ANALYSIS OF BIOPHILIC DESIGN PRINCIPLES IN DRUG REHABILITATION CENTRES IN NIGERIA

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ABSTRACT

Biophilic architecture is based on the assertion that humans have an innate connection with nature that should be expressed in their daily lives, especially in cities. This, which has not been a strong feature of architectural principles (even though there has been a long tradition of landscape architecture), yet potentially offers great rewards if the assertion is true. However, earlier and more recent studies have revealed that individuals who dwell among the splendours and mysteries of nature are never alone or weary of life thus, implying that there is something infinitely healing in the repeated refrains of nature. This paper is aimed at examining biophilic design principles in drug rehabilitation centres in Nigeria. The research adopts a descriptive research method, with the use of observation schedules, and an in-depth review of existing literature. Samples were taken from rehabilitation centres in Nigeria using the convenience sampling method. Findings show a low level of implementation and use of biophilic design principles in the design of drug rehabilitation centres within the study area. It is however pertinent to know that biophilic design principles are passive and sustainable measures that can be adopted to enhance drug de-addiction and rehabilitation in rehabilitation centres in Nigeria; which is a recommendation this paper puts forward. This paper concludes by advocating for the use of biophilic design principles in drug rehabilitation centres in Nigeria to aid de-addiction and rehabilitation.

Keywords: *Biophilic design, De-addiction, Drug, Nature, Rehabilitation*

1.0 Introduction

Over the years, humanity has been evolving in a close relationship with nature and the quality of this relationship is reflected in the emotions, thoughts, culture, and health that every individual or society expresses. In modern times however, the built space has been conceived and designed by giving nature a role that is not only marginal, but also irrelevant to the health and happiness of individuals (Kellert, 2012). Earlier studies (as early as the 1960's) have revealed that individuals who dwell among the splendours and mysteries of nature are never alone or weary of life thus,

implying that there is something infinitely healing in the repeated refrains of nature (Salingaros, 2015).

The term biophilia was coined from two Greek words 'bios' which means life and 'philia' which means to love; suggesting a meaning of anything that is nature loving. The term "biophilia" which was used for the first time in the 1960s by Erich Fromm is the intrinsic human disposition to affiliate with nature" (Kellert & Calabrese, 2015). Although biophilia is the phenomenon, biophilic design is internationally recognized as a process that offers a sustainable design approach aimed at relinking individuals with their natural environment (Downton *et al.*, 2017). It is note-worthy that architecture is not a treatment, but can most significantly become part of the healing process through the creation of spaces that foster and provide meaning to those activities utilized to achieve gradual rehabilitation.

However, according to World Health Organization (WHO), de-addiction is a process of reversing the state of someone physically or psychologically enslaved to a particular habit while rehabilitation is defined as a set of measures that assist individuals who experience or are likely to experience disability or addictions to achieve and maintain optimum functioning in interaction with their environment (WHO, 2016).

The menace of drug abuse and addiction in Nigeria has reached a frightening proportion and has pervaded every fibre of the society, especially in the North-West. The issue of drug addiction over the years has become an issue for National concern in Nigeria and the National Drug Law Enforcement Agency (NDLEA) has continued to come up with measures to aid rehabilitation in a bid to minimally reduce drug addiction in the country (NDLEA, 2018). Part of these measures is to establish fully functional drug de-addiction and rehabilitation centres in areas identified by the agency as areas most affected by this menace in line with the Federal Government policies

against drug addiction. Hence, the need for rehabilitation Centres in those regions. An approach to achieving this is by integrating biophilic design principles which have been argued to have certain effects on the rehabilitation and de-addiction of drug addicts (Ryan *et al*., 2014).

This paper is aimed at examining biophilic design principles in drug rehabilitation centres in Nigeria.

2.0 Literature Review

2.1 Drug Addiction Treatment and Recovery

Addiction is a preventable and treatable disease. Discoveries in the science of addiction have led to advances in drug abuse treatment that help people stop abusing drugs and resume their productive lives. Addiction need not be a life sentence. Like other chronic diseases, addiction can be managed successfully. Treatment enables people to counteract addiction's powerful disruptive effects on brain and behaviour and regain control of their lives.

Research shows that combining a therapeutic environment, treatment medications (where available), and behavioural therapy is the best way to ensure success for most patients (Naomma, 2014).

