

Perception of Medical Doctors on the Effectiveness of Therapeutic Architecture

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Abstract

Therapeutic architecture is an approach to healthcare design that integrates elements such as natural light, ventilation, spatial layout, and access to nature to promote healing and enhance the well-being of both patients and medical staff. This study investigates the perception of medical doctors on the effectiveness of therapeutic architecture in general hospitals across Lagos State, Nigeria. A total of 60 doctors from various medical fields were surveyed through a structured questionnaire, aiming to explore their awareness, knowledge, and evaluation of therapeutic design principles in healthcare environments. The findings revealed that 70% of the respondents were familiar with therapeutic architecture, with most associating it with natural lighting, proper ventilation, and access to nature. Among the architectural elements evaluated, natural lighting was rated as the most impactful, with 85% of respondents agreeing that it positively influences patient recovery and reduces stress. Similarly, 78% of the doctors highlighted the importance of ventilation in preventing infections and improving air quality, particularly in surgical and emergency environments. However, despite the general agreement on the benefits of therapeutic architecture, only 60% of the respondents acknowledged the presence of such design features in their current work environments, indicating a gap between theory and practice. The study also noted varying perceptions across medical specialties, with pediatricians and psychiatrists emphasizing the calming effects of biophilic design, while surgeons prioritized efficient spatial layouts and air quality. Overall, the study concluded that therapeutic architecture is perceived as a valuable tool in enhancing patient care and staff efficiency, though its implementation in Lagos State hospitals is limited by cost constraints, space limitations, and existing infrastructure. The study recommends greater interdisciplinary collaboration between architects and healthcare professionals, retrofitting of older hospital buildings, and government support to encourage the widespread adoption of therapeutic design principles in healthcare environments.

Keywords: Healthcare Design, Hospital Environment, Natural Lighting, Patient Well-being, Therapeutic Architecture.

Introduction

In contemporary healthcare, the environment in which treatment and care are delivered is increasingly recognized as an integral part of the healing process. The field of therapeutic architecture, which focuses on designing spaces that promote well-being and accelerate recovery, has emerged as a critical area of research and practice (Marques, McIntosh &

Kershaw, 2021; Villela & Ely, 2022). Therapeutic architecture encompasses various design strategies aimed at creating environments that support physical, psychological, and emotional health (Golembiewski, 2022; Zhong, Schröder & Bekkering, 2022). This concept is grounded in the belief that the built environment has a profound effect on human behavior and well-being, particularly in healthcare settings where stress, anxiety, and discomfort are prevalent (Altomonte, Allen, Bluysen, Brager, Heschong, Loder & Wargocki, 2020).

Healthcare facilities, traditionally designed with a focus on functionality and efficiency, are evolving to incorporate principles that enhance the therapeutic experience for patients and staff alike (Liddicoat, Badcock & Killackey, 2020; Schroeder, Bertelsen, Scott, J., Deane, Dormer, Nair & Brooke, 2022). Key features of therapeutic architecture include the integration of natural elements, such as light, vegetation, and water, the use of calming colors and textures, sound control, flexible spaces, and a focus on patient privacy and dignity (Jennifer, Asharhani & Ratnasari, 2024). Research by Liddicoat, Badcock & Killackey (2020) showed that these elements can reduce stress, promote faster recovery times, improve patient satisfaction, and even lower operational costs in hospitals by enhancing staff performance and reducing burnout. The physical environment can also play a role in controlling infection, supporting mobility, and ensuring the safety and comfort of both patients and caregivers (Tian, 2023).

Research Objectives

The primary objective of this study is to explore the perceptions of medical doctors regarding the effectiveness of therapeutic architecture in healthcare settings. Specifically, the study seeks to:

- i. examine doctors' knowledge of Therapeutic Architecture and its impact on staff and patients;
- ii. investigate how medical doctors perceive the impact of various architectural elements—such as spatial layout, lighting, ventilation, and access to nature—on patient healing; and
- iii. examine doctors' insights on the role of therapeutic architecture in improving the overall healthcare experience for patients and caregivers.

