

Research Article

Socio-Spatial Ward Design and Perceived Therapeutic Benefits of Outdoor Environments in Nigerian Psychiatric Hospitals

Chijioke Chinyere Onwuzuligbo ¹ , Patrick Chukwuemeke Uwajeh ² , Timothy Onosahwo Iyendo ^{2,*} ,
Chukwunonso Obiefuna Umeora ¹ , Nkechi Maryann Maduka ¹ 

¹ Department of Architecture, Faculty of Environmental Sciences, Chukwuemeka Odumegwu Ojukwu University, Uli campus, Anambra State, 431124, Nigeria

² Department of Architecture, Faculty of Environmental Sciences, Nile University of Nigeria, Abuja, 900001, Nigeria

* Corresponding Author: Timothy Onosahwo Iyendo, E-mail: timothy.iyendo@nileuniversity.edu.ng

Article Info	Abstract
Article History	While environmental psychology theories support the therapeutic potential of the outdoor environment in hospitals, studies are predominantly from Western cultures. Little is known about such associations in a socio-culturally and economically diverse setting. This study investigated the influence of patient characteristics and ward attributes on patients' perceptions of the therapeutic value of outdoor environments in four tertiary psychiatric hospitals in southeastern Nigeria. Using a quantitative cross-sectional design, data were collected from 123 inpatients with three validated tools and analyzed using quantile regression: the Inpatient Demographic and Admission Self-Report Questionnaire, the Socio-Spatial Ward Attribute Checklist, and the Perceived Influence of Ward Attributes on Outdoor Therapeutic Experience Scale. Quantile regression analysis revealed that specific ward attributes, including layout, dominant outdoor view, social density, outdoor access modality, and nursing station configuration, were significant and meaningful predictors of perceived therapeutic value. In contrast, patient characteristics such as age, length of stay, and history of admissions were non-significant predictors, while gender had a statistically significant but negligible practical influence. This reinforces the dominant role of spatial design in deriving therapeutic value from outdoor environments, but with nuanced interpretations. Findings contribute to an emerging discussion on privacy and restorativeness, highlighting social dynamics in shared psychiatric wards and a conditional preference for grey outdoor views. The study offers context-specific, evidence-based design guidance for low-resource mental health systems seeking to enhance autonomy, dignity, and recovery through socially and culturally relevant environmental interventions.
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1. Introduction

Outdoor environmental affordances are gaining recognition for their potential to facilitate recovery from mental and physical health conditions, offering benefits such as stress reduction, increased

socialization and peer support, enhanced autonomy and a sense of freedom, cognitive benefits through distraction and focused engagement, and encouragement of physical activity [1]. These benefits position outdoor environments as an integral, rather than supplementary, component of comprehensive psychiatric treatment, suggesting that their inclusion and optimal design are not merely aesthetic enhancements but are fundamental to achieving holistic patient recovery across the psychological, social, physical, and cognitive dimensions of health [2].

This therapeutic potential is generally supported by environmental psychology and design theories such as Attention Restoration Theory, Stress Reduction Theory, Supportive Design, and Biophilic Design theory, which provide a baseline expectation that access to and views of nature within psychiatric settings should generally yield significant therapeutic benefits [3-5]. However, the applicability of this understanding may require further investigation due to contextual differences in cultural and social origins, which can significantly influence the perception and interpretation of design features [6-8].

1.1. Research Problem and Gap

In low- and middle-income countries such as Nigeria, mental healthcare is grossly underfunded, and research in this area is limited [9]. As such, Western models of care have typically been imported without sufficient adaptation to local realities in terms of environmental and social cues that are truly meaningful to patients [10]. Moreover, given differing social, cultural, economic, and individual developmental factors, the perceptual interpretations of and satisfaction with the healing affordances commonly associated with nature may not conform to generalized findings from other contexts [11,12]. Unlike Western and High-Income contexts, where intentionally integrating natural elements at micro, meso, and macro levels of stressed spaces has gained growing recognition, the Nigerian mental health service continues to grapple with limited awareness, institutional neglect, funding shortages, and pervasive stigma [9,13-15]. These factors negatively shape the design of hospital environments and personal interpretations of such settings.

Consequently, deviations from the generic understanding of the perception of environmental features may exist within the Nigerian context, as a recent study in southeastern Nigeria suggests [16]. This deviation indicates that the mechanisms through which outdoor environments become "therapeutic" may not be universally applied, but may be shaped by local social, cultural, and practical factors even within healthcare settings.

1.2. Research Goal, Objectives, and Hypothesis

To the best of our knowledge, there is currently no study that investigates how various patients perceive outdoor environments through the subjective experience of ward environments in southeastern Nigeria, hence this study. Therefore, this study investigates the influence of patients' characteristics and socio-spatial ward attributes on patients' perceived therapeutic value of outdoor environments in psychiatric

hospitals in southeastern Nigeria. Specifically, the study explores how factors such as age, gender, mode of admission, number of admissions, and length of stay (patient characteristics), alongside social density, type of ward layout, nursing station configuration, outdoor access modality, predominant outdoor view, and communal area for meeting visitors (ward attributes), influence patient perceptions of the therapeutic value of these outdoor spaces within the unique socio-cultural context of Southeastern Nigeria.

Hypothesis: Psychiatric ward attributes and patient characteristics are not significantly associated with patients' perceived therapeutic value of outdoor environments in Southeastern Nigeria.

2. Literature review

2.1. Therapeutic Environments in Psychiatric Settings

Therapeutic environments in healthcare settings are designed to promote physical, psychological and social well-being [17-19]. In the context of this study, the therapeutic value of outdoor environments refers to the perceived capacity of outdoor environments within psychiatric settings to support emotional regulation, alleviate psychological distress, and facilitate cognitive restoration. This conceptualization aligns with findings from environmental psychology and is operationalized through aggregated patient-reported experiences of autonomy, privacy, social connection and interaction, as well as perceived safety and aesthetic satisfaction [2, 20]. These dimensions are essential in psychiatric care, where patients often experience heightened levels of psychological strain [1, 21].

