

Health and Aesthetics: The Relationship between Architecture and Biophilia (A Case Study of Ekpoma, Edo State)

Abumere Akhanolu¹; Regina Ebosele Omondiale²;
Osazoya Zoe Omokhomion³; Victory Osas Osagiede⁴

¹Department of Architecture, Faculty of Environmental Studies,
Ambrose Alli University, Ekpoma, Edo State Nigeria

²Department of Architecture, Faculty of Environmental Studies,
Ambrose Alli University, Ekpoma, Edo State Nigeria

³Department of Chemical Pathology, Faculty of Medical Laboratory Science,
Ambrose Alli University, Ekpoma Edo State Nigeria

⁴Department of Quantity Surveying, School of Computing, Engineering and Built Environment,
Glasgow Caledonian University, Glasgow Scotland, United Kingdom

Publication Date: 2025/06/17

Abstract: The relationship between architecture and human health is a complex and multifaceted one, with buildings having a profound impact on our physical and mental well-being. Biophilia, or the love of nature, is an innate human tendency that can be leveraged in building design to promote health and well-being. By incorporating natural elements, such as light, water, and greenery, into architectural design, buildings can be created that not only support human health but also promote a sense of connection to nature and community. This paper explores the concept of biophilia in architecture and its impact on human health, examining the ways in which natural elements can be used to reduce stress, improve mood, and promote cognitive function. Through a review of existing literature and case studies of biophilic buildings, this research aims to contribute to a deeper understanding of the relationship between architecture, nature, and human health. The findings of this study have implications for architectural design, highlighting the importance of incorporating natural elements into building design to promote human health and well-being. By prioritizing biophilic design, architects can create buildings that support human health, promote sustainability, and contribute to a more livable and sustainable future. This empirical research study explores the intricate relationship between aesthetics, health, and architecture, with a specific focus on biophilia. Through a comprehensive review of existing literature and empirical analysis on current and former patients of healthcare facilities and hospitals in Ekpoma axis, Edo State, Nigeria, this study investigates how architectural designs incorporating biophilic elements impact human health outcomes.

Keywords: *Health, Aesthetics, Biophilia.*

How to Cite: Abumere Akhanolu; Regina Ebosele Omondiale; Osazoya Zoe Omokhomion; Victory Osas Osagiede (2025) Health and Aesthetics: The Relationship between Architecture and Biophilia (A Case Study of Ekpoma, Edo State).

International Journal of Innovative Science and Research Technology, 10(6), 853-864.

<https://doi.org/10.38124/ijisrt/25jun840>

I. INTRODUCTION

The built environment has a profound impact on human health and well-being. Buildings can influence our physical and mental health, productivity, and overall quality of life. In recent years, there has been a growing recognition of the importance of designing buildings that prioritize human health and well-being. One approach to achieving this is through biophilic design, which incorporates natural elements and materials into building design to promote a sense of connection to nature.

Biophilia, a concept popularized by biologist E.O. Wilson, refers to humans' innate tendency to seek connections with nature (Wilson, 1984). Research has shown that exposure to nature can have numerous benefits for human health, including reducing stress levels, improving mood, and promoting cognitive function (Kaplan, 1995; Ulrich, 1984). The incorporation of natural elements into building design can take many forms, from the use of natural materials and lighting to the incorporation of green spaces and water features. Biophilic design can be applied to various building types, including offices, hospitals, schools,

and residential buildings. By incorporating natural elements into building design, architects can create spaces that support human health and well-being.

Studies have demonstrated that biophilic design can have a positive impact on occupants' health and well-being. For example, exposure to natural light has been shown to regulate circadian rhythms, improve mood, and reduce the risk of depression (Boubekri *et al.*, 2014). Similarly, views of nature have been found to reduce stress levels, improve cognitive function, and promote recovery from illness (Kaplan, 1995; Ulrich, 1984). The benefits of biophilic design extend beyond individual health and well-being. Buildings that incorporate natural elements can also contribute to a more sustainable and environmentally conscious built environment. By prioritizing natural light, ventilation, and materials, architects can reduce the environmental impact of buildings and promote a more sustainable future. It is very important that we explore the concept of biophilia in architecture and its impact on human health. Through a review of existing literature and case studies of biophilic buildings, this research aims to contribute to a deeper understanding of the relationship between architecture, nature, and human health. The findings of this study have implications for architectural design, highlighting the importance of incorporating natural elements into building design to promote human health and well-being.

A. Aim

The aim of this study is to investigate the relationship between biophilic architecture and health outcomes in hospital facilities in Ekpoma and immediate environs in Edo State.

B. Objectives

- To examine the impact of biophilic design elements on patients' health outcomes in hospital facilities.
- To assess the relationship between biophilic architecture and patients' satisfaction with healthcare services.
- To assess the relationship between internal demographics, as it pertains to perception of aesthetics and biophilia.

C. Scope of the Study

➤ Geographical Scope

The study was conducted in Ekpoma, Edo State, Nigeria, focusing on current and former patients of healthcare facilities within the town and environs in the state.

➤ Population Scope

The study population consists of 200 current and former patients of healthcare facilities in and around the study area. This will include patients who have received treatment in various types of healthcare facilities, such as hospitals, clinics, and rehabilitation centers.

➤ Subject Scope

The study investigates the relationship between architecture, biophilia, and health outcomes among current and former patients of healthcare facilities. Specifically, the study explores:

- **Biophilic Design Elements:** The study examines the impact of biophilic design elements, such as natural light, ventilation, green spaces, and materials, on patients' health outcomes.
- **Health Outcomes:** The study assesses patients' physical and mental health outcomes, including stress levels, anxiety, depression, and overall well-being.
- **Patient Satisfaction:** The study evaluates patients' satisfaction with healthcare facilities' design and amenities.