2.2 Theory of Biophilia

The theory of biophilia was introduced in 1984 by socio-biologist Edward O. Wilson in his book of the same name. However, the first time the notion of biophilia was mentioned was in the late 1960's by Erich Fromm, a German social psychologist. Fromm hypothesized that people have a passionate love of life and all that is alive; it is the wish to further growth, whether in a person, a plant, an idea, or a social group (Fromm, 1973). Wilson's theory of biophilia states that humans have an innate tendency to focus on life and lifelike processes (Wilson & Kellert, 1993).

2.3 Biophilic Design

Steven Kellert, a Professor of Social Ecology at Yale, has taken the biological theory of biophilia and applied it to the built environment, coining the term "biophilic design". The goal of biophilic design is to translate an understanding of biophilia into the design of the built environment, resulting in beneficial contact between people and nature within modern buildings and landscapes (Kellert, 2012).

2.4 Dimensions of Biophilic Design

Biophilic design contains two main dimensions: the "organic or naturalistic" dimension and the "place-based or vernacular" dimension (Gamble *et al.*, 2014).

2.4.1 Organic or Naturalistic Dimension of Biophilic Design.

The organic dimension of biophilic design is shapes and forms in the built environment that directly, indirectly, or symbolically reflect the inherent human affinity for nature (Na-umma, 2014). Nature can be experienced directly, indirectly, and symbolically under this dimension of biophilic design.