2.2. Environmental Psychology and Design Theories

The nexus between the outdoor environment and beneficial effects on mental health is supported by theoretical frameworks rooted in environmental psychology. Specifically, this study is undergirded by Stress Reduction Theory (SRT), Attention Restoration Theory (ART), Theory of Supportive Design (TSD), and Biophilic Design Theory (BDT). SRT and ART highlight nature's restorative power but focus on different mechanisms. SRT emphasizes stress reduction through positive psychological and physiological responses to nature [5]. In contrast, ART focuses on the cognitive dimension, proposing that nature aids recovery from mental fatigue by engaging attention effortlessly and allowing for cognitive restoration [22]. Both theories highlight nature's dual capacity to support emotional and mental recovery and are highly valuable assets in psychiatric settings where patients experience high psychological strain. This study applies these theories to evaluate how Nigerian psychiatric ward environments support such restorative experiences through their outdoor affordances. The Theory of Supportive Design (TSD) offers a comprehensive framework for designing healing environments. It emphasizes design elements that foster a sense of control, social support, and positive distractions in patients [4, 23]. BDT acts as an overarching concept, positing an innate human need to connect with nature by integrating natural elements and patterns

into built environments to enhance well-being [24-26].

Indeed, the rationale for adopting these theories in the Nigerian context is to test their universality. While these theories have a strong foundation in Western-centric research, this study's primary goal is to examine if and how these principles translate to a socio-culturally and economically diverse setting. The investigation seeks to determine if the mechanisms through which outdoor environments become "therapeutic" are universally applied, or if local social, cultural, and practical factors shape them. This approach enables us not only to validate these established theories but also to nuance their application, potentially revealing new insights relevant to low-resource settings.

3. Materials and Methods

3.1. Study Design and Ethics

This study employed a quantitative cross-sectional research design, underpinned by a positivist philosophical framework, to investigate the perceived therapeutic value that patients associate with their outdoor environments across four selected public tertiary health facilities in Southeastern Nigeria. Data were collected using structured, self-administered questionnaires, allowing for the systematic quantification and statistical analysis of patient perceptions within an objective, empirical framework. The research protocol was approved by the Research and Ethics Committees of the participating hospitals due to industrial action at the host institution.

3.2. Study Setting

Four participating facilities were randomly selected from each cluster following the grouping of all public tertiary healthcare facilities in Southeastern Nigeria that provided inpatient psychiatric services at the time of the survey (2022). Figure 1 shows the participating facilities, and they include:

1. State Neuro-Psychiatric Hospital, Nawfia, Anambra state (SNH)
2. Psychiatric Department of Enugu State University Teaching Hospital, Parklane (ESUTH)
3. Federal Neuro-Psychiatric Hospital, New Haven (FNH)
4. Department of Mental Health of Federal Medical Centre, Umuahia, Abia State (FMC)

Furthermore, Southeastern Nigeria, also known as Igboland, was specifically chosen for this study because it is a culturally homogeneous region with a unique social structure rooted in kinship and communal living. This cultural context offers a unique setting to explore how environmental psychology and design principles are perceived by a population that places a high value on social interaction and community. The selection of these four tertiary psychiatric hospitals within this specific region provides a controlled, yet diverse, sample for a quantitative cross-sectional design, allowing the study to provide context-specific insights while also contributing to the broader academic discourse on therapeutic environments.

