

Influence of Ward Spatial Features on Staff Activities of Healthcare Delivery in Public Tertiary Mental Health Facilities in Southeast Nigeria

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ABSTRACT

Cognitive psychologists have advanced the argument that the configuration of spaces is instrumental in patterning the movement and activities, as well as modifying the functions, of persons using such spaces. The objective of the study was to examine the relationship between type of ward layout (which is a variable of ward spatial features) and staff activities of healthcare delivery in public tertiary mental healthcare facilities which offer inpatient psychiatric services in Southeast Nigeria. Out of the 302 staff who make ward contact with the patients, 190 were sampled for this cross-sectional study. Statistical analysis was carried out using frequency distribution, descriptive summary measures, and Point-Biserial correlation ($\alpha = 0.05$) using SPSS-20. Data on the following were collected using structured questionnaires: demographic characteristics of the health workers (gender, years of experience in MHC delivery, and designation); specific ward features (social density, type of ward layout, location of nursing station, type of ward supplies service); and the extent to which staff agree to the influence of each of these ward features on planned patient contact, structured patient observation, and quick response to patient. It was established that type of ward layout does not significantly correlate with overall staff activities. even though the influences of the individual ward features correlated significantly. Inconsistent findings with previous studies may be influenced by the differing socio-cultural context within which the study was carried out and ill-conceived notion about mental health, thus, preventing patient-centred model of care in psychiatric hospitals in the study area. Recommendations include use of private rooms and cubicle wards for patients with decentralized nursing stations, and mental health literacy for care givers on aspects of patient-centred model of care.

Keywords: Direct patient care, Hospital affordance, Staff activities, Ward spatial feature.

INTRODUCTION

Technological advancements have improved the efficiency of staff activities in healthcare settings. However, concerns have been raised on the use of architectural design of the physical environment in these settings to facilitate staff functions, patient safety and other patient outcomes (Reiling et al., 2008). Cognitive psychologists have advanced the argument that the configuration of

spaces is instrumental in patterning the movement and activities, and modifying the functions, of persons using such spaces (Reiling et al., 2008) for improved efficiency in executing functions. To address the challenge of efficiency in carrying out functions, intrinsic adjustments to organizational climate, healthcare protocols and the physical settings of wards are necessary, and need to align so that the caregivers and the resources that support them are set up for proper patient care (Tyson et al., 2002; Ulrich, 2006, Ulrich et al., 2004).

Several studies have associated design features of wards with positive patient outcomes such as reduced anxiety, higher levels of satisfaction with care, reduced aggression (need for restraint and seclusion), improved social interaction with fellow patients and staff, increased compliance with treatment plans, reduced depression and stereotypy (Stolz et al., 2015; Lockman et al., 2017; Ulrich et al., 2014; Bressington et al., 2019; Grootens-Wiegers et al., 2018; Holohan & Saegert 1973). However, Tyson et al. (2002) noted that the positive modification in behaviour observed in patients may not entirely be in response to changes in ward features alone. They may be more attributable to changes in staff work activities and behaviours as well as changes in organizational milieu (indirect influences) than the change in itself (direct influence). It is, therefore, imperative to examine what influence ward spatial features have on staff activities, such that they carry out these activities effectively, thereby enhancing the therapeutic milieu of the ward.

Having seen the likely influence of staff work activities on patient outcome, it is surprising only a few studies have been done in that regard (Lauder et al., 2006; Stuart et al., 2015). The majority of these were focused on regions representative of high income countries. It is therefore imperative to carry out similar studies in low-and-middle income countries such as Nigeria, considering that low-and-middle income countries generally do not have comprehensive mental healthcare policies; where they do exist, they are ineffectively implemented due to shortage of resources such as infrastructure, personnel and funding (Gureje & Alem, 2000; Gureje et al., 2005; Thornicroft et al., 2017).

