hospital personnel experience the effects of anxiety, depression, and poorer job satisfaction. Staff members perform better and recover from stress more quickly when they are in direct contact with nature.

Biophilic Design Impact on Hospital Visitors

While nature acts as a beneficial diversion that makes individuals feel less apprehensive, calmer, refreshed, cheerful, and more suited to face the situation, the benefits of nature in hospital settings should also extend to family members and visitors.

Biophilic Design Impact on Patients

The biophilic design promotes human mental, emotional, and physical wellness when used in the built environment. Seeing pictures of mountains, trees, and other natural landscapes has the same positive effects on the mind as actually being outside in a natural setting. Going outside enhances your mood and is good for your physical health because it reduces stress hormone production, blood pressure, heart rate, and muscle tension. It could even reduce mortality.

CASE STUDY

Khoo Teck Puat Hospital

The Khoo Teck Puat Hospital in Singapore is a well-known illustration of a hospital with the highest levels of biophilia. A replacement hospital with 550 beds, Khoo Teck Puat Hospital is set on 3.5 hectares (Figure 15). The layout focuses on patient care while recreating the elegance and naturalistic ambiance of the pre-war hospital [12–15]. It also increases staff efficiency. The energy-efficient design allows for natural ventilation in 40% of the floor space, resulting in a 50% reduction in energy costs. According to the experts, no institution of this size has form, space, and landscape components that are so obviously

linked to the objective of promoting human well-being, which is the exact definition of biophilic design. The idea of creating a therapeutic environment, which is connected to the establishment of plant and architectural integration, has been the main focus of this hospital project from the outset.



Figure 15. Khoo Teck Puat Hospital, Singapore.

The local ecosystem's biodiversity has increased as a result of the combination of plants and architecture, attracting new species of birds and butterflies. Residents also use the hospital's rooftop to grow their food. Unlike many other hospitals, 15% of visitors to Khoo Teck Puat come for leisure activities like gardening or relaxation (Figure 16). The goal of this hospital's design was to improve patient recovery times and pain tolerance while also boosting doctor productivity and visitor well-being.



Figure 16. Area for gardening provides hospital staff and patients with refreshment.

To achieve this, the designers included flora throughout the hospital, from the courtyard to the top floors, where the balconies of the patients are adorned with fragrant plants (Figure 18). Similar to Frank Lloyd Wright's Falling Water, the hospital was designed around the Yishun Pond (Figure 17). The architects incorporated a natural feature into the hospital's courtyard to give the impression that the water was collected from the pond.

By arranging common spaces and corridors in the direction of the north and southeast prevailing winds, the hospital also makes use of natural ventilation as much as feasible; this has decreased energy usage by 60% and boosted airflow by 20% to 30%. This provides comfortable thermal settings for both patients and medical personnel [16]. The majority of the strategies employed by Khoo Teck Puat are obvious from the aforementioned techniques. The hospital's general architectural design has structured complexity throughout and makes use of transitional space to help residents feel more connected to nature. As a gathering place for those who work there and live nearby, Khoo Teck Puat has developed

a sense of place for its residents and neighbours. The hospital adheres to five biophilic principles as part of its overall biophilic initiative.

- *Sight* – Access to water and vegetation visually
- *Smell* – A variety of fragrant plants
- *Sound* – The sound of water falling.
- *Diversity* – Diverse vegetation, birds, and butterflies make up diversity.
- *Community* – Areas that are blue and green and contain public places.



Figure 17. Pond ecosystem provided in the passage.



Figure 18. Green courtyard can be seen from the hospital premises above the floors.

Ostra Psychiatric Facility

The case study of Ostra Hospital, a mental health facility in the Swedish city of Goteborg (Figure 19), is used as an illustration to explore the strategies used to create a biophilic experience during department, indoor and outdoor access to nature [17], and different community environments by taking into account the wide range of needs of users, particularly patients, and staff, to provide an environment for all occupants.