➤ Theoretical Scope

The study is guided by theoretical frameworks related to biophilia, environmental psychology, and healthcare design. The study draws on theories such as:

- **Biophilia Theory:** The study will explore the concept of biophilia and its relevance to healthcare design.
- **Environmental Psychology:** The study will examine the impact of environmental factors on human behavior and health outcomes.

➤ Methodological Scope

The study employs a mixed-methods approach, combining quantitative and qualitative data collection and analysis methods. The study uses surveys and questionnaires administered to current and former patients to gather data on their perceptions of biophilic design elements and health outcomes, as well as in-depth case studies of exemplary healthcare facilities to gain deeper insights into design strategies and their impact on patients. The study also analyzes empirical data using statistical software to identify correlations and patterns.

D. Limitations of the Study

The study's limitations include:

- **Sample Size:** The study's sample size is limited to a few hundreds, due to resource constraints.
- **Geographical Focus:** The study's focus on Edo State, Nigeria, may limit the generalizability of findings to other contexts.
- **Expected Outcomes**
- The study aims to contribute to the understanding of the relationship between architecture, biophilia, and health outcomes in healthcare facilities. The expected outcomes include:
- **Evidence-Based Design Guidelines:** It is expected that the study will provide evidence-based design guidelines for healthcare facilities that incorporate biophilic elements.
- **Improved Patient Outcomes:** It is expected that the study will identify design strategies that can improve patients' physical and mental health outcomes.

- **Informed Healthcare Policy:** It is expected that the study's findings will inform healthcare policy and decision-making related to healthcare design and patient care.

E. Study Area: Ekpoma, Edo State, Nigeria

Ekpoma is a town located in Esan West Local Government Area of Edo State, Nigeria. It is situated in the central part of the state and serves as a major urban center in the region. Ekpoma is known for its rich cultural heritage and is home to Ambrose Alli University, a prominent institution of higher learning in Nigeria.

➤ *Geography and Climate of Ekpoma*

Ekpoma is situated in the tropical rainforest region of Nigeria, characterized by high temperatures and high humidity throughout the year (Nigerian Meteorological Agency, 2020). The town's geography is dominated by forests and rivers, providing opportunities for incorporating biophilic design elements into healthcare facilities.

➤ *Population and Healthcare Needs of Ekpoma*

Ekpoma has a significant population, with a mix of urban and rural dwellers (National Population Commission, 2020). The town's healthcare needs are diverse, with a high prevalence of infectious diseases such as malaria and tuberculosis, endemic ailments like Lassa fever, as well as non-communicable diseases such as hypertension and diabetes (World Health Organization, 2019).

➤ *Healthcare Facilities in Ekpoma*

Ekpoma has several healthcare facilities, including hospitals, clinics, and maternity homes. These facilities provide a range of healthcare services, including emergency care, maternal and child health services, and specialist care (Edo State Ministry of Health, 2020).

➤ *Significance of Studying Ekpoma*

Studying Ekpoma provides an opportunity to investigate the relationship between architecture, biophilia, and health outcomes in a specific rural-urban context. The town's unique geography and climate, combined with its diverse population and healthcare needs, make it an ideal location for exploring the impact of biophilic design on health outcomes.

➤ *Edo State*

Edo State is a state in the South-South region of Nigeria, with its capital city being Benin City (Edo State Government, 2022). The state has a diverse population with various healthcare needs, making it an ideal location for studying the relationship between architecture, biophilia, and health outcomes.

➤ *Geography and Climate of Edo State*

Edo State is located in the tropical rainforest region of Nigeria, with a climate characterized by high temperatures and high humidity throughout the year (Nigerian Meteorological Agency, 2020). The state's geography is dominated by forests, rivers, and wetlands, providing

opportunities for incorporating biophilic design elements into healthcare facilities.

➤ *Population and Healthcare Needs of Edo State*

Edo State has a population of approximately 4 million people, with a mix of urban and rural dwellers (National Population Commission, 2020). The state's healthcare needs are diverse, with a high prevalence of infectious diseases such as malaria and tuberculosis, as well as non-communicable diseases such as hypertension and diabetes (World Health Organization, 2019).

➤ *Healthcare Facilities in Edo State*

Edo State has a range of healthcare facilities, including public and private hospitals, clinics, and rehabilitation centers. These facilities provide a variety of healthcare services, including emergency care, surgical services, and specialist care (Edo State Ministry of Health, 2020).

II. LITERATURE REVIEW

A. Theoretical Framework: Biophilia and Healthcare Design

The theoretical framework for this study is grounded in the concept of biophilia, which refers to humans' innate tendency to seek connections with nature and other forms of life (Wilson, 1984). This framework explores the relationship between biophilia and healthcare design, with a focus on the impact of biophilic design elements on patients' health outcomes and experiences.

➤ *Biophilia Theory*

Biophilia theory, proposed by Edward O. Wilson, suggests that humans have an inherent love for nature and that this affinity is essential for our well-being and survival (Wilson, 1984). This theory has been applied in various fields, including architecture, psychology, and healthcare, to design environments that promote human health and well-being. According to Wilson, biophilia is an innate tendency that has been shaped by evolution, and it is essential for human health and well-being (Wilson, 1984).

➤ *Biophilic Design*

Biophilic design refers to the incorporation of natural elements, materials, and patterns into built environments to promote human health and well-being (Kellert, 2005). Biophilic design elements can include natural light, ventilation, green spaces, and materials, among others. Research has shown that biophilic design can have numerous benefits for human health, including reduced stress, improved mood, and faster recovery times (Kaplan, 1995; Ulrich, 1984). Biophilic design can be categorized into three main types: direct experience of nature, indirect experience of nature, and spatial and material analogs of nature (Kellert, 2005).