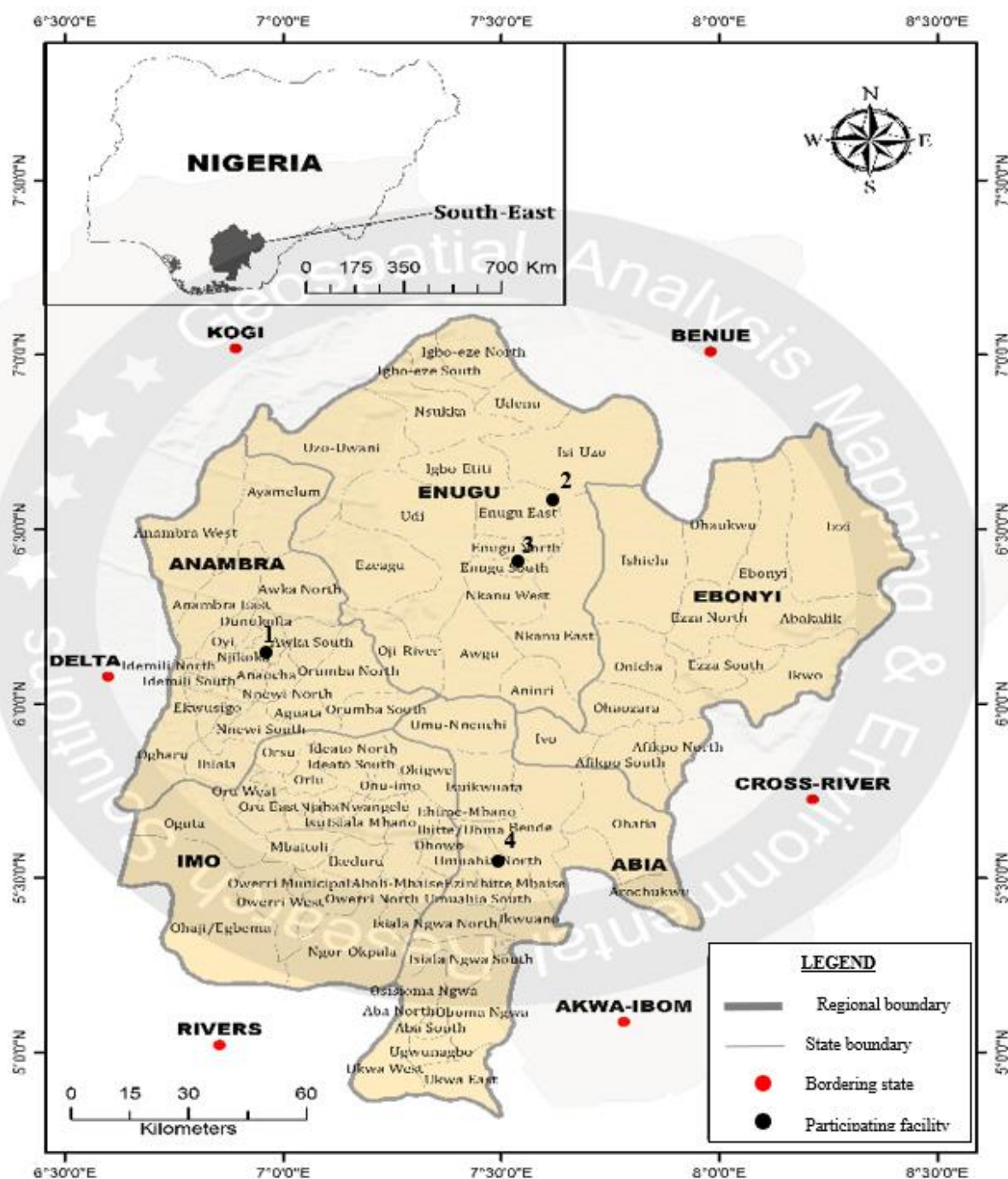


Figure 1. Southeastern states indicating the participating facilities. Source: adapted from GIS Lab, UNN (2019)

3.3. Study Participants

The demographic population was obtained from hospital records, which included the total number of beds in each facility, resulting in a total of $N = 181$ beds. The Taro Yamane formula (at 95% confidence level and significance level $p < 0.05$) was used to obtain the sample size [27], which was further adjusted for a 10% non-response rate to give 138 patients. Subsequently, 138 copies of the survey instruments were distributed among the sampled facilities according to the ratio each facility contributed to N . 123 copies were returned after 5 months, representing an acceptable 89.1% response rate [28]. The inclusion criteria

for the patient population were:

- i. Currently admitted to the selected psychiatric hospitals,
- ii. Being cognitive and emotionally stable enough to participate in the study, as determined by at least two nurses on duty,
- iii. Willingness to provide informed consent.
- iv. Understand English or the Igbo language.

Participants were excluded at various stages for these reasons:

- i. Acute psychotic states, such as acute schizophrenic episodes
- ii. Severe cognitive impairment or communication barriers
- iii. Inability or unwillingness to participate

3.4. Instruments and Measures

Inpatient Demographic and Admission Self-Report Questionnaire (IDASQ): This 5-item self-report instrument was developed from relevant clinical studies and used to capture patient characteristics of age, gender, length of current stay, number of prior admissions, and mode of admission for a short recall period [29].

Socio-Spatial Ward Attribute Checklist (SS-WAC): The SS-WAC is a 6-item survey instrument designed to identify key ward attributes from the literature on psychiatric ward design, with possible influence on patients' perception of therapeutic value, and distributed to patients for self-reporting on space and person-related features of their respective wards. These include social density, ward layout, nursing station configuration, dominant window view, outdoor access modality, and availability of communal areas. Patients indicated each ward attribute by selecting an option from the predetermined options, to ensure generalisability of descriptors across all wards. The SS-WAC was pre-tested on a cohort from one hospital to determine its validity.

Perceived Influence of Ward Attributes on Outdoor Therapeutic Experience Scale (PIWA-OTES): The PIWA-OTES is a seven-item, patient-reported instrument developed to assess inpatients' perceptions of how specific ward attributes influence established theoretical constructs that define an environment's restorativeness [2]. Each item directly references a key socio-spatial attribute of the ward (Table 1) and asks patients to rate the extent to which these features foster social interaction, privacy, autonomy, safety, aesthetic appreciation, or meaningful engagement on a 5-point Likert scale. Item scores were averaged to yield a composite PIWA-OTES score for each respondent (range 1–5), with higher scores indicating stronger perceived restorativeness. Prior to administration, the scale was reviewed by an expert panel for content validity and pilot-tested for clarity, demonstrating acceptable internal consistency (Cronbach's $\alpha = 0.82$).

Table 1. Content-linkage matrix

No.	PIWA-OTES Item	Socio-Spatial Attribute	Theoretical Construct
1	Social Density Promotes Interaction (SDSP)	Social Density	Supportive Design (social support) [4, 23]
2	Ward Layout Reduces Privacy (WPPI)	Ward Layout	Supportive Design (privacy, control, and social interaction) [4, 30]
3	Nursing Station Enhances Freedom with Nurses (TPFN)	Nursing Station Configuration	Supportive Design (autonomy and Control) [31]
4	Nursing Station Enhances Safety (TPFS)	Nursing Station Configuration	Stress Reduction (safety and security) [31]
5	Outdoor View is Pleasing (PPOV)	Dominant Window View	Biophilic Design (being away, fascination) and Attention Restoration [2, 32]
6	Link to Outdoors Enhances Autonomy (LEPA)	Access Modality to the outdoors	Supportive Design (control and restoration) [33, 34]
7	Meeting Visitors in Communal Areas is Meaningful (MVMP)	Communal Outdoor Spaces	Supportive Design (social support and positive Distraction) [4, 23, 35]

3.5. Data analysis

Data was collated independently by two members of the research team, cross-validated, cleaned, coded, and analyzed. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarise patient characteristics, ward attributes, and distribution of perception scores by patient characteristics and ward attributes using SPSS (v25.0). Inferential statistics (Theil-Sen median regression and 0.5 quantile median regression) were used to examine the relationship between patient characteristics and ward attributes, and the mean PIWA-OTES score using R. These inferential statistics were used to account for potential non-normality and outliers [36, 37]. All predictor variables were introduced into the model using the forced entry method, similar to the study in Ref [38], and categorical variables were dummy-coded for inclusion [39]. Patients with more than one missing PIWA-OTES item were excluded from the analysis; those with only one missing item were prorated. Missing predictors were imputed using the median (ordinal) or mode (categorical), while cases with missing outcome scores were excluded (n=2) [40-41].