Problem Statement

Understanding the views of medical doctors on therapeutic architecture is not only important for validating the effectiveness of current design approaches but also for informing future architectural innovations in healthcare (Cho, 2023). As healthcare systems worldwide face growing challenges, including aging populations, increasing demand for services, and rising healthcare costs, creating environments that optimize patient

outcomes and operational efficiency is more important than ever (Gu, Andreev & Dupre, 2021).

Literature Review

Therapeutic architecture has gained prominence as a vital aspect of healthcare design, emphasizing the role of the physical environment in enhancing patient recovery and staff well-being. Numerous studies have explored the benefits of incorporating therapeutic design principles into healthcare settings, which encompass a range of architectural strategies aimed at promoting healing and improving the overall healthcare experience.

Theoretical Foundations of Therapeutic Architecture

The concept of therapeutic architecture is grounded in several interdisciplinary theories, combining insights from environmental psychology, evidence-based design (EBD), and biophilic design. Environmental psychology emphasizes the impact of physical spaces on human behavior and emotions, suggesting that well-designed environments can reduce stress, enhance mood, and improve cognitive functioning (Ricci, 2021; Hussein, Mansour & Kamel, 2023). These principles are particularly relevant in healthcare settings where patients often experience heightened levels of anxiety, discomfort, and stress (Engineer, Gualano, Crocker, Smith, Maizes, Weil & Sternberg, 2021).

Evidence-based design (EBD), another key theoretical underpinning, advocates for the use of research and empirical data to inform architectural decisions. EBD according to Melchionni (2021) posits that healthcare environments should be designed based on proven outcomes, such as reduced infection rates, shorter recovery times, and enhanced patient satisfaction. The concept of biophilic design, introduced by Edward O. Wilson, argues for the integration of nature into built environments, recognizing that humans have an innate connection to natural elements that can promote well-being (Totaforti, 2020; Zhong, Schröder & Bekkering, 2022). This theory has been widely applied in healthcare architecture, with studies highlighting the healing effects of natural light, views of greenery, and access to outdoor spaces.

Design Elements of Therapeutic Architecture

Several core design elements are commonly associated with therapeutic architecture, each contributing to the creation of a healing environment. Natural lighting, for example, is frequently cited as a critical factor in promoting patient recovery (Münch, Wirz-Justice, Brown, Kantermann, Martiny, Stefani & Skene, 2020). Studies by Burns, Saxena, Vetter, Phillips, Lane & Cain (2021), Vasey, McBride & Penta (2021) have shown that exposure to natural light can regulate circadian rhythms, reduce depression, and improve sleep quality, which are essential factors in the healing process. Artificial lighting, when used

appropriately, can also create calming atmospheres and enhance visibility, aiding both patients and healthcare workers (Attia, 2021).

Ventilation and indoor air quality are also essential components of therapeutic architecture. Proper ventilation reduces the risk of airborne infections, improves respiratory health, and creates a more comfortable environment for both patients and staff (Ilić, Markić, Bjelić & Farooqi, 2022). The spatial layout of healthcare facilities is another important consideration, as it influences circulation, privacy, and accessibility (Sabir & Mustafa, 2023). Flexible spaces that can be easily reconfigured to meet the changing needs of patients and staff have been shown to improve the functionality of healthcare settings and contribute to better patient outcomes (Halawa, Madathil, Gittler & Khasawneh, 2020).

Incorporating nature into healthcare environments, through biophilic design principles, is another significant aspect of therapeutic architecture. Access to gardens, views of natural landscapes, and the use of natural materials like wood and stone have been shown to reduce stress and promote psychological well-being (Halawa, Madathil, Gittler & Khasawneh, 2020). The use of calming colors, textures, and sound control further enhances the therapeutic potential of healthcare spaces by creating environments that foster relaxation and reduce anxiety (Attia, 2021).

Impacts of Therapeutic Architecture on Patients and Staff

A growing body of research has demonstrated the positive effects of therapeutic architecture on both patients and healthcare staff. For patients, healing environments can lead to faster recovery times, reduced levels of stress and anxiety, and improved overall satisfaction with their care. A study by Yeung, Irwin & Cheung (2021) on patients recovering from surgery found that those with views of nature experienced shorter hospital stays, required fewer pain medications, and reported better overall recovery experiences compared to those with views of brick walls. Similarly, research by Tian (2023) highlighted the role of environmental factors such as lighting, acoustics, and ventilation in improving patient health outcomes.