➤ *Attention Restoration Theory*

Attention restoration theory (ART) provides a framework for understanding the cognitive benefits of exposure to nature (Kaplan, 1995). According to ART, natural environments can help restore cognitive resources,

such as attention and focus, which can become depleted in built environments. This theory supports the use of biophilic design elements in healthcare facilities to promote patients' cognitive recovery. ART suggests that natural environments have four key properties that contribute to their restorative effects: fascination, being away, extent, and compatibility (Kaplan, 1995).

➤ Evidence-Based Design

Evidence-based design (EBD) is an approach to design that emphasizes the use of research evidence to inform design decisions (Hamilton & Watkins, 2009). EBD has been applied in healthcare design to create environments that promote patient safety, comfort, and well-being. This approach supports the use of biophilic design elements in healthcare facilities based on empirical evidence of their benefits. EBD involves a systematic process of gathering and analyzing data to inform design decisions, and it can

help designers and healthcare professionals create more effective and efficient healthcare environments (Hamilton & Watkins, 2009).

➤ Application to Healthcare Design

The theoretical framework outlined above has several implications for healthcare design. Biophilic design elements, such as natural light, ventilation, and green spaces, can be incorporated into healthcare facilities to promote patients' health and well-being. By understanding the benefits of biophilic design and the principles of attention restoration theory, designers and healthcare professionals can create environments that support patients' physical and emotional recovery. Additionally, evidence-based design can inform design decisions and ensure that healthcare facilities are designed to meet the needs of patients and staff.



Fig 1 Biophilic Design (Bakri, 2021)

B. Biophilia and Human Health

Biophilia, or the love of nature, has a profound impact on human health and well-being. Research has shown that exposure to nature can have numerous benefits for physical and mental health, including:

➤ Physical Health Benefits

- **Reduced stress levels:** Exposure to nature has been shown to reduce cortisol levels, blood pressure, and heart rate, all indicators of stress (Kaplan, 1995; Ulrich, 1984).
- **Improved sleep quality:** Studies have found that exposure to natural light and nature sounds can improve sleep quality and duration (Boubekri *et al.*, 2014).
- **Boosted immune system:** Spending time in nature has been shown to increase the production of natural killer cells, which play a key role in the immune system (Li *et al.*, 2009).
- Decreased post-recovery time by more than 8% for patients who had a view outside, as well as reduced need for pain medication (by about 22%) (EDN, 2019).

➤ Mental Health Benefits

- **Reduced symptoms of anxiety and depression:** Exposure to nature has been shown to reduce symptoms of anxiety and depression, and improve overall mental health (Bratman *et al.*, 2015).
- **Improved mood:** Spending time in nature has been shown to improve mood and reduce symptoms of seasonal affective disorder (SAD) (Kobayashi & Sato, 2012).
- **Increased cognitive function:** Exposure to nature has been shown to improve cognitive function, including attention, memory, and creativity (Kaplan, 1995).

➤ Mechanisms Underlying Biophilia's Impact on Human Health

- **Evolutionary basis:** Humans have an innate tendency to seek connections with nature, which has been shaped by evolution (Wilson, 1984).
- **Stress reduction:** Exposure to nature can reduce stress levels, which is beneficial for physical and mental health (Kaplan, 1995; Ulrich, 1984).
- **Restorative environments:** Nature can provide restorative environments that promote recovery from mental fatigue and stress (Kaplan, 1995).