The Centre satisfies a mental facility's safety and security requirements while fostering therapeutic environments and encouraging communication with nature. Despite these difficulties, the architects managed to incorporate outdoor space access with the necessary safety measures. It is an example of how complexity and order can be induced by sensory information that drives a hierarchy approximating that seen in nature as the division of hospital space on a departmental scale [18]. Designers needed to plan each department's layout so that patients could navigate it easily and feel in control of their surroundings. All the rooms, in single or double units, have access to natural sunshine (Figure 20) and are arranged spatially within the bigger departments. A semi-private circulation area and sunroom are

also accessible from each group of patient rooms. The department moves inside to the light courtyard's (Figure 21) semi-public common areas from this exterior hallway.

The Ostra facility's design strategy is built on methods for giving all of its user access to outdoor areas and access to natural views from inside. As a result, three central courtyards are chosen as the location to offer both direct and indirect access to the patient rooms in addition to the aforementioned function which accommodates natural light (Figure 22). Patients and other building inhabitants are stimulated by [19] the thoughtful design elements that provide a visual connection to the outdoors to engage in physical exercise, which can help them feel more independent and in control while also reaping the advantages of being in nature.



Figure 19. Ostra psychiatric facility.



Figure 20. Patient's rooms in hospital.



Figure 21. Courtyard in the hospital.



Figure 22. Green passage in the hospital premises.

Another noteworthy aspect of this facility is the dynamic and diffuse light element, which encourages varying levels of light intensity and shadow as well as changes throughout the day to mimic natural conditions. The designer of this centre took into account the advantages of natural light and well-diffused lights on the body's circadian rhythm and mood (Figure 23). Each room has a movable window wall and a solarium that allows patients to individually control the amount of inside lighting to suit their preferences. Additionally, the light from the central courtyards (Figure 24) in each department gently shines on the inner space where there are fewer windows and in other locations like the eating area and hallways.



Figure 23. Refuge pattern of biophilia in the courtyard.



Figure 24. Semi-opened courtyard.



Figure 25. The entrance of the Symbiosis Hospital.

Symbiosis University Hospital and Research Centre

Symbiosis University Hospital and Research Centre (SUHRC) is a stunning example of biophilic architecture in the picturesque Sahyadri mountain range at Lavale near Pune, Maharashtra (Figure 25).

The 216-bed, multi-specialty SUHRC is housed within Symbiosis International University's 40-acre campus. SUHRC is the ideal illustration of a biophilic architectural design that melds with modernism, created by Mumbai-based IMK Architects. The general hospital block, the procedural block, and the multi-specialty block are the three sections at SUHRC that are concerned with the hospital and patient care. The Skill Centre is the fourth section.

There is a separate entrance for the wounded or casualties at the main hospital as well. Currently, the government uses a portion of the hospital as a COVID-19 care facility. To prevent cross-infection, the hospital's design features two large courtyards that are manicured with trees and flowering bushes. The courtyards, which are seen from the wards and the outpatient department (OPD), are intended to let in natural light and ventilation and promote healing (Figures 26 and 27). The parking lot, shops, mortuary, medical gases, workshop, engineering offices, garbage disposal, etc. [20] are all located in the basement and lower ground levels, which are meant to have natural ventilation and daylight. OPD, casualty, radiology, and Misericordia Health Centre (MHC) are positioned on the ground floor because they see a lot of patients. The general, twin, and single-bed wards are located on the first level, most of which have a view of the garden.



Figure 26. Garden for patients.



Figure 27. Courtyard in the center of the hospital.