It is for this reason that this study aims to assess the influence of ward spatial features on staff activities of healthcare delivery in public tertiary mental health facilities in southeast Nigeria, with a view to proffering design modifications to ward design for improved staff functions. The current investigation is part of a wider study that assesses the effects of the physical environment on mental healthcare delivery in public mental healthcare facilities in Southeast Nigeria with the aim of generating design strategies that would significantly improve healthcare delivery outcomes for both staff and patients.

As a specific objective, the current study seeks to examine the relationship between type of ward layout (which is a variable of ward spatial features) and staff activities in healthcare delivery. The null hypothesis postulated for this unit of investigation is ‘There is no significant relationship between type of ward layout and staff activities of healthcare delivery in the study area.’

METHOD

The research area is the South-East geo-political zone of Nigeria comprising five states namely: Abia, Anambra, Enugu, Imo and Ebonyi States. Southeast Nigeria is located within latitudes 4°4’35” N and 7°7’44” N of the Equator, and longitudes 7°54’26” E and 8°27’10” E of the Greenwich Meridian. According to the 2006 population census conducted in Nigeria, southeast Nigeria has a population of 16,395,555 persons (Federal Republic of Nigeria Official Gazette, 2009).

This cross-sectional study was conducted in the public tertiary health facilities of the region which offer inpatient mental health services. Seven operational facilities were identified, each falling under any one of the following category: state-owned specialist hospital, state-owned hospital department, federal-owned specialist hospital, federal-owned hospital department. See Table 1.

Table 1: Stratification of Public Inpatient Mental Healthcare Facilities in Southeast Nigeria by Ownership-Specialty

S/No	State-Owned Specialist Hospital	State-Owned Hospital Department	Federal-Owned Specialist Hospital	Federal-Owned Hospital Department
1	State Neuro-Psychiatric Hospital, Nawfia	Abia State University Teaching Hospital, Aba	Federal Neuro-Psychiatric Hospital, Enugu	Alex Ekwueme Federal University Teaching Hospital, Abakaliki
2		Enugu State University Teaching Hospital, Parklane		Federal Medical Centre, Umuahia
3				University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu

Following this stratification, random sampling by balloting was applied to each stratum (having more than one facility) to identify the facility to be surveyed. The following were selected:

- i. *State-owned specialist hospital*: State Neuro-Psychiatric Hospital, Nawfia, Anambra state (SNH)
- ii. *State-owned hospital department*: Psychiatric Department of Enugu State University Teaching Hospital, Parklane (ESUTH)
- iii. *Federal-owned specialist hospital*: Federal Neuro-Psychiatric Hospital, New

Haven (FNH)

- iv. *Federal-owned hospital department:* Department of Mental Health of Federal Medical Centre, Umuahia, Abia State (FMC)

The number of mental healthcare (MHC) workers for each facility was obtained from the nominal roll of staff for each facility. The respondent sample size was derived using the Taro Yamane formula (Israel, 2012) at 95% confidence level and maximum degree of variability of $\rho = 0.05$, and adjusted for non-response rate of 10%:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n= Sample size for finite population

N= Population size = 302

e= level of precision = .05

The obtained figure (138 staff) was distributed among the sampled facilities according to the ratio each contributes to N, and the research tool shared accordingly (Table 2).

Table 2: Respondents sample size in sampled facilities

S/N	FACILITY	STAFF	
		Existing	Sampled
1	State Neuro-Psychiatric Hospital, Nawfia	38	24
2	Psychiatrics Unit, Enugu State University Teaching Hospital, Emene	27	17
3	Federal Neuro-Psychiatric Hospital, New Haven	215	135
4	Department of Mental Health, Federal Medical Centre, Umuahia	22	14
TOTAL		302	190

The research tool was designed to elicit data on the demographic characteristics of the health workers (gender, years of experience in MHC delivery, and designation); specific ward features (social density, type of ward layout, location of nursing station, type of ward supplies service); and the extent to which they agree to the influence of each of these ward features on planned patient contact (patient handling), structured patient observation, and quick response to patient. These were ranked on a 5-point Likert scale. The research tool was subjected to the scrutiny of experts in the specialties of Architecture, Psychiatry, Psychology and Statistics to ensure content validity while test-retest reliability method was adopted to ensure reliability of the tool.