Therapeutic architecture has also been shown to benefit healthcare staff by reducing workplace stress, improving job satisfaction, and enhancing overall performance. Healthcare professionals often work in high-stress environments where burnout and fatigue are common issues. Well-designed spaces that prioritize natural light, ventilation, and flexible layouts can create more comfortable and efficient working conditions, which in turn can lead to improved patient care. For instance, a study by Karanikola, Andrea, Tampakis & Tsolakidou (2020) found that healthcare staff working in environments with access to natural light and views of nature reported lower levels of stress and higher job satisfaction.

Perceptions of Healthcare Professionals

While much of the literature focuses on patient outcomes, there is a growing interest in understanding how healthcare professionals, particularly medical doctors, perceive the effectiveness of therapeutic architecture. As primary caregivers, doctors are in a unique position to observe the effects of the physical environment on both patients and their practice. Their perceptions offer valuable insights into the practical application of therapeutic design principles and can inform future architectural innovations in healthcare. Several studies have examined the views of healthcare professionals regarding the impact of the built environment on patient care. A survey by Faraj, Siow & Maruthaveeran (2024) found that doctors and nurses perceived therapeutic environments as beneficial to patient recovery, noting improvements in patient mood, cooperation, and overall well-being. However, these professionals also highlighted practical challenges, such as balancing aesthetic considerations with functionality and ensuring that design elements do not interfere with medical procedures.

Further research by Patrício, Sangiorgi, Mahr, Čaić, Kalantari & Sundar (2020) explored the perspectives of medical professionals on the integration of nature into healthcare settings. Doctors and nurses reported that access to nature, either through windows or dedicated outdoor spaces, had a calming effect on both patients and staff. However, the study also noted that the effectiveness of these design elements depended on their implementation, with some professionals expressing concerns about maintenance and accessibility.

Gaps in the Literature

Despite the growing interest in therapeutic architecture, several gaps remain in the existing literature. First, while many studies highlight the benefits of therapeutic design for patients, there is a need for more research focused on the perspectives of medical professionals. Understanding how doctors perceive the impact of design elements on their workflow, patient interactions, and overall care delivery is crucial for optimizing healthcare environments.

Additionally, while much of the existing research focuses on specific design elements, there is limited exploration of how these elements work together in holistic therapeutic environments. Further studies are needed to investigate the interplay between different architectural features—such as lighting, ventilation, and spatial layout—and their combined effects on healthcare outcomes.

Methodology

This study employs a descriptive research design using a quantitative approach to gather data on the perceptions of medical doctors regarding the effectiveness of therapeutic architecture. The research focuses on exploring the opinions of doctors working in various general hospitals across Lagos State. The sample size for this study selected by stratified

random sampling technique is 60 medical doctors, randomly selected from various general hospitals in Lagos State. This method of sample size selection was done because of accessibility to the respondents and to allow for easy management and data analysis. They were chosen to provide a diverse representation of doctors working in different fields, including surgery, pediatrics, internal medicine, obstetrics, and psychiatry so as to capture a wide range of perspectives on the effectiveness of therapeutic architecture in promoting healing and supporting healthcare operations. A structured questionnaire was developed and administered to the selected doctors. The questionnaire was designed to gather information on various aspects of therapeutic architecture, including perceptions of its impact on patient recovery, staff performance, and overall healthcare outcomes. The questionnaire is divided into four sections: Demographic Information (Section A), Knowledge of Therapeutic Architecture (Section B), Perception of Architectural Design Elements (Section C) and Overall Evaluation of Therapeutic Architecture (Section D). The data collected from the questionnaires were analyzed using both descriptive statistical methods. Descriptive statistics were used to summarize the demographic information and responses in each section of the questionnaire. These statistical measures provided a clear overview of doctors' perceptions of therapeutic architecture.

Findings and Discussion

This section presents the findings from the survey of 60 medical doctors across various general hospitals in Lagos State on their perceptions of the effectiveness of therapeutic architecture. The data collected is analyzed and interpreted, followed by a discussion that compares the results with existing literature.