4. Results

4.1. Descriptive Statistics of Patient and Socio-Spatial Ward Attributes

A total of 123 patients participated in the study. The mean age of patients was 36.5 years (± 10.2), with the largest proportion aged between 30 and 39 years (31.7%), while patients of less than 20 years formed the smallest cohort (5.7%). Females (50.4%) outnumbered males (49.6%) slightly. The majority

were admitted voluntarily (53.3%), had single admissions (63.1%), and had been hospitalized for less than 8 weeks (51.2%). The average length of stay within these facilities was 5.14 weeks (± 3.8). Details as gathered through the IDASQ are shown in Table 2.

Table 3 presents the self-reported results from the SS-WAC. Ward environments were predominantly open layout (86.1%) and of high to very high bed density (55.4%). Most patients were in wards with centralized and open nursing stations (60.3%), had direct door access to outdoor spaces (65.3%), and were exposed to non-green views (64.0%). Views to any form of greenery (tendered or wild) were less common (11.5%). While 38.0% of patients use corridors for visitor meetings, 21.5% reported a lack of any designated visitor area for meeting with visitors apart from their wards. Gardens (10.7%) and car parks (14.9%) were reported to have been used less frequently for such social interactions.

Table 2. Descriptive statistics of patient characteristics

Value Labels	N	%
Age of patient (AOP)	123	100
< 20 years	7	5.7
20-29 years	28	22.8
30-39 years	39	31.7
40-49 years	29	23.6
> 50 years	20	16.3
Mean AOP $\pm$ SD	36.50 $\pm$ 10.20	
Gender of patient (GOP)	123	100
Female	62	50.4
Male	61	49.6
Mode of admission (MOA)	122^a	100
Voluntary	65	53.3
Involuntary	56	45.9
Number of admissions (NOA)	122^a	100
Single admission	77	63.1
Multiple admissions	45	36.9
Length of stay (LOS)	121^a	100
< 1 week	30	24.8
1-4 weeks	32	26.4
4-8 weeks	31	25.6
8-12 weeks	20	16.5
> 12 weeks	8	6.6
Mean LOS $\pm$ SD	5.14 $\pm$ 3.8	

^aTotal does not sum to 123 due to missing or invalid responses for this variable

Table 3. Descriptive statistics of socio-spatial ward attributes

Value label	N	%
Social density of ward (SDW)	121^a	100
1-5 beds	14	11.6
6-10 beds	23	19.0
11-15 beds	33	27.3
16-20 beds	17	14.0
21 and above	34	28.1
Mean SDW ± SD	14.2 ± 6.3	
Type of ward layout (TWLO)	122^a	100
Open ward	105	86.1
Cubicle ward	8	6.6
Type of nursing station (TONS)	121^a	100
Centralized and open	73	60.3
Centralized and closed	42	34.7
Decentralized and open	4	3.3
Decentralized and closed	2	1.7
Dominant outdoor view from window (DOEN)	122^a	100
Tendered green space	3	2.5
Wild green space	11	9.0
Buildings and walls	65	53.3
Parking area	13	10.7
Mixed	30	24.6
Link to outdoor from ward (WOL)	121^a	100
Windows only	21	17.4
Doors from ward	79	65.3
Doors from staff areas	21	17.4
Communal area for meeting visitors (CMAV)	121^a	100
None	26	21.5
Along corridor	46	38.0
Garden	13	10.7
Car park	18	14.9
Other	18	14.9

^aTotal does not sum to 123 due to missing or invalid responses for this variable

4.2. Descriptive Statistics of Perceptions Across Patients and Ward Subgroups

The composite Perceived Influence of Ward Attributes on Outdoor Therapeutic Experience Scale PIWA-OTES score (averaged from the seven items per person on the 5-point Likert scale) had a mean score of 3.9 (± 0.5), indicating moderately high overall perceptions of outdoor therapeutic benefit among patients.

Item-level trends (see Figure 2) illustrate that 'Agree' responses dominated across most PIWA-OTES items except for outdoor view pleasantness (PPOV: $\bar{x}=2.92 \pm 1.1$) and meaningfulness from meeting visitors in communal areas (MVMP: $\bar{x}=2.95 \pm 1.12$), which had polarised responses and high neutral feedback, respectively, thus dropping the mean scores of both items, compared to others.

A further breakdown of perceptions across patient characteristics subgroups (Table 4) reveals that the youngest patients (< 20 years) reported the highest perceived privacy from ward layout (WPPI $\bar{x}=2.29$) and the strongest sense that the link to the outdoors enhanced autonomy (LEPA $\bar{x}=3.86$) compared to all other age groups. Conversely, the oldest patients (> 50 years) had the highest mean for perceptions that ward layout reduces privacy (WPPI $\bar{x}=3.95$) and that nursing stations enhance freedom (TPFN $\bar{x}=3.75$). Males reported higher scores across all perception values, including outdoor view pleasantness (PPOV $\bar{x}=3.03$), which scored least for the male cohort. Notably, females ranked outdoor pleasantness even lower than males (PPOV $\bar{x}=2.8$). Additionally, males reported a stronger sense that nursing stations enhanced freedom (TPFN $\bar{x}=3.52$) and that meeting visitors in communal areas was meaningful (MVMP $\bar{x}=3.19$) when compared to females. In terms of length of stay, patients on admission for more than 12 weeks reported a remarkably high perception across all items except social interaction as influenced by ward social density. These patients perceived that the link to the outdoors enhanced autonomy (LEPA $\bar{x}=4.0$) and that meeting visitors in communal areas was meaningful (MVMP $\bar{x}=4.0$), thus suggesting that such attributes may become increasingly vital to a patient's well-being during longer hospitalizations.

