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Research Paper

Impacts of Salutogenic Design Strategies on Rehabilitation Centres in Southwest, Nigeria

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Abstract
Salutogenic design emphasizes holistic features that promote health and well-being. This study explores the impact of salutogenic design strategies such as cultural elements, artistic features, private reflection rooms, communal spaces, natural lighting and nature on rehabilitation centres in Southwestern Nigeria. Through an evaluative approach, the study examines three existing rehabilitation centres, their design characteristics and respondents' perception of the salutogenic elements and effectiveness in enhancing well-being. The research employed a multistage sampling technique, case study approach and data were gathered from 263 respondents. Findings show that design characteristics like easy movement of people through spaces is available in the rehabilitation centres, while private reflection rooms had the lowest availability. Salutogenic strategies such as natural lighting was considered the most important, outdoor therapy sessions rated the least important. Respondents in the selected rehabilitation centres rated strategies like natural lighting the most significant and recreational spaces was placed in the lower significance group. The study reveals the significance of integrating salutogenic strategies into future rehabilitation centre designs to create sustainable, health-promoting environments.

Keywords: *Salutogenic Design, Rehabilitation Centres, Environmental Psychology, Patient Well-being, Sustainable Design.*

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I. Introduction

Health is not merely the absence of disease but a state of complete physical, mental, and social well-being, as defined by the World Health Organization. The environment in which individuals live, work, and receive medical care plays a crucial role in their overall health and recovery process. With undergoing changes in world's population characteristics and health, this means the need for rehabilitation is going to increase in subsequent years. Since health conditions can impact an individual's functioning and are linked to increased levels of disability, rehabilitation can be advantageous. (World Health Organisation, 2022).

However, natural spaces have been connected to a wide range of health benefits, such links have been well known (Van den Bosch, Sang, 2017). Therefore, a holistic approach to rehabilitation focuses on finding new meanings and achieving security through both conscious and unconscious methods. Rehabilitation centres, designed to support individuals recovering from injuries, illnesses, and mental health conditions, must go beyond medical treatments to create spaces that actively promote healing.

The concept of salutogenic design, which emphasizes health-promoting environments, is increasingly gaining recognition in architecture and healthcare. Rehabilitation centres, which cater to individuals recovering from physical, cognitive, and psychological conditions, can greatly benefit from these design strategies. In Nigeria, rehabilitation centres often prioritize functionality over holistic well-being, leading to gaps in patient-centered recovery approaches.

This study evaluates the impact of salutogenic design strategies in rehabilitation centres across Southwestern Nigeria.

Rehabilitation facilities play a crucial role in providing comprehensive care and therapy for individuals recovering from various health challenges (Gutenbrunner et al., 2020). However, many existing centres lack architectural elements that contribute to the holistic well-being of users. The integration of salutogenic design principles can address this gap by creating environments that foster recovery, reduce stress, and improve overall health outcomes. The importance of biophilic elements, such as natural ventilation, green spaces, and therapeutic

landscapes, has been widely acknowledged in global healthcare architecture, but their implementation in Nigerian rehabilitation centres remains limited. This research seeks to bridge this gap by examining existing rehabilitation centres in Southwestern Nigeria, assessing their design characteristics, and evaluating how salutogenic elements can be effectively incorporated to enhance patient recovery and staff well-being. Through a combination of case studies, surveys, and observational analysis, the study provides a framework for integrating salutogenic principles into the design of a rehabilitation centre.

Conceptualization and Review of the Literature

Globally, an estimated 2.4 billion people are currently living with medical conditions that may benefit from rehabilitation (Cieza et al., 2020). The need for rehabilitation worldwide is predicted to increase due to changes in the health and characteristics of the population. For example, people are living with more chronic disease and disabilities yearly. Currently, the need for rehabilitation is largely unmet. In some low- and middle-income countries, a lot of people do not receive the rehabilitation services they require. Emergencies including conflicts, disasters and outbreaks create enormous surges in rehabilitation needs while also disrupting rehabilitation services. Rehabilitation is an imperative part of universal health coverage and an approach to achieve Sustainable Development Goal "Ensure healthy lives and promote well-being for all at all ages." (United Nations, 2015). Rehabilitation centre is an institution, other than a hospital, which provides rehabilitative services such as physiotherapy, occupational therapy, treatment for physical injury, disabilities, mental health conditions, substance abuse. Patients are constantly facing uncertainty about their health, often feeling stressed when not in treatment. An improved hospital environment can cut costs from airborne ailments by 9–20% (Stockwell, 2019) and also support individuals of all ages in attaining independence in daily activities.