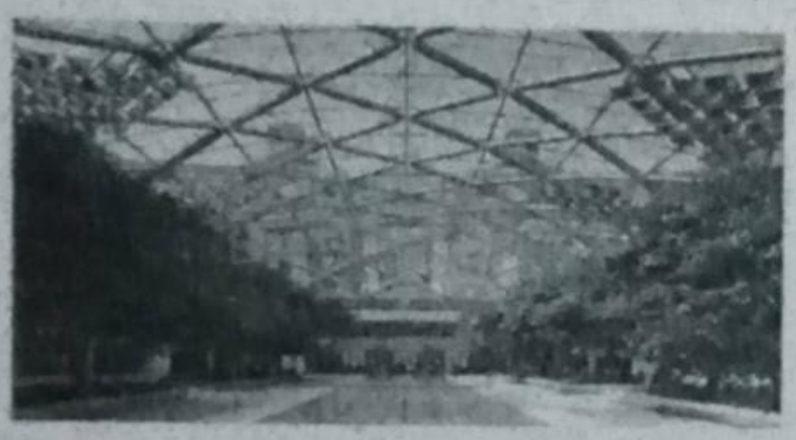


***Figure 1**: Direct connections to nature afforded by natural light and vegetation within an atrium.*

***Source**: (http://www.princeton.edu/pr/pwb/05/0530/3a.shtml).*

2.4.2 Vernacular Dimension of Biophilic Design

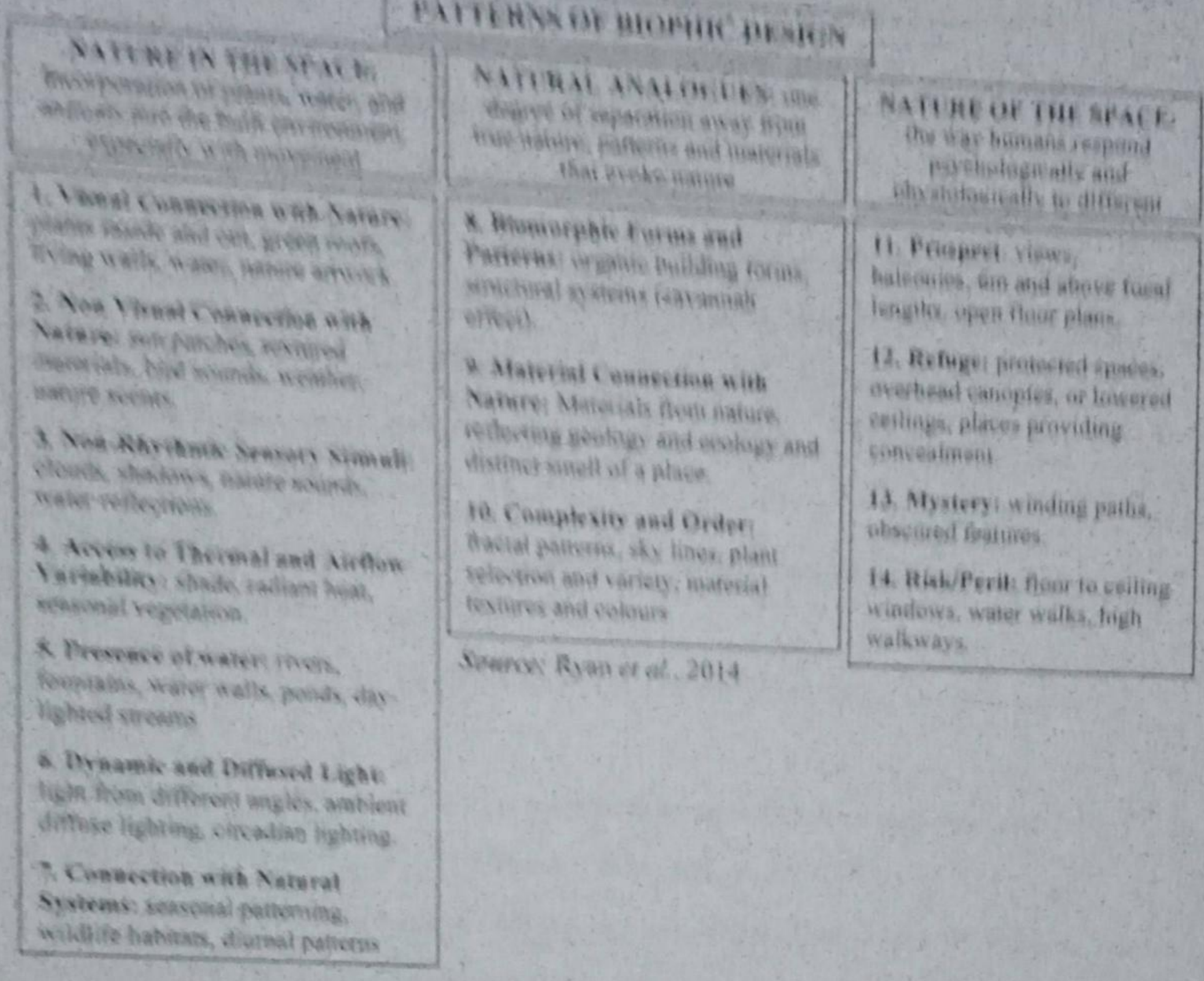
The vernacular dimension of biophilic design involves buildings and landscapes that connect to the culture and ecology of a locality or geographic area (Hildago, 2014). Vernacular design is a means of creating spaces that reflect the places people live and work and avoid the placelessness prevalent in the built environment today. Furthermore, Kellert *et al.* (2008) classified four different types of vernacular dimensions of biophilic design. These include; Vernacular Design Relating to Ecology of a Place, Vernacular Design Relating to Culture and History of a Place, Vernacular Design Fusing Culture and Ecology and Vernacular Design Avoiding Placelessness.

2.5 Patterns of Biophilic Design

Ryan *et al.* (2014) refined the six elements and seventy design attributes of Biophilic design with supportive qualitative and quantitative research in both the physiological and the psychological. They recognized that previous design attribute lists were unwieldy and potentially confronting for designers, and then consolidated the design attributes to the following fourteen patterns within three categories as illustrated in **Table 1.0** below

While informed by science, biophilic design patterns are not formulas; they are meant to inform, guide and assist in the design process and should be thought of as another tool in the designer's toolkit. The purpose of defining these patterns is to articulate connections between aspects of the built and natural environments and how people react to and benefit from them.

Table 1.0 Patterns of Biophilic Design



2.6 Benefits of Biophilic Design to Patients' Health

Evidence from over three decades of research on the impact of nature on human health and wellbeing can justify the claim that Biophilic design is beneficial to patients' health (Gillis & Gatersleben, 2015).

The most significant body of research to date has shown a strong positive correlation between exposure to nature and psychological well-being measured in a range of ways, including mental restoration, self-esteem, attachment, and anger (Barton & Pretty, 2010; Dallimer *et al.*, 2012).

2.7 Application of Biophilic Design in Health Facilities.

The evolution of Biophilic design characteristics has led to the recently published document "The Practice of Biophilic Design" by Stephen Kellert and Elizabeth Calabrese (2015). There are three kinds of experience of nature that represent the basic categories of Biophilic design framework. These include the **direct experience of nature, the indirect experience of nature, and the experience of space and place** (Kellert & Calabrese, 2015).