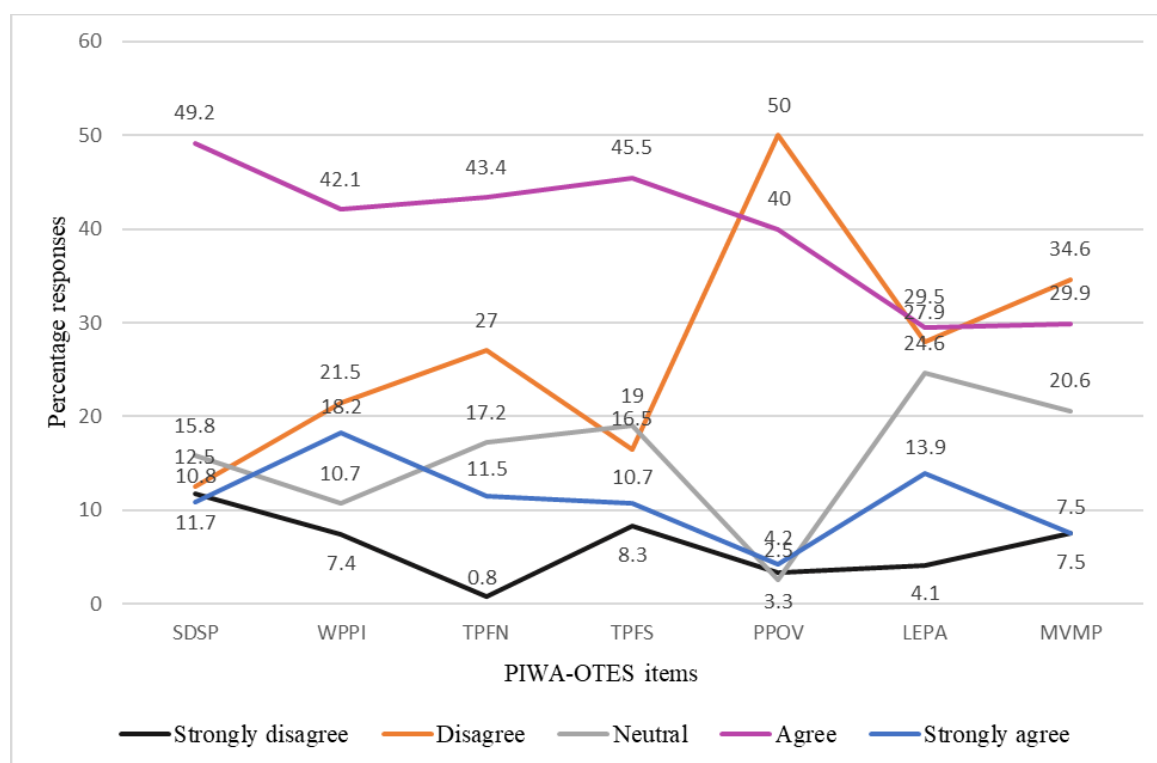


Figure 2. Frequency distribution of PIWA-OTES responses

Across ward attributes (Table 5), open ward layout scored higher than cubicle wards in enhancing

social interaction (SDSP $\bar{x}$ = 3.41), reducing privacy (WPPI $\bar{x}$ = 3.22), pleasantness of outdoor views (PPOV $\bar{x}$ = 2.85), enhanced autonomy (LEPA $\bar{x}$ = 3.23) and meaningfulness while meeting with visitors (MVMP $\bar{x}$ = 2.97), even though this dimension differed marginally from that derived from cubicle wards ($\bar{x}$ = 2.17). Patients in wards with tendered green views recorded slightly higher perceptions of outdoor view pleasantness (PPOV $\bar{x}$ = 3.67), whereas those in wards with views dominated by grey spaces (buildings and walls $\bar{x}$ = 3.0 ± 1.08 , parking area $\bar{x}$ = 3.0 ± 1.15) scored lower. Interestingly, patients in wards with outdoor views of wild green (bushes) recorded the lowest outdoor view pleasantness (PPOV $\bar{x}$ = 2.5). In terms of communal areas and outdoor links, patients with access to a garden (MVMP $\bar{x}$ = 3.54) or a car park ($\bar{x}$ = 3.29) as communal areas reported these as more meaningful for meeting visitors than along corridors ($\bar{x}$ = 2.61). Additionally, patients with direct access to outdoor links from wards (LEPA $\bar{x}$ = 3.3) and from staff areas ($\bar{x}$ = 3.14) reported the highest perceptions of enhanced autonomy. Wards with only window access to outdoor environments scored lower in enhancing autonomy ($\bar{x}$ = 2.86).

4.5. Quantile Regression Results

A quantile regression model was employed to investigate the relationship between patient characteristics, ward attributes, and the perceived therapeutic value of outdoor environments. The model explained 39.0% of the variance in the composite PIWA-OTES scores ($R^2 = 0.390$). Full regression results indicate the following as statistically significant predictors of outdoor therapeutic experience:

- i. Ward layout reduces privacy (WPPI: $\beta = 0.175$, $p < .001$)
- ii. Social density promotes interaction (SDSP: $\beta = 0.168$, $p < .001$)
- iii. Nursing station enhances safety (TPFS: $\beta = 0.161$, $p < .001$)
- iv. Link to outdoors enhances autonomy (LEPA: $\beta = 0.160$, $p < .001$)
- v. Meeting visitors in communal areas is meaningful (MVMP: $\beta = 0.159$, $p < .001$)
- vi. Outdoor view is pleasing (PPOV: $\beta = 0.156$, $p < .001$)
- vii. Nursing station enhances freedom (TPFN: $\beta = 0.147$, $p < .001$)

5. Discussion

5.1. Main findings

Findings indicate that for psychiatric patients in southeastern Nigeria, the therapeutic value of outdoor environments is determined primarily by the social and physical characteristics of the ward, rather than the characteristics of the patients themselves. Even though perceptions varied by patient characteristics, the quantile regression showed that they were either not significant predictors or, as was the case with gender, had practically negligible influence on the perceived restorativeness of outdoor environments. The general leaning towards the restorativeness of the social and physical attributes of the environment aligns with the foundational principles of TSD and SRT [4, 23], but in dimensions which are highly contextual and non-generic.