The second level is where the hospital's intensive care units (ICUs), operation theatres (OTs), and post-operative, and pre-operative sections are located, making that floor a sterile zone. The entire fourth and fifth floors of the building are taken up by a Skill Centre, which has a separate entrance on the ground floor. It is supported by steel pipes that resemble stainless steel surgical equipment, and at the entry, a huge silver-steel bird (made of steel with an aluminium skin) welcomes guests with its wings open. To promote healing and rejuvenation in both patients and medical personnel, the SUHRC's design integrates ideas from biophilia, and the innate human propensity to seek connections with nature and other forms of life. There is enough natural light and a view of the outside in two large courtyards, which also serve as buffer zones to stop cross-infection [21]. Crucial regions such as ICUs are endowed with gentle and calming hues to alleviate tension; whereas the OPD has no air conditioning but allows for fresh, natural air – so minimizing the air conditioning load and power consumption for these areas.

By paying attention to details like the brick art and the exposed concrete, the structure strives to make gestures that are big yet local and sensitive. The project serves as an example of sustainable development and passive architecture (Figures 28 and 29). On-site production of naturally crushed, sundried earthen bricks (CSEBs) is used to construct a double-skinned facade with boxed forms and substantial shade projections to lessen heat input (Figure 30). By allowing the building to breathe, CSEB's inherent porosity and use in components like cavity walls and jails let the structure adapt to the local climate. This lowers interior heat gain and increases thermal comfort while using less energy. A block-making machine was used to create the bricks on-site, which increased local employment prospects and reduced carbon emissions. This is the first project of this size where CSEB has been utilized. While spent water is recycled and reused for other purposes, like air conditioning and gardening, water-cooled heat pumps connected to air conditioning chillers are used to heat water, saving close to 65% of energy.

ANALYSIS

The research paper sheds light on investigating and recognizing the implications of biophilia and biophilic components in healthcare facility design to improve the environment's quality as well as the users' health and well-being, and how advantages can be reached in terms of both user experiences and built environment improvement. Eight sections make up the paper's structure. The first is the introduction which summarizes the concept of biophilia, followed by a brief of the fundamentals of the concept of biophilia and how it affects people's well-being [22]. The second category is the biophilic patterns, which are intended to support, enlighten, and guide the design process. They aim to draw links between various elements of the built and natural environment and how people interact with them. It is then followed by human biological reactions, which discuss biophilic patterns and how they impact human well-being. The next area of study focuses on applying biophilia as a design tool and improving the quality of the setting and space in healthcare facilities and hospitals.

The implementation of biophilic design in the healthcare facility and how the design would affect hospital staff, visitors, and patients is discussed in the following section of the research paper. The case studies of various hospitals and healthcare facilities, including Khoo Teck Puat Hospital, Ostra Psychiatric Facility, and Symbiosis University Hospital and Research Centre, are then presented. These facilities have incorporated the biophilia concept into their designs and discuss how the design is helping the hospital's environment and benefits the staff and patients. To achieve the objectives of sustainability and quality of the built environment, it is crucial to incorporate biophilia. The final section also discusses the potential for further research in this area.

FINDINGS

Key findings that come from the overview of the research paper are

- *The concept of biophilia and biophilic design:* In which it is described as a design strategy that aims to bring building occupants closer to nature. The productivity and health of occupants are increased by incorporating natural lighting, ventilation, landscaping, and other elements into buildings with biophilic designs. It has been discovered that biophilic design promotes mental health, physical health, and psychological well-being. It promotes worker well-being and productivity as well as the interaction of humans with nature.