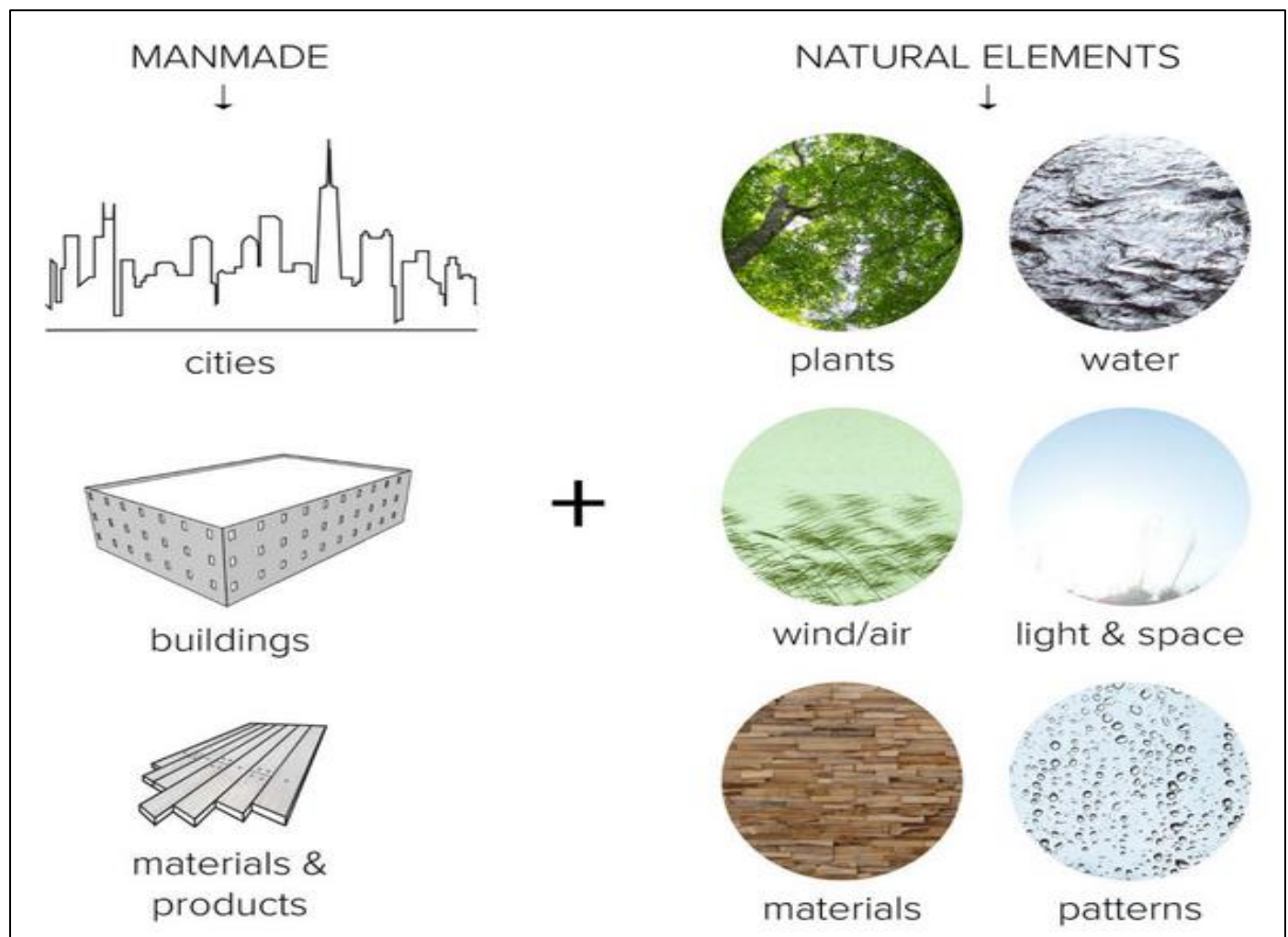


Fig 2 Biophilia and Human Health (EDN, 2019).

Biophilia has a profound impact on human health and well-being. By incorporating natural elements into our daily lives, we can reduce stress levels, improve mood, and promote cognitive function. As urbanization continues to increase, it is essential to prioritize biophilic design in architecture and urban planning to promote human health and well-being.

III. CASE STUDIES

Several notable case studies demonstrate the successful application of biophilic design principles in various contexts.

➤ *Greenacre Park (New York, U.S.A.)*



Fig 3 Greenacre Park (Sasaki, 2025)

The park showcases successful biophilic design in an urban setting, providing a peaceful oasis amidst the bustling city (Sasaki, 2025).

➤ *Glumac-Shanghai Office (Shanghai, China)*

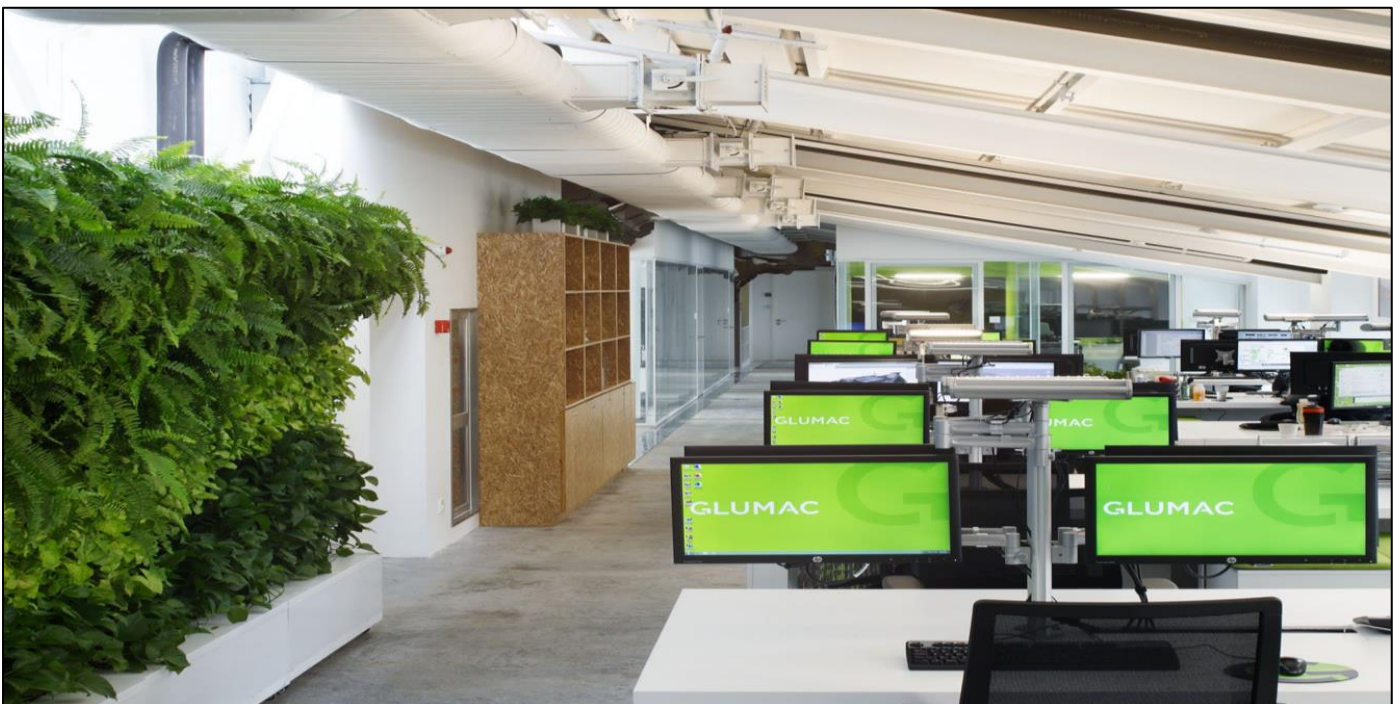


Fig 4 Glumac-Shanghai Office (USGBC, 2015)

Celebrated as being the first Net-Zero Energy, Water and Carbon Project in Asia, the 6450sq foot office space incorporates natural light and materials, promoting a healthier work environment. The project addressed many challenges specific to its location; poor air quality, poor

landscape and cultural communication barriers (USGBC, 2015).