Table 4. Descriptive statistics of perceptions by patient characteristics

Categories		Social Density Promotes Interaction		Ward Layout Reduces Privacy		Nursing Station Enhances Freedom		Nursing Station Enhances Safety		Outdoor View is Pleasing		Link to Outdoors Enhances Autonomy		Meeting Visitors in Communal Areas is Meaningful	
		N	Mean (sd)	N	Mean (sd)	N	mean (sd)	N	Mean (sd)	N	Mean (sd)	N	Mean (sd)	N	Mean (sd)
Age in years	< 20	7	3.29 (1.25)	7	2.29 (1.25)	7	3.14 (0.9)	7	3.14 (1.07)	7	2.57 (0.98)	7	3.86 (1.35)	6	3.0 (1.55)
	20-29	27	2.89 (1.34)	27	3.19 (1.3)	27	3.3 (1.1)	27	3.19 (1.14)	27	2.81 (1.21)	27	3.15 (1.17)	26	2.85 (1.12)
	30-39	38	3.89 (0.73)	38	3.61 (1.17)	39	3.18 (1.14)	39	3.18 (1.25)	39	2.79 (1.08)	39	3.1 (1.23)	36	2.92 (1.13)
	40-49	28	3.11 (1.37)	29	3.31 (1.23)	29	3.52 (0.95)	28	3.61 (0.99)	28	3.32 (1.02)	29	3.21 (0.94)	22	3.05 (1.09)
	> 50	20	3.3 (1.08)	20	3.95 (0.89)	20	3.75 (0.79)	20	3.55 (1.05)	19	2.84 (1.07)	20	3.3 (1.03)	17	3.06 (1.09)
Gender	Female	60	3.25 (1.27)	61	3.48 (1.34)	61	3.23 (1.07)	61	3.3 (1.15)	60	2.8 (1.05)	61	3.18 (1.1)	55	2.73 (1.08)
	Male	60	3.45 (1.1)	60	3.37 (1.1)	61	3.52 (0.98)	60	3.38 (1.12)	60	3.03 (1.13)	61	3.25 (1.15)	52	3.19 (1.12)
Mode of admission	Voluntary	63	3.19 (1.22)	63	3.33 (1.27)	64	3.39 (0.99)	63	3.37 (1.07)	63	2.83 (1.14)	64	3.22 (1.13)	58	3.05 (1.13)
	Involuntary	55	3.51 (1.15)	56	3.48 (1.18)	56	3.39 (1.06)	56	3.27 (1.2)	55	3.02 (1.05)	56	3.2 (1.1)	47	2.87 (1.1)
Number of admissions	Single	75	3.24 (1.21)	77	3.43 (1.21)	77	3.29 (0.98)	76	3.37 (1.04)	76	2.91 (1.02)	77	3.23 (1.06)	66	2.94 (1.02)
	Multiple	45	3.53 (1.14)	44	3.41 (1.26)	45	3.53 (1.1)	45	3.29 (1.27)	44	2.93 (1.27)	45	3.18 (1.23)	41	2.98 (1.27)
Length of Stay in weeks	< 1	30	3.03 (1.45)	30	2.97 (1.33)	30	3.4 (1.1)	29	3.1 (1.26)	30	2.7 (1.02)	30	2.73 (1.31)	18	2.39 (1.2)
	1-4	31	3.58 (1.18)	31	3.52 (1.15)	32	3.47 (0.88)	32	3.53 (0.95)	31	3.03 (1.08)	32	3.38 (1.01)	30	3.13 (1.07)
	4-8	31	3.55 (1.03)	31	3.65 (1.14)	31	3.29 (1.1)	31	3.55 (1.03)	31	2.97 (1.02)	31	3.29 (0.97)	30	2.77 (1.1)
	8-12	19	3.21 (0.85)	20	3.45 (1.15)	20	3.1 (1.07)	20	3.15 (1.23)	19	2.84 (1.07)	20	3.25 (0.91)	20	3.0 (0.97)
	>12	8	3.12 (1.36)	8	3.75 (1.49)	8	3.88 (0.99)	8	3.25 (1.39)	8	3.38 (1.77)	8	4.0 (1.41)	8	4.0 (0.76)
Total		120 ^a	3.35 (1.19)	121 ^a	3.42 (1.22)	122 ^a	3.38 (1.03)	121 ^a	3.34 (1.13)	120 ^a	2.92 (1.1)	122 ^a	3.21 (1.12)	107 ^a	2.95 (1.12)

N represents the number of valid responses for specific PIWA-OTES items within each category.