Salutogenesis is derived from the Latin word "salus" (health) and the Greek word "genesis" (origin), interpreted as "origin of health." It focuses on creating environments that improve well-being rather than just treating illness (Kaur, 2022). Aaron Antonovsky introduced this concept in the 1970s, emphasizing its relevance in healthcare settings. Architectural interpretations of salutogenesis integrate biophilic design, natural ventilation, and spatial harmony to reduce stress and improve recovery outcomes. The advantages of salutogenic design are mainly based on the three concepts of sense of coherence, which are sense of comprehensibility, sense of manageability, sense of meaningfulness. Sense of comprehensibility refer to how people can understand, make sense of their environment and experiences. Sense of manageability means ability of an individual to cope with challenges. Sense of Meaningfulness is the belief that life is purposeful and challenges are worth overcoming.

II. Materials and Methods

Study Area

The study was based in Ayede, a town under Ogo-Oluwa Local Govement, in the Guinea Savannah zone and Northeast of Oyo state that is in Southwestern Nigeria. Yoruba people are the dominating tribe in this region. With its scenic beauty and landscape, the town showcases a blend of traditional and contemporary architecture.

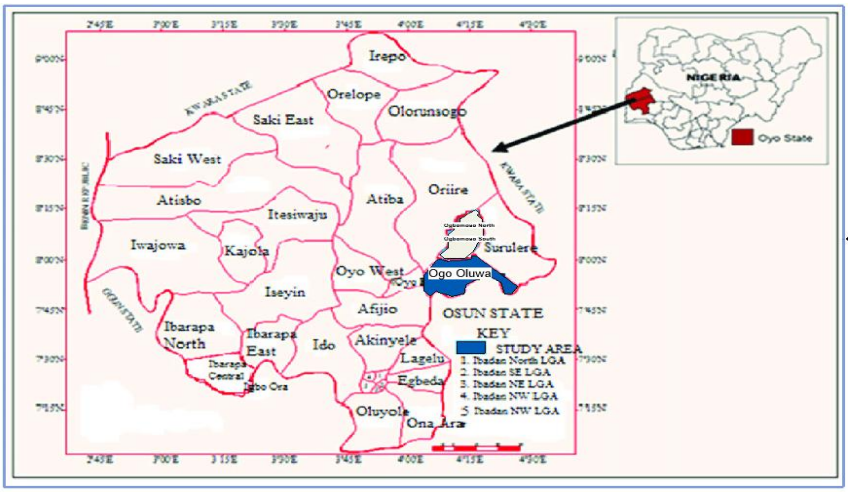

Figure 2: Oyo State map showing all the Local Governments
Source: Somuyiwa, Adepoju, and Odepidan (2020)

III. Methodology

This research employed multistage sampling technique. The rehabilitation centres analyzed are those frequently used and purpse-built, while some informations were also obtained from the users.

Firstly, all the South-west rehabilitation centres were identified. Using stratified random sampling, the identified rehabilitation centres were categorized based on ownership into strata classification such as Federal, State or Private, which formed the sampling frame. From each stratum, all the purpose-built rehabilitation centres were purposively selected to form the sample size.

The first stage which was stratification of the region into states include Ekiti, Lagos, Ogun, Ondo, Osun and Oyo. A total number of fifty-five (55) rehabilitation centres were recorded in south-west Nigeria which represents the sample frame. Thirty-eight (38) of them are private, eight (8) are State and the remaining nine (9) are Federal Rehabilitation Centres. These constitute the sampling frame for the study as shown in Table 1.