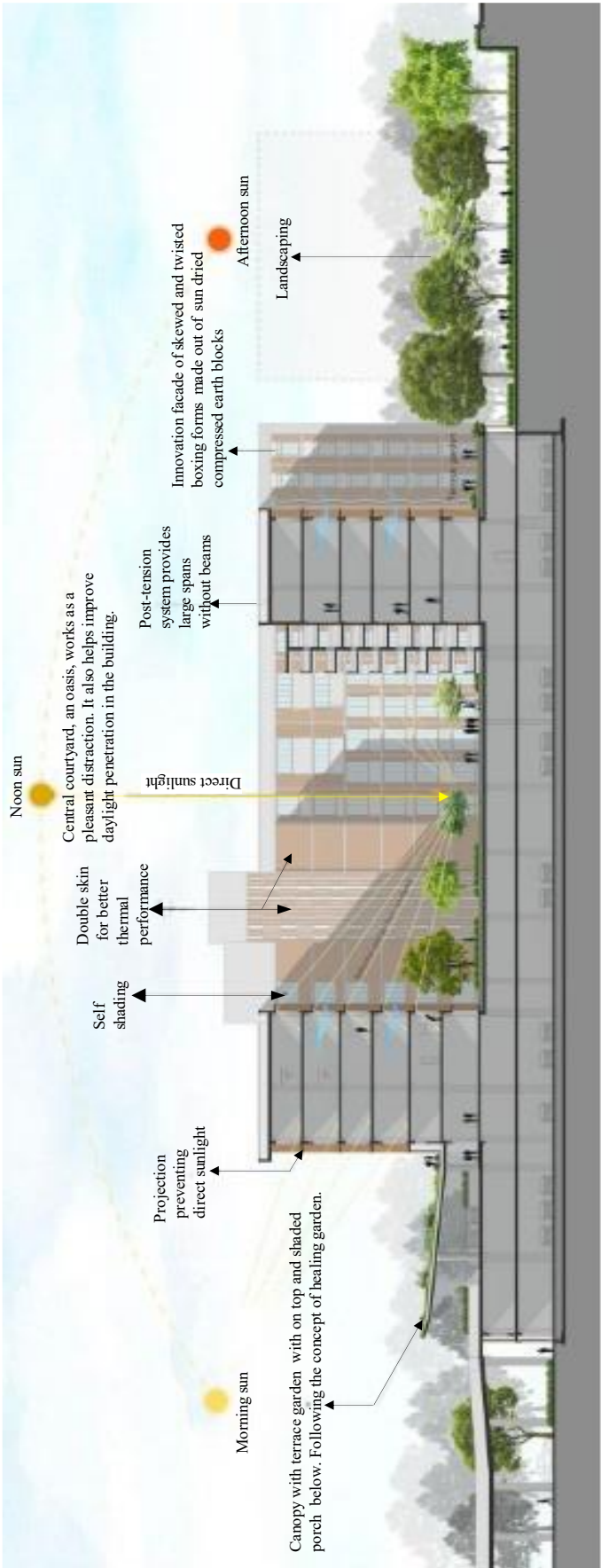


Figure 28. Sustainable design of the hospital.