Table 5. Descriptive statistics of perceptions by socio-spatial ward attribute

Categories		Social Density Promotes Interaction		Ward Layout Reduces Privacy		Nursing Station Enhances Freedom		Nursing Station Enhances Safety		Outdoor View is Pleasing		Link to Outdoors Enhances Autonomy		Meeting Visitors in Communal Areas is Meaningful	
		N	Mean (sd)	N	Mean (sd)	N	Mean (sd)	N	Mean (sd)	N	Mean (sd)	N	Mean (sd)	N	Mean (sd)
Social density of the ward in beds	1-5	14	3.46 (1.27)	14	3.21 (1.25)	14	3.43 (1.09)	14	3.86 (0.95)	14	3.71 (1.2)	14	4.0 (1.18)	14	3.79 (0.97)
	6-10	23	3.35 (0.88)	22	3.64 (1.26)	23	3.17(0.98)	23	2.83 (1.23)	22	2.55 (1.06)	23	2.91 (1.04)	21	2.81 (1.03)
	11-15	33	2.91 (1.35)	33	3.3 (1.24)	33	3.45 (1.06)	33	3.39 (1.2)	32	2.84 (1.08)	33	3.0 (1.32)	26	2.92 (1.06)
	16-20	17	3.76 (0.9)	17	3.24 (1.03)	17	3.71 (0.92)	17	3.0 (1.22)	17	2.88 (0.99)	17	3.06 (1.03)	14	2.57 (1.22)
	21 and above	34	3.61 (1.14)	34	3.65 (1.23)	34	3.26 (1.08)	33	3.61 (0.86)	34	2.88 (1.04)	34	3.38 (0.85)	31	2.87 (1.15)
Type of ward layout	Open ward	103	3.41 (1.12)	104	3.46 (1.23)	105	3.35 (1.06)	104	3.29 (1.15)	103	2.85 (1.11)	105	3.23 (1.09)	96	2.97 (1.1)
	Cubicle ward	8	2.25 (1.49)	8	3.25 (1.16)	8	3.38 (0.92)	8	3.5 (0.93)	8	2.75 (1.04)	8	2.88 (1.36)	6	2.17 (1.17)
Type of nursing station	Centralized and open	72	3.32 (1.25)	72	3.21 (1.24)	73	3.59 (1.01)	72	3.49 (1.41)	71	3.0 (1.15)	73	3.18 (1.13)	63	3.03 (1.18)
	Centralized and closed	41	3.51 (1.05)	42	3.88 (1.06)	42	2.98 (0.98)	42	3.07 (1.13)	42	2.69 (0.0)	42	3.12 (1.11)	38	2.76 (1.0)
	Decentralized and open	4	3.0 (1.15)	4	2.75 (0.96)	4	3.5 (1.29)	4	3.75 (0.5)	4	4.0 (0.0)	4	4.5 (0.58)	3	3.0 (1.73)
	Decentralized and closed	2	3.0 (0.0)	2	4.0 (0.0)	2	4.0 (0.0)	2	3.0 (1.41)	2	2.0 (0.0)	2	4.0 (0.0)	2	4.0 (0.0)
Dominant outdoor environment	Tendered green space	2	2.5 (2.12)	3	3.0 (1.73)	3	2.67 (1.15)	3	3.0 (1.73)	3	3.67 (1.53)	3	3.0 (1.0)	3	2.67 (1.15)
	Wild green space	11	3.18 (1.08)	11	2.73 (0.9)	11	3.27 (1.01)	11	3.36 (1.03)	10	2.5 (0.85)	11	2.82 (0.98)	10	2.9 (0.88)
	Buildings and walls	64	3.39 (1.09)	64	3.52 (1.13)	65	3.63 (0.86)	65	3.46 (0.94)	64	3.0 (1.08)	65	3.23 (1.1)	56	3.12 (1.08)
	Parking area	13	3.62 (1.04)	13	3.31 (1.18)	13	3.46 (1.33)	12	2.92 (1.56)	13	3.0 (1.15)	13	3.69 (1.03)	10	2.7 (1.49)
	Mixed	30	3.27 (1.44)	30	3.57 (1.45)	30	2.9 (1.09)	30	3.27 (1.31)	30	2.77 (1.14)	30	3.13 (1.25)	28	2.75 (1.14)
Link to the outdoor from the ward	Windows only	21	3.14 (1.2)	21	3.48 (1.33)	21	3.19 (1.03)	21	3.05 (1.28)	21	2.57 (1.08)	21	2.86 (1.2)	16	2.75 (0.93)
	Doors from wards	78	3.29 (1.2)	79	3.33 (1.22)	79	3.28 (0.96)	78	3.46 (0.95)	77	2.92 (1.06)	79	3.3 (1.04)	71	2.92 (1.08)
	Doors from staff areas	20	3.75 (1.12)	21	3.71 (1.15)	21	3.86 (1.15)	21	3.1 (1.48)	21	3.14 (1.15)	21	3.14 (1.28)	19	3.16 (1.34)
Communal area for meeting visitors apart from the wards	None	26	3.31 (1.26)	26	3.62 (1.27)	26	3.31 (1.09)	26	3.54 (1.07)	26	2.96 (1.08)	26	3.0 (1.39)	14	2.93 (0.92)
	Along corridor	46	3.22 (1.09)	46	3.28 (1.22)	46	3.09 (0.96)	45	2.91 (1.14)	45	2.53 (0.92)	46	2.83 (0.85)	46	2.61 (1.11)
	Garden	11	3.64 (0.92)	13	3.15 (1.14)	13	3.77 (0.83)	13	3.46 (1.13)	13	3.62 (1.04)	13	3.69 (0.95)	13	3.54 (0.97)
	Car park	18	3.11 (1.32)	17	3.41 (1.23)	18	4.06 (0.87)	18	3.94 (0.87)	18	3.5 (1.2)	18	4.17 (1.04)	17	3.29 (1.21)
	Other	18	3.89 (1.23)	18	3.67 (1.28)	18	3.22 (1.11)	18	3.39 (1.14)	18	2.72 (1.07)	18	3.17 (0.92)	17	3.12 (1.11)
Total		120^a	3.35 (1.19)	121^a	3.42 (1.22)	122^a	3.38 (1.03)	121^a	3.34 (1.13)	120^a	2.92 (1.1)	122^a	3.21 (1.12)	107^a	2.95 (1.12)

N represents the number of valid responses for specific PIWA-OTES items within each category.

While previous studies suggest females often derive greater benefits from green spaces [42], this study found males reported slightly higher overall mean scores across all PIWA-OTES items, including outdoor view pleasantness. Specifically, males perceived greater social interaction, less privacy reduction from ward layout, more enhanced freedom from nursing stations, and more meaningful visitor meetings than females. This consistent trend of higher agreement among males, particularly within the sociocultural context of the study area, may be associated with the region's prevailing male dominance and supremacy [43]. Consequently, females in this region might exhibit greater caution, which could inadvertently influence their readiness to fully and freely engage with and express enjoyment of environmental cues. However, this is only a premise and requires further investigation.

From the results, patients exposed to gardens (tendered green view) reported higher pleasantness compared to those viewing grey spaces (parking areas and buildings/walls). Bushes (wild green views), on the other hand, yielded the lowest pleasantness scores. This counter-intuitive finding, that unkempt green views are perceived less favourably than grey views, challenges a simplistic interpretation of biophilic principles [4, 26], and may be explained by the preference for cues that embody order, predictability, and thoughtfulness, being characteristics of defined buildings and walls, over unpredictability and neglect, as bushes likely suggest. It is possible that for psychiatric patients, perceived order and aesthetic appeal associated with managed greenery, despite their rarity within the study area, may be more restorative than the more common uncontrolled natural environments [44].

The high levels of agreement regarding the high social density promoting interaction (SDSP) and open ward layout reducing privacy (WPPI) indicate that patients perceived these aspects as supportive, with both measures significantly predicting outdoor therapeutic experience. In facilities where open wards and high social density are predominant, patients largely found this beneficial for interaction. This aligns with studies which assert that increased social density on wards can foster interactions through incidental encounters, social concordance, and reduced social distance [45], contributing to a sense of community and emotional comfort in multi-bedded rooms [46], even among patients with psychotic symptoms [47].