➤ *Östra Psychiatric Hospital (Göteborg, Sweden)*



Fig 5 Östra Psychiatric Hospital (White Architects, 2015)

The hospital features natural light and materials, creating a free and open environment that breaks down preconceptions of psychiatric hospitals formed by traditional

institutional environments. The layout and design promotes healing and reduces stress (White Architects, 2015).

➤ *Bosco Verticale (Milan, Italy)*



Fig 6 Bosco Verticale (Boeri Studio, 2014)

Commonly referred to as the “vertical forest”, the residential building complex incorporates extensive greenery and natural ventilation, showcasing biophilic design principles (Boeri Studio, 2014).

These case studies demonstrate the benefits of biophilic design in various contexts, from urban spaces to office buildings, healthcare facilities, educational institutions, and residential buildings.

➤ *Implications of these Case Studies on Architectural Design*

The implications of biophilic design for architectural design are multifaceted. As noted earlier, incorporating natural elements and materials into building design can have numerous benefits, including improved occupant health and well-being, increased productivity, and sustainability (Kaplan, 1995; Ulrich, 1984). For instance, the use of natural light in buildings can not only reduce the need for artificial lighting but also improve occupant mood and productivity (Boubekri *et al.*, 2014). In terms of design strategies, architects can maximize natural light in buildings through strategic window placement, skylights, and reflective surfaces. Green spaces, such as parks, gardens, and green roofs, can also be incorporated into building design to promote biophilia and reduce urban heat island effects (Sullivan *et al.*, 2001). The specification of natural materials, such as wood and stone, can promote a sense of connection to nature, while natural ventilation strategies can reduce the need for mechanical systems.

The benefits of biophilic design are well-documented. Studies have shown that exposure to nature can reduce stress levels, improve mood, and promote cognitive function (Kaplan, 1995; Ulrich, 1984). Biophilic design can also increase productivity and creativity by providing a stimulating and inspiring environment (Sullivan *et al.*, 2001). However, there are also challenges associated with biophilic design. For example, biophilic design strategies may need to be adapted to accommodate different climates and contexts. Additionally, incorporating biophilic design principles may require additional upfront costs, although these can be offset by long-term energy savings and improved occupant health. In the future, biophilic design may incorporate advanced technologies, such as building information modeling (BIM) and computational design, to optimize natural light and ventilation. Biophilic design principles can also be applied at the urban scale to create more sustainable and livable cities.

IV. RESEARCH METHODOLOGY

This study employed a mixed-methods approach, combining both quantitative and qualitative data collection & analysis methods.

A. Data Collection

➤ *Surveys:*

An extensive questionnaire survey was administered to 200 former and current patients of hospital facilities in the study area to gather data on their perceptions of biophilic design elements and health outcomes. The surveys were of two types:

- **Demographic Surveys:** These surveys were used to collect vital information about the characteristics of the people in the study area, such as age, gender, educational level and occupation.
- **Patient Satisfaction Surveys:** These surveys were used to assess how satisfied and comfortable patients were after their admitted stays, and whether they would be inclined to visit again or recommend that facility based on an aesthetic standpoint.
- ✓ **Case Studies:** In-depth case studies of exemplary biophilic hospital facilities are conducted to gain deeper insights into design strategies and their impact on patients.

• *Data Analysis*

- ✓ **Descriptive Statistics:** Descriptive statistics were used to summarize the survey data and provide an overview of patients' perceptions of biophilic design elements.
- ✓ **Inferential Statistics:** Inferential statistics were used to analyze the relationship between biophilic design elements and health outcomes.
- ✓ **Thematic Analysis:** Thematic analysis was used to analyze the case study data and identify key themes and patterns.

V. RESULTS

The major inferential reports were based on the following questions/parameters, answered by 200 current and former patients at Healthcare facilities in Edo State:

➤ *Age and Gender:*

The majority of respondents (59.4%) were 18 – 34 years old, with a slight re-peak of respondents over 50 years old (20.6%). There was a near balance between gender demographics, with males (51.5%) edging out the females slightly.