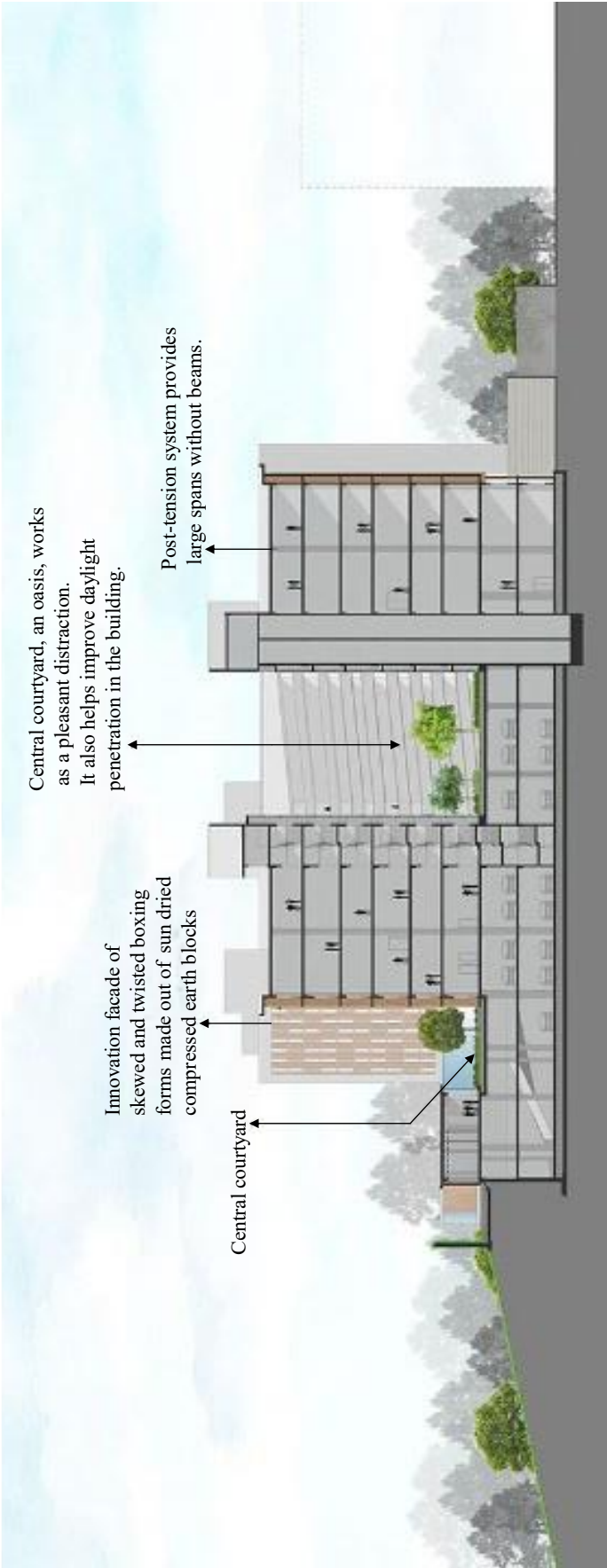


Figure 29. Biophilic elements in the hospital.

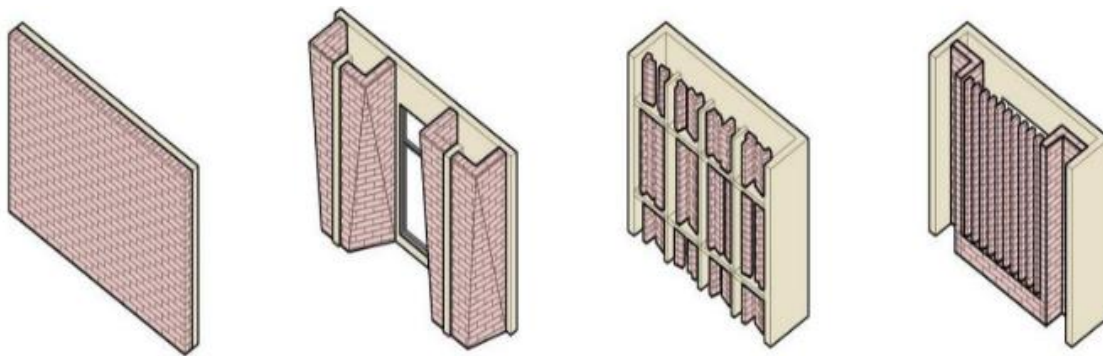


Figure 30. Different brick formations used in the building to make it sustainable.

- *Biophilia and its association with human well-being:* where it explains how people interact with nature and the advantages, they derive from it. It reveals that the human body, cognition, behaviour, and social connection are significantly impacted by biophilic involvement.
- *The biophilic patterns:* which are not having any rules or regulations. They are the strategies that are used to support the design process. It focuses on nature in space, presenting nature in space and the spatial characteristics of the space.
- *Human biological responses:* Sheds light upon the benefits that humans receive in their biological system from the biophilic patterns present in the built environment of any healthcare centre or hospital.
- *The use of biophilia as a design tool and its implication in a particular space:* Explains various design considerations by which biophilic design can be incorporated into any space.
- *The initiation of biophilic design in hospitals and healthcare facilities:* Tells the benefits and the ways of including biophilia in any healthcare centre or hospital. It also states the different impacts on different groups of people in the hospital or healthcare premises like the patients, the visitors, and the hospital staff.
- *Case studies of healthcare centres:* Like Khoo Teck Puat Hospital, Ostra Psychiatric Facility, and Symbiosis University Hospital and Research Centre that incorporate biophilia into their design and encourage the idea of biophilic design.