Demographic Information of Respondents

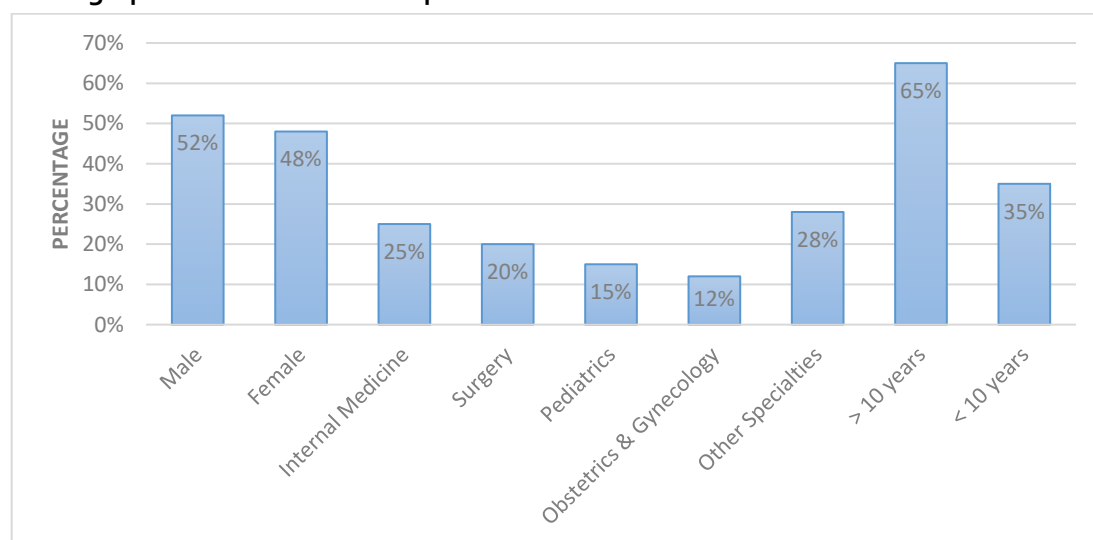


Figure 1: Demographic Characteristics of Respondents

Source: Authors (2024)

The demographic characteristics of the respondents as represented in Figure 1, provided an essential foundation for interpreting the results. The majority of the doctors surveyed were between the ages of 30 and 50, with a balanced gender distribution of 52% male and 48% female respondents. The respondents represented a diverse range of medical specializations, with 25% working in internal medicine, 20% in surgery, 15% in pediatrics, 12% in obstetrics and gynecology, and the remaining 28% spread across other specialties, including psychiatry, oncology, and emergency medicine. The majority of the respondents (65%) had more than 10 years of professional experience, with 35% having practiced for less than 10 years.