2.7.1 Direct Contact with Nature

The direct experience of nature refers to actual human contact with environmental features in the built environment. Which comprises of;

1. Natural Features: Water, Air (Natural Ventilation), Sunlight (Daylight) and Vegetation (Plants)
2. Views and Vista: Recovery and patient's wellbeing set upon the natural scenes that are conveyed from the outdoor natural environment (AbdelMeguid, 2014)
3. Natural Landscape and Ecosystem: When design is done considering the natural landscape and ecosystem, long-term sustainability is achieved (Lecklear, 2012).
4. Façade Greening

Figure 2: Nature features in the built environment at Henry Ford West Bloomfield Hospital
Source: *https://www.nytimes.com/2016*

Figure 3: *Façade greening at Haushan Hospital, Shanghai China*
Source: *https://www.greshamsmith.com*

2.7.2 Indirect Contact with Nature

The indirect experience of nature refers to contact with the representation or image of nature, the transformation of nature from its original condition, or exposure to particular patterns and processes characteristic of the natural world. This can be expressed by the use of:

1. Natural materials

2. Natural Colours: Colour affect human behaviour, controls stress, affect the healing status of patients (AbdelMeguid, 2014).

3. Natural Shapes, Forms and Patterns

4. Images of Nature: A recent study by *Gamble et al.*, (2014) concluded that brief viewing of nature pictures offers an inexpensive and enjoyable way to temporarily boost cognitive function in both young and older adults.

Figure 4: *Use on natural materials at St. Bernard Parish Hospital, New Orleans USA*
Source: *https://www.greshamsmith.com*

Figure 5: *Natural patterns on facade at Airspace Tokyo, Japan*
Source: *https://www.flickr.com*

2.7.3 Experience of Space and Place

The experience of space and place refers to spatial features characteristic of the natural environment that have advanced human health and wellbeing.

1. Transitional spaces and Bounded spaces: Transitional spaces include hallways, thresholds, doorways, gateways, and areas that link the indoors and outdoors especially porches, patios, courtyards, colonnades, and more which when well-planned enhance easy use of building spaces. (Kellert & Calabrese, 2015). Bounded spaces give patients a sense of privacy, security and territoriality (Kellert, 2008).

2. Security and Protection

3. Spatial Harmony and Spaciousness

4. Attraction and Beauty

5. Connection to Place. Architecture of Place is about creating designs that make people feel empowered, important, and excited to be in the places they inhabit in their daily lives.

6. Mobility and Way finding: People's comfort and wellbeing often relies on freely moving between diverse and often complicated spaces.

3.0 Methodology

The research employed the descriptive research method which engaged the use of purposefully and well-structured observation schedules to obtain relevant data for the study. A sample of Rehabilitation Centres in Nigeria was selected and used for the study. Convenience Sampling was used for the selection of samples, as selection was done based on rehabilitation Centres that were easily accessible due to the sensitive nature of some rehabilitation Centres in Nigeria. The biophilic elements (variables) observed in the samples taken were targeted towards assessing the following: **direct contact with nature, indirect contact with nature and Experience of Space and Place**

The Rehabilitation Centres observed are;

i. Ekiti State Government relief and rehabilitation centre, Ekiti State.

ii. Plateau State rehabilitation centre, Jos, Nigeria.

iii. Bauchi State rehabilitation centre, Bauchi, Nigeria.

iv. Rehabilitation Centre for the disabled, Moniya, Ibadan. Oyo state.

v. Quintessential Healthcare Centre, Jos, Plateau State

Table 3.0 Assessment of key biophilic elements that reveal indirect contact with Nature

S/N	List of Rehabilitation Centres	Natural Materials	Natural Colours	Natural Forms, Shapes and Patterns	Images of Nature
1.	Ekiti State Rehabilitation Centre	X	X	X	X
2.	Plateau State Rehabilitation Centre	X	X	X	X
3.	Bauchi State Rehabilitation Centre	X	X	X	X
4.	Rehabilitation Centre, Moniya, Ibadan, Oyo state.	✓	X	X	X
5.	Quintessential Healthcare Centre	X	X	X	✓
	Total (%)	**20**	**0**	**0**	**20**

✓ – Available X – Not available.