Table 1: List of Rehabilitation Centres in South-Western Nigeria

S/N	STATES	NAME OF FEDERAL REHABILITATION CENTRES	NAME OF STATE REHABILITATION CENTRES	NAME OF PRIVATE REHABILITATION CENTRES	TOTAL
1.	Ekiti	Centre for development, rehabilitation and research, Ado Ekiti	-Ekiti state Government relief and rehabilitation centre, Ado Ekiti	-Adetade Rehabilitation centre, Ado Ekiti -PEAK physiotherapy and wellness centre	4
2.	Lagos	University of Lagos Rehabilitation Centre (UNILAG)	Lagos state University, Rehabilitation Centre, Ojo (LASU)	-Adicare Rehabilitation Home, Lagos -Anchor University Medical centre, Ayobo. -Hakron specialist care hospital, Oshodi. -Wellspring Rehabilitaion Centre, Apapa -House of Refuge, Lekki -Tranquil and Quest, Lekki -Augustine University Teaching Hospital, Lagos -Cadam Rehabilitation Centre, Epe -Caleb University, Rehabilitation Centre, Lagos, -Eko University of medical and Health Science, Ijanikin -KFS-Blessing traditional Healing Centre, Lagos -Gracehill Hospital & Rehab Lagos -Owodunni Adekunle Herbal Home International Rehabilitation Centre,, Ayetoro -Pan Atlantic University, Rehabilitation Centre, Lagos -St. Innocent Rehabilitation & Nursing Centre	17
3.	Ogun	-Federal University of Agriculture, Medical centre -Federal Neuropsychiatric Hospital, Abeokuta	-Moshood Abiola University of Science and Technology Medical Centre	-Babcock University Teaching Hospital Wellness and Rehabilitation Centre, Ilishan-Remo -Hope Resources Day Centre, Abeokuta	5
4.	Ondo	-Rehabilitation Centre, Oke Igbo, Ondo State -Gani Fawehinmi Health Diagnostic & Rehabilitation centre.	-Ondo State University Teaching Hospital, Rehabilitation Centre Department	- Rehabilitation Drug Addict Centre, Ondo -Elizade University, Ilara-Mkin	5
5.	Osun	- OAU, Teaching Hospital Rehabilitation Centre, Ile-Ife, Osun state. -PHC Iragbiji, Ifon Osun	-Egbeda Health Rehabilitation Facility, Osogbo -Osun state University Health Rehabilitation Centre, Osogbo	-Adonai Medical Rehabilitation Clinic and Gym Centre, Ile-Ife, Osun state -De Noble physiotherapy clinic Home, Oke Ila street, Osogbo -ELAPOP Rehab Centre -Lifefirst Hospital & MDC W/A Ltd, Osogbo -Point of care physiotherapy clinic limite, Osogbo -St. Mary Rehabilitation Centre, Ipetumodu, Osun -Vifern Rehabilitation Centre, Osogbo -Wolbern Hospital, Osogbo	13

				-Wellness Rehabilitation Clinic, Osogbo	
6.	Oyo	University of Ibadan Teaching Hospital (UCH) Rehabilitation Centre, Ibadan	- Oyo state Rehabilitation Centre, Adeoyo, Ring road, Ibadan -Ladoke Akintola University of technology, (LAUTECH), Rehabilitation Centre, Ogbomoso.	-As Sobour Health Care and Ruqyah Rehabilitation Centre, Ibadan -Bowen Teaching Hospital Rehabilitation Centre, Ogbomoso -Compassionate Recovery Centre, Ibadan -Emmanuel Alayande Rehabilitation Centre, Ibadan -Prison Rehabilitation and Law Abiding Organisation, Ibadan -Sir Kesington Adebutu Geriatric Rehabilitation Centre, Ibadan -StalizWellness and Rehabilitation Centre, Ibadan -The Sanctuary Drug Rehabilitation Centre, Oyo	11
	TOTAL	**9**	**8**	**38**	**55**

Source: Federal ministry of Health, 2024.

Using Slovin formula at 95% confidence level and a 0.05 margin of error, a sample size of 263 users, which represents 35% of the total population for the study were selected for questionnaire administration.