Knowledge of Therapeutic Architecture

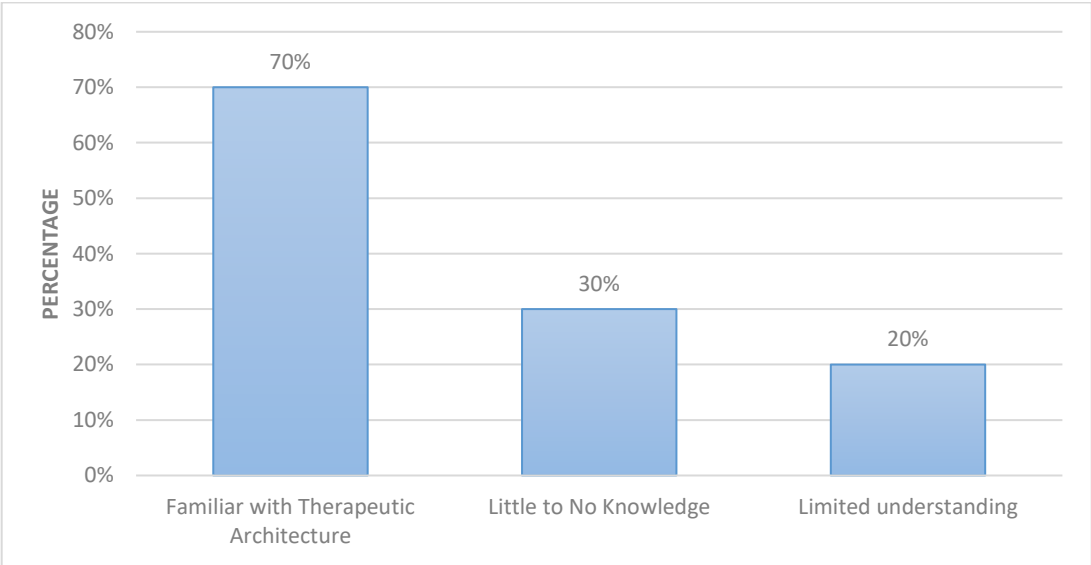


Figure 2: Awareness and Understanding of Therapeutic Architecture

Source: Authors (2024)

The survey revealed a moderate to high level of awareness of therapeutic architecture among the respondents. Approximately 70% of the doctors were familiar with the concept of therapeutic architecture and its application in healthcare environments, while the remaining 30% had little to no prior knowledge. Among those familiar with the concept, a significant number associated therapeutic architecture with design elements such as natural lighting, access to nature, proper ventilation, and spatial organization aimed at improving patient outcomes and staff efficiency. However, 20% of those familiar with the term indicated a limited understanding, highlighting the need for more awareness and education on the subject.

This finding aligns with earlier studies (Marques, McIntosh & Kershaw, 2021) that emphasize the growing recognition of therapeutic architecture within the medical community, though knowledge gaps still exist. Doctors who were less familiar with the

concept expressed interest in learning more about how architectural design could impact their clinical practice, suggesting potential avenues for interdisciplinary collaboration between healthcare professionals and architects.

Perception of Architectural Design Elements

The doctors were asked to rate the effectiveness of specific architectural design elements, including lighting, ventilation, spatial layout, and access to nature, in promoting patient recovery and supporting their daily work routines.

Table 1: Perception of Impact of Therapeutic Architecture Elements on Healthcare Delivery

Element	Positive Impact	Percentage
Natural Lighting	Reduces stress, enhances mood, improves recovery	85%
Ventilation and Air Quality	Prevents infections, improves comfort, maintains sterile environment	78%
Spatial Layout	Affects efficiency of healthcare delivery, clear circulation paths	65%
Access to Nature	Calming effect on patients and staff	60%
Use of Calming Colors and Textures	Creates relaxing atmosphere	55%

Source: Authors (2024)

The findings shown in Table 1 are as follows:

Natural Lighting: 85% of respondents agreed or strongly agreed that natural lighting positively impacts patient well-being, particularly in terms of reducing stress and enhancing mood. Several respondents noted that patients in rooms with access to sunlight appeared more cooperative and engaged during treatment. This is consistent with research by Burns, Saxena, Vetter, Phillips, Lane & Cain (2021), which found that exposure to natural light can improve recovery times and mental health.

Ventilation and Air Quality: 78% of doctors rated proper ventilation as highly effective in preventing infections and improving patient comfort, particularly in wards dealing with respiratory conditions. Doctors working in surgery and emergency medicine highlighted the importance of air quality in maintaining a sterile environment. These findings corroborate studies on the role of indoor air quality in healthcare settings (Agarwal, Meena, Raj, Saini, Kumar, Gopalakrishnan & Aggarwal, 2021).

Spatial Layout: 65% of respondents agreed that the spatial layout of hospitals affects the efficiency of healthcare delivery. Doctors emphasized the need for clear circulation paths and the proximity of critical facilities (e.g., operating theaters, diagnostic rooms, and

patient wards). However, 25% noted that some hospital layouts were inefficient, leading to delays in patient care or staff movement. These findings resonate with existing literature, which underscores the importance of efficient circulation patterns in healthcare design (Halawa, Madathil, Gittler & Khasawneh, 2020).

Access to Nature: 60% of the doctors indicated that access to natural elements, such as gardens or views of greenery, had a calming effect on both patients and staff. However, many respondents noted that most general hospitals in Lagos lacked green spaces, limiting the potential benefits of biophilic design. This is in line with biophilic design theories that advocate for the integration of nature into healthcare settings to reduce stress (Tekin, Corcoran & Gutiérrez, 2023).