Source: Authors

The result obtained in **Table 3.0** above shows that none of the rehabilitation centres featured the use of natural colours as well as natural forms, shapes and patterns. However, only 20% of the rehabilitation centres employed the use of natural materials and also images of nature within their spaces. The results show that spaces within these rehabilitation centres provide users with inadequate indirect contact with nature.

Furthermore, the result obtained in **Table 4.0** below shows that 60% of the rehabilitation centres have staircases with widths that are ≥1.5m (which is regarded as adequate for staircases), none of which have natural features along staircases. Also, 40% possess lobbies/halls that have widths ≥2m (which gives an acceptable range of widths for lobbies/halls) and none of the rehabilitation centres have natural features along lobbies/halls. In addition, 40% of the rehabilitation centres have walkways with widths falling within the acceptable range ≥1.2m and only 40% feature natural features along walkways. Further results reveal that only 40% of the rehabilitation centres possess well-spaced public spaces such as receptions and visiting areas and only 20% feature any form of connection to nature within those spaces.

Table 4.9 Assessment of key biophilic elements that reveal experience of place and space

S/N	List of Rehabilitation Centres	Statircases		Lobbies Halls		Walkways		Public Spaces	
		Width Allow	Natural Features	Width Allow	Natural Features	Width Allow	Natural Features	Attractive	Connection to Nature
1.	Ekiti State Rehabilitation Centre	X	X	X	X	X	X	X	X
2.	Plateau State Rehabilitation Centre	✓	X	X	X	X	✓	X	X
3.	Bauchi State Rehabilitation Centre	✓	X	✓	X	X	X	✓	X
4.	Rehabilitation Centre, Moniya, Ibadan Oyo state	X	X	X	X	✓	✓	X	X
5.	Quintessential Healthcare Centre	✓	X	✓	X	✓	X	✓	✓
	Total (%)	**60**	**0**	**40**	**0**	**40**	**40**	**40**	**20**

✓ – Available X – Not available

Source: Authors

The result obtained in **Table 5.0** below shows that none of the rehabilitation centres feature natural elements within their wards or spatial harmony of the built and natural environments surrounding the buildings. Whereas, 20% incorporated the use of traditional building materials and indigenous cultural elements within spaces.

Table 5.0 Assessment of key biophilic elements that reveal experience of place and space

S/N	List of Rehabilitation Centres	Natural features in Wards	Traditional Building Materials	Indigenous (Cultural) Elements	Spatial Harmony of Natural and Built Environments
1.	Ekiti State Rehabilitation Centre	X	X	X	X
2.	Plateau State Rehabilitation Centre	X	✓	X	X
3.	Bauchi State Rehabilitation Centre	X	X	X	X
4.	Rehabilitation Centre, Moniya, Ibadan Oyo state	X	X	✓	X
5.	Quintessential Healthcare Centre	X	X	X	X
	Total (%)	**0**	**20**	**20**	**0**

✓ – Available X – Not available

Source: Authors

Figure 4: Courtyard Green Plaza in rehabilitation centre for Nigeria
Source: Author's Field work (August 2018)

Figure 5: Shading vegetation covers and notable trees and flowers in Rehabilitation centre for the disabled, Moniya, Ibadan
Source: Authors' Field work (August, 2018).

5.0 Conclusion

From the study it is clear that most of these rehabilitation Centres possessed biophilic elements within their surroundings, but however direct contact with nature was only featured outside the buildings and not within interior spaces. Also, indirect contact with nature was a feature that was seldom observed within interior spaces. In addition, the study revealed that the experience of place and space was not sufficiently introduced into interior spaces, thereby revealing little connection between people and their culture and indigenous environments.

This study therefore indicates that biophilic design principles have not really been incorporated as strong features in the design of rehabilitation Centres in Nigeria as passive and sustainable measures for fostering rehabilitation and in turn, drug de-addiction.

5.0 Recommendation

From the study, these recommendations can be applied to improve the design and operation of rehabilitation Centres in Nigeria:

i. Biophilia should be adopted as a design principle for the design of health and rehabilitation Institutions as Government policy for better result in the recovery and rehabilitation process.

ii. Local and indigenous Architecture, building materials, historical elements and cultural features should be used in the development of rehabilitation Centres around Nigeria, as this will make for better connection between people and their traditional habitat which in turn will enhance rehabilitation and recovery.

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