Table 2. Sample Size and Questionnaire Administration

S/N	*Name of rehabilitation centres and Location*	*Capacity of users*	*Sample size (35%)*
1	Ekiti State Government Relief and Rehabilitation Centre, Ado Ekiti Cadam Rehabilitation Centre, Epe, Lagos state	200	70
2	Federal Neuropsychiatric Hospital, Abeokuta, Ogun state.	250	88
3		300	105
	TOTAL	**750**	**263**

Source: Author's Compilation (2024)

IV. Results and Discussion

Integrate the Roles of Salutogenic Design Strategies in Rehabilitation Centres to Promote Health and Wellbeing IRSDSRCPHW

The data from Table 3 examines the role of salutogenic design strategies in promoting health and well-being in rehabilitation centres. Each strategy is rated across five response categories, ranging from "Strongly Agree" to "Strongly Disagree." Access to gardens or green spaces received MWV of 4.52 and standard deviation of 0.66**,** showing a strong consensus on its critical role in promoting recovery and well-being. Green spaces contribute to mental relaxation, stress reduction, and overall recovery, as reflected by the high number of "Strongly Agree" responses. Natural lighting, with MWV of 4.63, standard deviation of 0.63, highlights its perceived importance for bone health and immune function. While its score is among the highest, its contribution is significant in creating a healing environment. Communal spaces scored MWV of 4.00, standard deviation of 0.64**,** showing their positive social implications; however, they may be considered slightly less critical than other factors such as ventilation and private spaces. Natural ventilation, with MWV of 4.54, standard deviation of 0.71**,** ranks high in importance. It significantly impacts indoor air quality, directly influencing users' health and comfort. Private spaces scored MWV of 4.08, standard deviation of 0.65**,** showing their essential role in maintaining emotional well-being and catering to individual recovery needs. This reveals a strong preference for personal space as a factor in ensuring users' satisfaction and emotional stability. Therapy rooms recorded MWV of 4.21, standard deviation of 0.84, highlighting their critical role in integrating salutogenic design elements to optimize patient recovery. Recreational spaces scored MWV of 3.80 and standard deviation of 0.80, showing their role in promoting holistic healing and satisfaction. Recreational activities provide avenues for relaxation and physical engagement, essential for overall health. Water features, with MWV of 4.15 and standard deviation of 0.75**,** are acknowledged for their calming and therapeutic effects. Although not the highest priority, they contribute to creating a serene and healing environment. Artistic features, such as murals and sculptures, scored MWV of 4.25 and standard deviation of 0.61**,** showing their role in fostering a positive and healing atmosphere, emphasizing the importance of aesthetics in improving psychological well-being. Access to the natural environment recorded MWV of 4.24 and standard deviation of 0.78, emphasizing its importance in enhancing staff productivity and patient satisfaction. Noise control scored MWV of 4.02, and standard deviation of 0.65, ranking moderately among the strategies. This highlights its

critical role in ensuring a peaceful environment that supports optimal patient outcomes by minimizing stress and distractions.

The results reveal that different salutogenic design strategies contribute variably to health and well-being in rehabilitation centres**.** Natural lighting, natural ventilation, and access to green spaces emerged as the most significant factors due to their direct impact on patient recovery. Water features and access to natural environments were also prioritized, showing the importance of environmental factors in creating a therapeutic setting. In contrast, communal spaces and recreational spaces were perceived as relatively less critical; although they contribute to the overall ambiance, they may not address the immediate physiological health needs of patients as effectively as other strategies. Rehabilitation centres should prioritize strategies with high MWV values, such as natural lighting, ventilation, green spaces, and therapy rooms**,** while still incorporating complementary strategies like communal spaces and recreational spaces to enhance the overall healing environment.