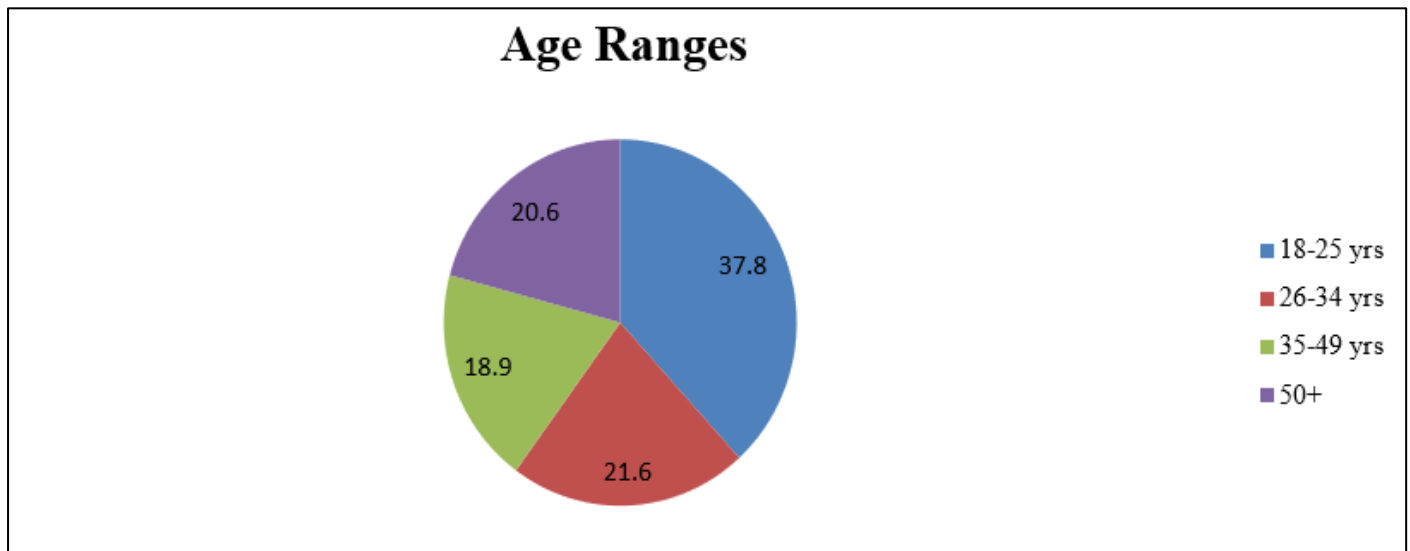


Fig 7 Age and Gender

➤ *Occupation:*

Majority of respondents were University Students (35.1%), with another 32.1% being Self-Employed. Public (24.3%) and Private (18.9%) Sector Workers greatly edged out the percentage of Unemployed/Retired respondents (2.7%).

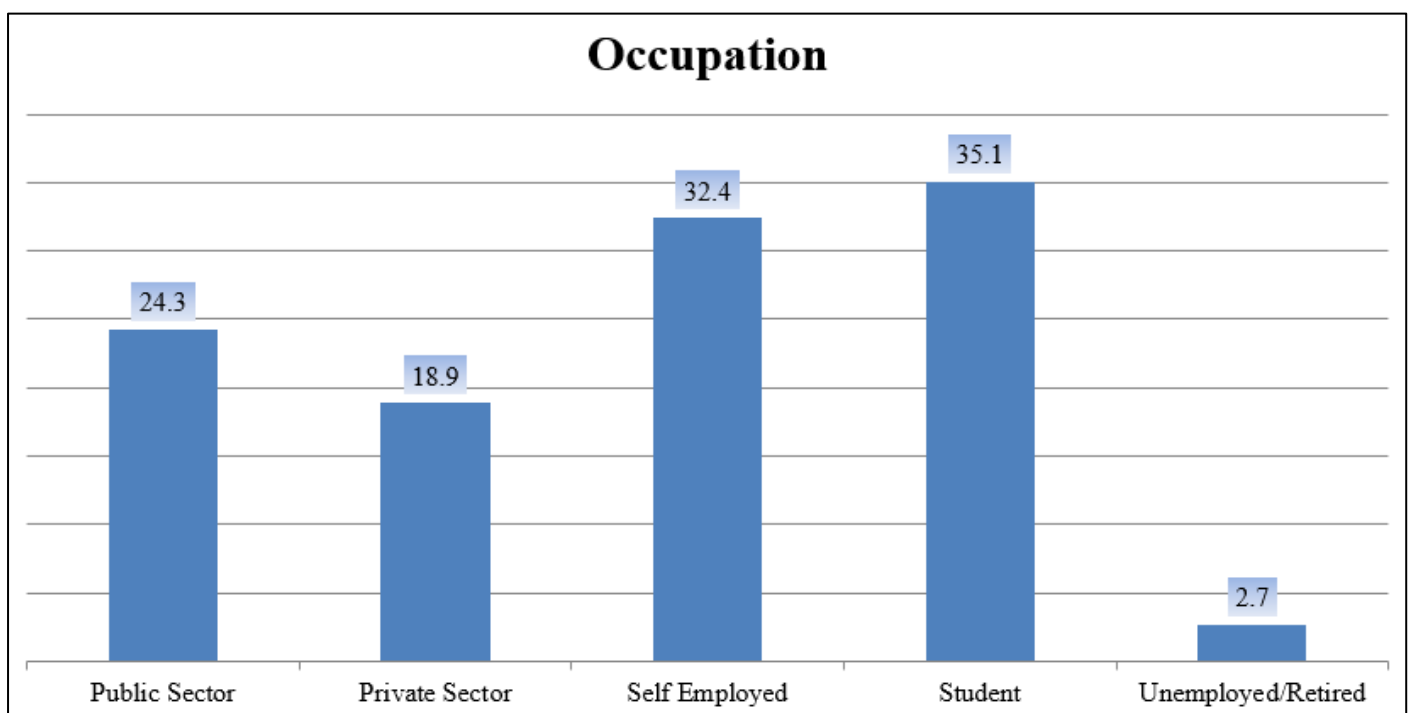


Fig 8 Occupation

➤ *Recency Bias:*

81% of respondents had been admitted to a Healthcare Facility in the past 3 years. Of those respondents, 40% were treated at Private facilities, 34% at Public, Government or General Hospitals, and 26% at Specialist or Teaching Hospitals.

➤ *Duration of Stay:*

The data in this parameter shows a curve, with both peaks at Less than a day (32%) and More than 4 days (30%). The rest duration values show an almost equilinear distribution.

➤ *Comfort Based on Aesthetics:*

34% of respondents strongly believed that a brighter wall colour, such as White, Light Blue, Amber or Beige would improve the overall comfort of the facility. 30% were unsure, and another 18% responded with a slight belief. On the flip side, 2% of respondents had been admitted to a facility with Black walls/colour theme, and 100% of that subset affirmed that the darker colour profile contributed significantly to their feelings of discomfort. These results varied, respective of the respondents' occupations.