RESULTS

- The study found that human contact with nature is essential to people's lives and that biophilic design is the built environment's attempt to reconnect people with nature inside contemporary structures and landscapes.
- According to research, being in nature helps restore human health and is a useful setting for stress management, health promotion, psychotherapy, and illness prevention access to natural lighting, outside views, passive design, and adding plants and greenery to hospital interior spaces helps lessen mental tiredness, ease psychological stress, and hasten the healing process. Also, the use of natural scenery in murals and paintings may help ease discomfort and anxiety.
- The research has been concentrated on demonstrating the impact of natural light and broad windows, plans and layouts, art, and technology on human physiology and cognitive function. Direct contact with natural settings aids in the healing process for the human body, and it also speeds up recovery from serious illnesses and surgical procedures. Nature views can block or lessen unpleasant thoughts, inspire positive sentiments, calm anxious or disturbed patients, maintain their attention, and even promote relaxation.
- Views of the outdoors could be important for those whose schedules are predictable and who spend a lot of time in one place [23], such as surgical patients, who are confined to hospitals and have no access to the outdoors other than via windows. A patient's emotional state may be impacted by the view from a hospital window, which could have an impact on their ability to recover.

- Incorporating biophilic design into the planning of interior spaces in a healthcare facility significantly impacts users, including lowering stress and anxiety levels, shortening hospital stays, and improving patient satisfaction and recovery rates.

CONCLUSION

Simply said, biophilic design is the relationship between people and the natural world. This connection enables people to experience comfort, appreciate aesthetics, and foster interpersonal connections. In this way, applying biophilic design to healthcare settings may aid patients in recovering from various illnesses. Using biophilic design in hospital architecture entails more than just incorporating plants, trees, green roofs, or walls; it requires a fresh perspective that yields creative answers to incorporate nature in hospital spaces. The benefits supplied by biophilia to the therapeutic environment, both figuratively and metaphorically, should be recognized and emphasized by the designers. This could pave the way for future sustainable and environmentally conscientious designs. As a result, the designer should create spaces that produce a new dimension in space design and the desired output or performance of said space through the partnership of nature and human perception. This collaboration can be included in healthcare facility designs to create a healthy environment, and control and shorten patients' stays, while also minimizing the necessity for a person to visit a hospital in the first place. To improve user health, wellness, and quality of life while also enhancing building performance and sustainability, it is vital to combine and include the biophilia theory and biophilic components into the design of buildings, particularly healthcare facilities.

Recommendations

- The concept of biophilia and its relationship to biophilic components in healthcare facilities should be developed to improve the users' health, well-being, and quality of life on the one hand, and the building's performance and sustainability on the other, since it may be the way forward in a future of sustainable and ecologically conscious designs.
- To give patients more natural light through skylights and windows and better views of the outside world, healthcare facilities should be oriented to receive as much sunlight as possible. Healthcare facilities should feature ponds, fountains, and interior gardens.
- The healthcare facility should avoid having deep plans because they will make the space feel gloomy and uncomfortable, which will aggravate the patient's health and lower staff morale.
- Large windows with views of the outdoors should be included in hospital seating areas, especially in stressful sites like emergency rooms, waiting areas, and staff quarters.
- In addition to a play area for children, healthcare facilities should have gardens with natural elements, flexible seating for socializing and relaxing, private places, clear signage, and facilities for physical movement or exercise with easy access to shaded areas.
- By combining the biophilic design aspects with the desired performance of the interior space, the interior designer should produce spaces that result in better compatibility between patients and the built environment, providing hospitals with a healthy environment and reducing the length of patients' stays.

Methods and Techniques

The research method used to construct the research paper is observation, descriptive and secondary research, and case studies, which are combined to form a qualitative research paper.

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