Table 3. Integrate the Roles of Salutogenic Design Strategies in Rehabilitation Centres to Promote Health and Wellbeing IRSDSRCPHW

Salutogenic Design Strategies	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	Total Frequency (f)	TWV	MWV	Standard Deviation (σ)
Access to gardens or green spaces improves recovery and wellbeing.	163	75	25	0	0	263	1190	4.52	0.66
Natural lighting is essential for bones' health and immune function.	189	52	22	0	0	263	1219	4.63	0.63
Communal spaces encourage social interaction, which positively affects patient recovery.	52	163	45	3	0	263	1053	4.00	0.64
Natural ventilation enhances indoor air quality and supports patient health.	175	55	33	0	0	263	1194	4.54	0.71
Private spaces are essential for preserving the emotional wellbeing of patients.	65	155	41	2	0	263	1072	4.08	0.65
Therapy rooms with salutogenic design elements improve recovery rate.	120	83	55	5	0	263	1107	4.21	0.84
Recreational spaces contribute to holistic healing and patient satisfaction.	56	107	92	8	0	263	1000	3.80	0.80
Water features (e.g., fountains, pools) have a calming effect on patients and staff.	95	115	51	2	0	263	1092	4.15	0.75
Artistic features (e.g., murals, sculptures) create a positive and healing atmosphere.	90	148	25	0	0	263	1117	4.25	0.61
Access to natural environments (e.g., green landscapes) enhances staff productivity and satisfaction.	120	86	57	0	0	263	1115	4.24	0.78
Noise control measures in rehabilitation centres improve patient outcomes.	55	160	45	3	0	263	1056	4.02	0.65
Total								**46.44/11 4.22**	**7.72**

Source: Author's Field Survey, 2024
TWV: Total Weight Value
MWV: Mean Weighted Value

Data Validation

To assess the effectiveness of salutogenic design strategies in rehabilitation centres, a one-way ANOVA was conducted on the Mean Weighted Value (MWV) scores obtained from the survey responses. The MWV was calculated using the formula:

$$MVW = \frac{TWV}{Total\ Frequency}$$

where TWV is the total weighted value, and Total Frequency represents the number of respondents for each strategy. The ANOVA test produced a significant F-value of 5.13 with a p-value of 0.008, indicating substantial differences in the importance ratings of different strategies. Since ANOVA confirmed statistical variation, Duncan's Multiple Range Test (DMRT) was applied to determine which strategies significantly differed. The results grouped the strategies into three significance levels: high, moderate, and low. Strategies like natural lighting (Mean Weighted Value = 4.63)**,** natural ventilation (Mean Weighted Value = 4.54)**,** and green spaces (Mean Weighted Value = 4.52) were ranked the highest top 3, while recreational spaces (Mean Weighted Value = 3.80)**,** communal spaces (Mean Weighted Value = 4.00)**,** and noise control measures (Mean Weighted Value = 4.02) were placed in the lower significance group.

This analysis shows that there are meaningful differences in how these strategies contribute to rehabilitation. DMRT successfully categorized them, helping prioritize the most impactful ones. The results reveal that natural lighting, green spaces, and natural ventilation should be given priority, while noise control measures, communal spaces, and recreational features may be of lesser concern.

V. Conclusion

The study examines the roles of salutogenic design elements that maximize therapeutic effectiveness, sense of coherence and comfort in rehabilitation centres. Elements such as green spaces and gardens, communal areas, color, therapy rooms, water features, natural lighting, artistic features, noise control measure and natural ventilation are recommended to create a therapeutic environment that aid healing and job satisfaction.

VI. Recommendation

Integration of gardens, rooftop greenery, and water features in rehabilitation centres create restorative settings that reduce stress, while abundant daylight and cross-ventilation, achieved through skylights, large windows, and shaded outdoor areas ensure thermal comfort and high indoor air quality without focusing mainly on mechanical systems. Therapy rooms should combine soundproofing, ergonomic furnishings, calming color palettes, and flexible layouts to accommodate diverse treatment needs. Incorporating fitness zones, walking trails support holistic physical and psychological rehabilitation. Wide, barrier-free terrace, ramps, and clear wayfinding indications aid easy accessibility. Private meditation spaces offer quiet retreats for self-reflection. Local cultural motifs and materials enrich each space, while solar panels, rainwater harvesting, and other eco-technologies in a coherent, zoned master plan unite all elements to produce a health-promoting environment.

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