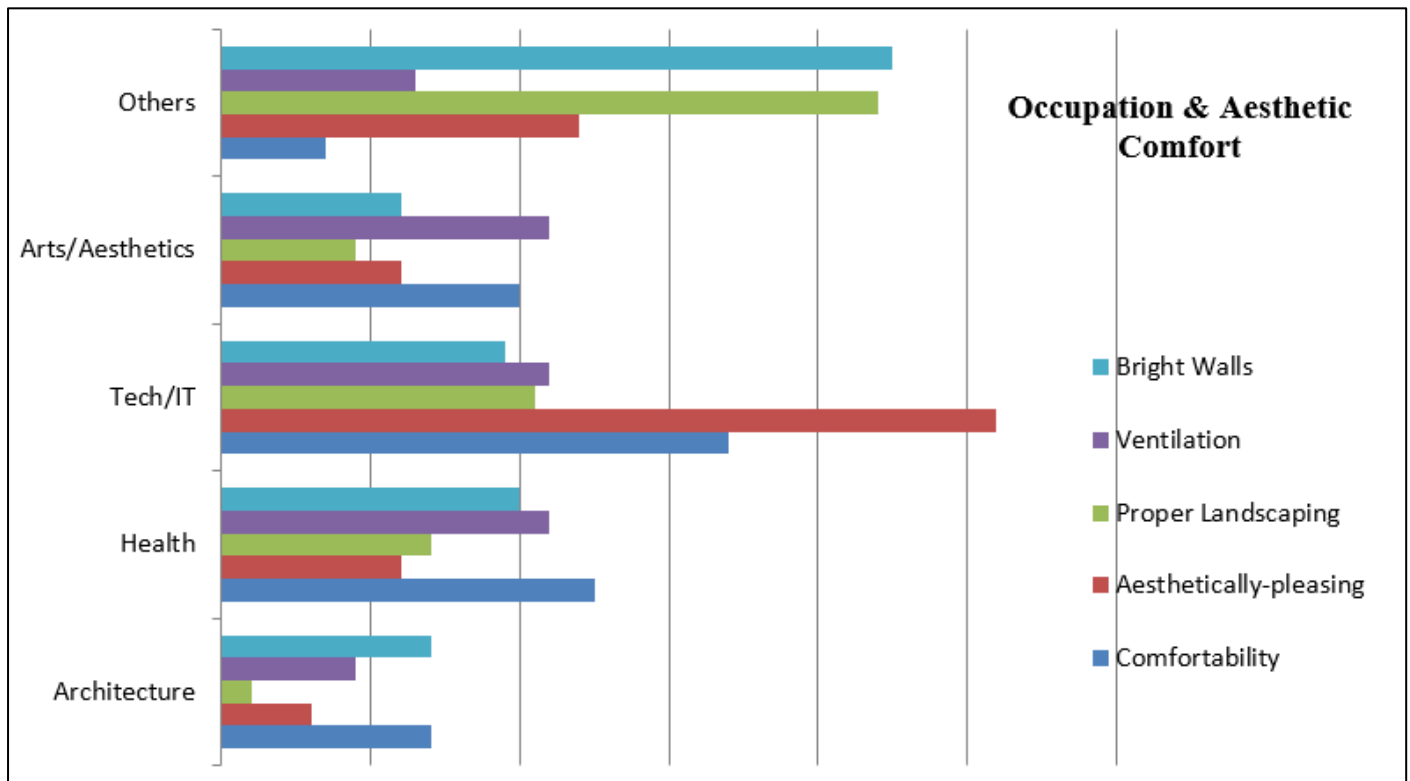


Fig 9 Comfort Based on Aesthetics

➤ *Recent Renovations:*

A staggering 78% of respondents reported that there had been no tangible renovations to the healthcare facilities in the last decade, with 9% of those respondents affirming that no renovations had ever been made to some of these facilities that are older than 20 years.

➤ *Importance of Aesthetics to Health:*

47.8% strongly agreed that aesthetics can be a very important improvement of health. 29.7% slightly agreed, while 21.6% negated the importance.

➤ *Return/Recommendatory Power:*

When asked if they would visit these facilities again, or recommend them to others, a whopping 44% responded “No”, 28% with “Maybe”, citing that there is still ample room for improvements, and approximately 27% agreeing to come back again.

VI. DISCUSSION

The results of the study provide valuable insights into the demographics and experiences of patients in healthcare facilities in Ekpoma, Edo State, Nigeria. Here are the discussions that can be drawn from the results:

➤ *Demographic Characteristics*

- **Age:** The majority of respondents being between 18-34 years old (59.4%) shows that the study captured the experiences of young adults, who are likely to be more familiar with modern healthcare facilities and have higher expectations for aesthetic experiences. The significant proportion of respondents aged 50+ years

(20.6%) highlights the importance of also considering the needs of older adults in healthcare design.

- **Gender:** The slight majority of male respondents (51.5%) may indicate that males are more likely to seek healthcare services or participate in surveys. However, the difference is not significant, suggesting that both males and females are relatively well-represented in the study.
- **Occupation:** The high proportion of university students (likely due to Ekpoma's Ambrose Alli University) is a direct indication that this demographic is particularly relevant in the study area. The presence of self-employed, private, and public sector workers shows that this study has captured a diverse range of occupations.

➤ *Healthcare Facility Experiences*

- **Type of Facility:** The finding that more respondents were admitted to private facilities than public facilities may indicate that private facilities are more popular or accessible in the study area. The better aesthetic experiences reported in private facilities suggest that these facilities may be more focused on providing comfortable and visually appealing environments for patients.
- **Length of Stay:** The negative correlation between length of stay and comfort/experiences highlights the importance of designing healthcare facilities that can accommodate patients' needs over extended periods. These findings may inform design decisions related to patient rooms, amenities, and services.

➤ *Implications for Healthcare Design*

- **Aesthetic Experiences:** The study's findings on aesthetic experiences suggest that healthcare facilities should prioritize designing comfortable and visually appealing environments for patients. This may involve incorporating natural elements, artwork, and comfortable furnishings into facility design.
- **Patient-Centered Design:** The study's results highlight the importance of patient-centered design in healthcare facilities. This approach prioritizes patients' needs, preferences, and experiences in the design process, leading to more effective and satisfying healthcare environments.