Use of Calming Colors and Textures: 55% of respondents believed that the use of calming colors, such as light blues and greens, contributed to creating a relaxing atmosphere, particularly in wards and outpatient areas. However, 20% of the doctors noted that current hospital designs rarely incorporate such features effectively, leaving much room for improvement.

Overall Evaluation of Therapeutic Architecture

When asked to provide an overall evaluation of therapeutic architecture, 75% of the respondents agreed that the application of these principles could significantly improve patient outcomes and enhance the overall efficiency of healthcare delivery. They reported that therapeutic architecture fosters a more holistic approach to care, which benefits both patients and medical staff. Specifically, respondents indicated that hospitals designed with patient well-being in mind tend to experience better patient cooperation, shorter recovery times, and fewer complications.

Interestingly, the 25% of doctors who were more neutral or skeptical about the effectiveness of therapeutic architecture cited practical challenges such as cost constraints, maintenance issues, and the difficulty of retrofitting older buildings with modern therapeutic design elements. These respondents emphasized the need for a balance between aesthetics, functionality, and financial feasibility in healthcare design.

Discussion of Findings

The findings of this study indicate that most doctors in Lagos State's general hospitals perceive therapeutic architecture as a valuable tool for improving patient care and staff performance. The positive evaluations of natural lighting, ventilation, and spatial layout are consistent with existing literature, which highlights these elements as critical to creating healing environments. The high rating for natural lighting aligns with the biophilic design theory and EBD studies by Melchionni 2021; Gaekwad, Sal Moslehian, Roös & Walker (2022)

and Tekin, Corcoran & Gutiérrez (2023) that link exposure to natural elements with enhanced patient outcomes.

However, the study also reveals several challenges and gaps in the implementation of therapeutic architecture in Lagos State. While doctors recognize the benefits of design elements like access to nature and calming interiors, the lack of green spaces (Jewkes, Moran & Turner, 2020; Higuera-Trujillo, Llinares & Macagno, 2021; Zhong, Schröder & Bekkering, 2022) and the minimal use of biophilic design in current hospital facilities limit the potential of therapeutic architecture. This is particularly significant in the context of urban hospitals, where space and budget constraints may restrict the application of such principles.

Furthermore, doctors from different specialties exhibited varying perceptions of the effectiveness of therapeutic architecture. Surgeons and emergency doctors, for example, placed a stronger emphasis on spatial efficiency and air quality, while doctors in pediatrics and psychiatry were more focused on the calming effects of natural light and access to nature. This variation agrees with Haleem, Javaid, Singh & Suman (2022) that therapeutic design elements should be tailored to the specific needs of different medical fields to optimize their impact on patient care.

The study also confirms the opinions of Gola, Brambilla, Barach, Signorelli & Capolongo (2020) and Bernhardt, Lipson-Smith, Davis, White, Zeeman, Pitt & Elf (2022) on the need for greater collaboration between architects and healthcare professionals in the design of hospital environments. Many respondents expressed a desire for more input in the design process, particularly regarding functionality and the practical needs of medical staff. This finding echoes Lawson et al. (2003), who emphasized the importance of engaging healthcare professionals in architectural design to ensure that the built environment supports clinical workflows.

Conclusion and Recommendations

Conclusion

This study explored the perceptions of medical doctors across various general hospitals in Lagos State regarding the effectiveness of therapeutic architecture in healthcare environments. The findings reveal that most doctors recognize the value of architectural design elements such as natural lighting, ventilation, spatial layout, and access to nature in improving patient care, recovery, and staff efficiency. Therapeutic architecture, by integrating these elements, creates a more holistic and supportive healthcare environment, promoting patient well-being while also enhancing the operational efficiency of healthcare professionals.

The study's findings suggest significant practical implications for healthcare design and hospital management. Hospital administrators and designers should prioritize incorporating natural lighting, proper ventilation, efficient spatial layouts, and access to

nature when planning or renovating healthcare facilities. These design elements can improve patient recovery, reduce stress for both patients and staff, and enhance operational efficiency, leading to better overall healthcare outcomes. Additionally, architects and healthcare professionals should collaborate more closely during the design process to ensure that hospital layouts meet the practical needs of medical staff, particularly in specialized fields such as surgery and emergency care. Integrating doctors' perspectives into design decisions could lead to more functional and patient-centered healthcare environments.