While patients reported reduced privacy on open wards than in cubicle wards, the perception of reduced privacy in wards positively predicted higher outdoor therapeutic experience (WPPI: $\beta = 0.175$, $p < .001$). This paradoxical finding can be interpreted through the lens of social dynamics in multi-occupancy settings, challenging the conventional view of privacy as physical seclusion (spatial privacy) alone. In high-density, multi-occupancy wards common in this region, and within a culture that emphasizes communal ties, the concept of privacy may be more contextually defined. The increased complexity of social connections and potential interactions in multi-occupancy wards might inadvertently create a perceived sense of 'social privacy' or 'privacy by anonymity', which Altman (1975) in [48] defines as a person's perceived control over their social interactions within a complex, crowded environment.

This cultivated sense of social control and agency is then translated into the outdoor environment, which becomes a vital space for patients to exercise this control more freely. The outdoor space's perceived therapeutic value is thus amplified, not as a direct escape from a lack of privacy, but as a powerful reinforcement of the social autonomy developed within the ward's unique dynamics. Again, these are possibilities that warrant further investigation.

The positive association between centralised and open nursing stations and freedom for nurses (TPFN), as well as perceptions of safety within wards (TPFS), suggests an indirect yet vital link to outdoor therapeutic benefits. When patients perceive greater security and freedom in interacting with nurses, as afforded by unobstructed sightlines from centralized open nursing stations, it fosters an overarching sense of empowerment and trust within the ward [31, 49] which engenders a greater willingness to explore and benefit from other therapeutic affordances, including outdoor spaces [21]. In terms of other predictors, modal access to nature and meaningfulness derived from meeting in communal areas were significant predictors of patients' therapeutic outdoor experience, yet responses to the influence of these ward attributes were varied. This highlights potential gaps between the provision of these settings and their perceived effectiveness as experienced by patients. Consequently, direct access to outdoor spaces may not always translate to the expected patient experience if such outdoor spaces do not support subjective interpretations of a supportive environment. Additionally, cultural interpretations of support for the Igbos, who thrive on kinship [50] may mean that undesignated spaces (corridors, car parks) may lack communal support or privacy for meaningful social interaction.

5.2. Limitations of the study

We acknowledge the inherent limitations of self-reported data, which may have influenced our findings in the following ways. Our data on ward attributes relied on patient reports of their respective wards, culled from predefined options in the literature, which may limit the precision of the link between physical ward design and patient perception. Again, participating patients were identified by at least two nurses on duty to ensure cognitive stability. Still, we acknowledge that a fluctuating mental state may have influenced patients' responses. Further studies may complement self-reported data with on-site observations/ measurements, as well as behavioural observations/ physiological assessments.

6. Conclusion, Novelty of the Study and Recommendations

6.1. Conclusion

This study examined the impact of patient characteristics and socio-spatial ward attributes on patients' perceptions of the therapeutic value of outdoor environments in psychiatric hospitals in southeastern Nigeria. It provides insight into the intricate relationship between psychiatric ward attributes, patient characteristics, and patients' perceived therapeutic experiences of outdoor environments in this specific

context. While perceptions varied across patient subgroups, the overall perceived therapeutic value is predominantly predicted by the influence of specific socio-spatial ward attributes.

Specifically, the perceived ability of social density to promote interaction, the nursing station to enhance safety, outdoor links to enhance autonomy, and communal areas to foster meaningful visitor interactions were all statistically significant predictors with substantial positive coefficients. Furthermore, the pleasantness of outdoor views, nursing station configurations to enhance freedom with nurses, and ward layout to reduce privacy were also found to be significant. In contrast, demographic factors such as age, length of stay, and admission history were found to have no statistically significant effect on the overall perceived therapeutic value. While gender and dominant outdoor view were statistically significant in the regression model, their near-zero beta coefficients indicate a negligible practical influence on this experience.

Therefore, by partially rejecting the null hypothesis, the findings affirm that the influence of specific socio-spatial attributes predominantly contributes to the perceived restorativeness of outdoor spaces. These effects are theoretically consistent with a nuanced understanding of environmental psychology principles, particularly Supportive Design, Stress Reduction and Attention Restoration, and highlight the contextual impact of architectural configurations on patient well-being, even when demographic differences exist.

6.2. Novelty of the Study

This study is considered novel by addressing a critical research gap in the design of mental healthcare environments within a previously underexplored context. We directly assess patients' self-reported experiences in psychiatric hospitals in southeastern Nigeria and provide a possible explanation for the contrasting findings, based on the complex interplay between human psychology, environment, and culture.

The study also adds depth to existing definitions of privacy, restorativeness, and support. In the context of wards with high social density, the study suggests a distinction between spatial privacy and social privacy. While the former is the underlying basis for advocating single rooms in previous studies, the latter explains how patients' perception of social privacy can be managed in the presence of many others. In terms of restorativeness, the therapeutic experience of outdoor spaces may be inherently associated with the quality, rather than the quantity, of a view, as grey views were more pleasing to the patients than unmanaged and wild green views. This research further extends the understanding of Supportive Design Theory by redefining it to be culturally sensitive and inclusive to a population that thrives on kinship and communal living.

6.3. Recommendations

The study highlights the importance of context-specific design interventions in psychiatric facilities, particularly in resource-constrained settings such as Nigeria. While general stress reduction and supportive

design principles remain applicable, their specific implementation must take into account local cultural values and environmental realities. Drawing from design, clinical policy, and cultural dimensions, our study recommends the following:

- Design shared psychiatric wards to support both interaction and personal retreat by leveraging spatial configurations that allow patients to control their social exposure, even in high-density wards.
- Integrate high-quality, green-dominant outdoor views from patient rooms by vertical gardens or green walls where there are horizontal space constraints.
- Create designated, dignified, and flexible communal spaces for social support and visits by transforming underused spaces (such as wide corridors or shaded outdoor car parks) into welcoming visitor zones with flexible seating arrangements.
- Design outdoor environments that reflect local flora and cultural symbols by planting indigenous trees and shrubs.

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