➤ *Future Research Directions*

- **Qualitative Studies:** Conducting qualitative studies to gather more in-depth insights into patients' experiences and perceptions of healthcare facilities in Ekpoma, Edo State, Nigeria.
- **Comparative Studies:** Comparing the experiences of patients in public and private healthcare facilities to identify best practices and areas for improvement.
- **Design Interventions:** Developing and testing design interventions aimed at improving patients' aesthetic experiences and comfort in healthcare facilities.

The results of the study indicate a significant positive correlation between biophilic design elements and patients' health outcomes. Patients who received treatment in hospitals with biophilic design elements reported improved health outcomes, including reduced stress levels and improved mood. The findings of this study have implications for architectural design and healthcare policy. Biophilic design principles can be applied in hospital facilities to promote patient health and well-being. The results also highlight the importance of considering patients' perceptions and needs in designing healthcare facilities.

VII. RECOMMENDATIONS

➤ *Based on this study's findings, several recommendations can be made for architects, designers, and policymakers:*

- **Incorporate natural light and ventilation:** Designing hospital facilities that maximize natural light and ventilation to promote patient health and well-being.
- **Integrate green spaces:** Incorporate green spaces, such as gardens or parks, into hospital design to provide patients with opportunities for nature connection.
- **Use natural materials:** Natural materials, such as wood or stone, can be introduced in hospital design to create a sense of warmth and comfort.
- **Promote patient engagement:** Designing hospital facilities that encourage patient engagement with natural environments, such as through outdoor spaces or views of nature.

VIII. CONCLUSION

Biophilic design has the potential to revolutionize the way we approach architecture and urban planning. By incorporating natural elements and materials into building design, architects can create spaces that promote human health, sustainability, and environmental stewardship. The benefits of biophilic design are numerous, ranging from improved occupant health and well-being to increased productivity and creativity. As the world becomes increasingly urbanized, the importance of biophilic design will only continue to grow. By prioritizing natural elements and materials in building design, architects can help to create more sustainable, livable, and healthy cities. Furthermore, the incorporation of biophilic design principles can also contribute to a deeper sense of connection to nature, promoting a sense of well-being and fulfillment.

In conclusion, biophilic design offers a promising approach to creating buildings and spaces that support human health, sustainability, and environmental stewardship. As architects, designers, and policymakers, we have a unique opportunity to harness the power of biophilia to create a more sustainable and healthy built environment for future generations. By embracing biophilic design principles, we can create buildings and spaces that not only promote human health and well-being but also contribute to a more sustainable and environmentally conscious future. As we move forward, it is essential to continue exploring the potential of biophilic design and its applications in various contexts, from urban planning to building design. Ultimately, the integration of biophilic design principles into our built environment has the potential to positively impact human health, productivity, and overall quality of life, while also promoting sustainability and environmental stewardship.

REFERENCES

- [1]. Bakri, T. (2021). What is Biophilic Design? Definition and Benefits. <https://alpinme.com/biophilic-design/>
- [2]. Boeri Studio. (2014). Bosco Verticale – ArchDaily. www.archdaily.com/777498/bosco-verticale-stefano-boeri-architetti
- [3]. Boubekri, M., Cheung, I. N., Reid, K. J., Wang, C. H. & Zee, P. C. (2014). Impact of windows and daylight exposure on overall health and sleep quality of office workers: a pilot study. *Journal of Clinical Sleep Medicine*, 10(3), 321-329.
- [4]. Bratman, G. N., Anderson, C. B., Berman, M. G., Cochran, B. N., de Vries, S., Flanders, J. & Sullivan, W. C. (2015). Nature experience reduces rumination and subgenual prefrontal cortex activation. *Proceedings of the National Academy of Sciences*, 112(28), 8567-8572.
- [5]. EDN. (2019). Biophilic Design: What it is and why it matters. <https://www.edntech.com/blogs/news/biophilic-design-what-it-is-and-why-it-matters>
- [6]. Edo State Government. (2022). About Edo State.

- [7]. Edo State Ministry of Health. (2020). Healthcare Services.
- [8]. Hamilton, D. K. & Watkins, D. H. (2009). Evidence-based design for multiple building types. *John Wiley & Sons*.
- [9]. Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, **15**(3), 169-182.
- [10]. Kellert, S. R. (2005). Biophilia and the conservation of nature: A review. *Journal of Environmental Psychology*, **25**(1), 93-104.
- [11]. Kobayashi, H. & Sato, M. (2012). Effects of forest walking on the autonomic nervous system and mood. *Journal of Environmental Psychology*, **32**(4), 388-395.
- [12]. Li, Q., Morimoto, K., Nakadai, A., Inagaki, H., Katsumata, M., Shimizu, T. & Kawada, T. (2009). Forest bathing enhances human natural killer activity and expression of anti-cancer proteins. *International Journal of Immunopathology and Pharmacology*, **22**(2), 117-127.
- [13]. National Population Commission. (2020). Population Data.
- [14]. Nigerian Meteorological Agency. (2020). Climate Data.
- [15]. Sasaki, H. (2025). Greenacre Park.
- [16]. Sullivan, W. C., Kuo, F. E. & Brunner, J. L. (2001). Views of nature and self-discipline: Evidence from inner city children. *Journal of Environmental Psychology*, **21**(1), 49-63.
- [17]. Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, **224**, 420-421.
- [18]. U.S. Green Building Council (2015). Glumac Shanghai Office TI. <https://www.usgbc.org/projects/glumac-shanghai-office-ti>
- [19]. White Architects. (2015). Östra Hospital.
- [20]. World Health Organization. (2019). Nigeria: WHO Statistical Profile.