However, implementing therapeutic architecture in existing hospitals, particularly in Lagos State, may be challenging due to practical limitations such as budget constraints, outdated infrastructure, and a lack of green spaces. Hospital management must carefully balance the cost of architectural improvements with their potential long-term benefits, including reduced staff burnout and improved patient satisfaction.

This study has certain limitations that should be acknowledged. The sample size of 60 medical doctors, while sufficient for exploratory research, may limit the generalizability of the findings. Additionally, the study was geographically confined to general hospitals in Lagos State, which may not reflect the perspectives of doctors in private or other healthcare systems or other regions of the world. Future studies could expand the sample size and include a broader range of healthcare facilities to validate these findings across different contexts.

Further research is needed to explore the long-term impacts of therapeutic architecture on healthcare outcomes, especially in different geographical regions and types of hospitals. Future studies could also investigate the cost-effectiveness of integrating therapeutic design elements in hospital renovation projects, particularly in resource-limited settings. Additionally, exploring patients' perspectives on therapeutic architecture could provide a more comprehensive understanding of how design influences the healing process from both the provider and patient viewpoints.

Recommendations

Based on the findings of this study, the following recommendations are made to enhance the implementation of therapeutic architecture in healthcare facilities:

- i. **Prioritize Natural Lighting in Healthcare Design:** The study revealed that 85% of doctors recognize the positive impact of natural lighting on patient well-being and recovery. Hospital administrators and architects should incorporate large windows, skylights, and other design features that maximize access to natural light in patient rooms and common areas. This can be achieved even in existing buildings by retrofitting or reorienting spaces to capture more daylight.
- ii. **Improve Ventilation and Air Quality:** With 78% of respondents highlighting the importance of proper ventilation in preventing infections and enhancing comfort,

healthcare facilities must prioritize ventilation systems that ensure air circulation, filtration, and cleanliness. This is particularly critical in high-risk areas such as operating rooms and intensive care units. Regular maintenance of HVAC systems should also be enforced to guarantee consistent air quality.

- iii. ***Design Efficient Spatial Layouts:*** The findings show that 65% of doctors perceive hospital spatial layout as crucial for healthcare delivery. Hospital management should work with architects to create clear, intuitive circulation paths that reduce staff travel time and improve patient access to critical services. When renovating older hospitals, particular attention should be given to minimizing disruptions and ensuring spatial efficiency in high-traffic areas.
- iv. ***Incorporate Green Spaces and Access to Nature:*** Although 60% of doctors acknowledge the calming effect of nature on both patients and staff, the study identified a lack of green spaces in Lagos hospitals. Future hospital designs should include accessible gardens, indoor plants, or views of nature to foster a healing environment. For existing facilities with limited outdoor space, introducing vertical gardens or interior courtyards could provide the same biophilic benefits.
- v. ***Utilize Calming Colors and Textures:*** With 55% of doctors indicating that calming colors enhance the healing atmosphere, hospital design teams should apply color psychology in interior spaces. Soft, neutral tones like light blues, greens, and earthy hues should be used in patient rooms and waiting areas to create a more relaxing environment. Textures that evoke warmth and comfort should also be incorporated into design elements like flooring and wall coverings.
- vi. ***Engage Medical Professionals in the Design Process:*** The study underscores the need for greater collaboration between architects and healthcare professionals. Doctors, nurses, and other staff members should be actively involved in the planning and design of healthcare spaces to ensure that practical needs and workflows are considered. Regular consultations between designers and medical teams can help align architectural innovations with clinical demands.
- vii. ***Increase Awareness and Training on Therapeutic Architecture:*** Given that 30% of respondents reported limited knowledge of therapeutic architecture, healthcare organizations should invest in awareness programs. Seminars, workshops, or interdisciplinary training that involve both healthcare providers and architects could bridge knowledge gaps and promote the integration of therapeutic design concepts into everyday medical practice.

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