The study protocol was approved by the Research and Ethics Committees of the individual health facilities after which the questionnaires were distributed to consenting health workers. Participants also reserved the right to withdraw from the study if and when they so wished, and were under no obligation to return questionnaires upon completion. Data collection across the 4 facilities was carried out within 6 months (June to November, 2022). Statistical analysis was done with Statistical Package for Social Sciences (SPSS-20) using descriptive summary measures and frequency distribution, Point-Biserial Correlation analysis.

RESULTS

Of the 190 questionnaires distributed, 173 were returned, representing 91.1% response rate. The total number of valid responses per variable of interest was indicated.

Table 3 describes the socio-demographic characteristics of the study population. Data collected on gender of staff show that more female staff (77.1%) work in the study area while 22.9% were identified as males. A greater percentage of staff had less than 3 years of experience (30.8%), closely followed by staff with 3-5 years of experience (21.5%). Staff with over 9 years of working experience were least represented (11%). More than half (60.1%) were nurses, 14.5% were psychiatrists, 10.4% were social workers while 5.8% were medical psychologists. 9.2% indicated to be working in other capacities not captured.

Table 3: Socio-demographic characteristics of participants

Characteristic	N	%
Gender	170^a	100
Male	39	22.9
female	131	77.1
Years of experience	172^a	100
< 3 years	53	30.8
3-5 years	35	21.5
5-7 years	28	16.3
7-9 years	37	20.3
>9 years	19	11.0
Designation	173	100
Psychiatrist	25	14.5
Nurse	104	60.1
Social worker	18	10.4
Medical psychologist	10	5.8
Other	16	9.2

^aFigures do not add up to 173 due to missing data

Table 4 shows the distribution of ward features among staff in the study area. With respect to social density of ward, results show that 94.2% of staff work in high multiple-occupancy wards. More specifically, 34.1% work in wards of at least 21 beds per ward, 21.4% work in 16-20 bed-wards, 20.8% work in wards with between 11 and 15 beds, 17.9% work in wards with 6 to 10 beds, while less than 5.8% work in wards with less than 6 beds. In terms of type of ward, 83% reported to be working in open wards while 17% reported to be working in cubicle wards. While 72.3% work in wards with centralized nursing station, 27.7% work from decentralized nursing stations. As far as type of supplies service is concerned, 61.8% reported to be working in wards with centralized supplies service while 38.2% operate with decentralized ward supplies service.

Table 4: Distribution of spatial features of wards

Spatial Feature of Wards	N	%
Social density of ward (SDW)	173	100
1-5 beds	10	5.8
6-10 beds	31	17.9
11-15 beds	36	20.8
16-20 beds	37	21.4
21 and above	59	34.1
Type of ward layout (TWL)	171^a	100
Open ward	142	83
Cubicle ward	29	17
Location of nursing station (LONS)	166^a	100
Centralized	120	72.3
Decentralized	46	27.7
Type of ward supplies service(TWSS)	173	100
Centralized	107	61.8
Decentralized	66	38.2

^aFigures do not add up to 173 due to missing data

Table 5 shows the extents to they agree to the influence of specific ward features as identified in Table 4. A greater majority of staff (72.5%) in the study area agree to varying extents that the social density of the ward in which they work positively influences how they handle patients. To this statement still, 18.1% disagreed to different degrees. On the influence of ward layout, 56.7% and 26.3% respectively agree and strongly agree that the layout of wards in which they work enhance visibility to patients. On the other hand, 7% and 5.3% respectively disagree and strongly disagree to this. When queried on response time to patients, 57.1% and 24.7% respectively agree and strongly agree that the location of nursing station from which they operate was instrumental in responding quickly to patients in the event of reactive patient contact. However, a minority of 11.2% disagreed/ strongly disagreed to this assertion. Again, more than half of the staff (73.6%) affirmed, to varying

extents, that the type of ward supplies services enhanced response time to patients while 15.4% of staff disagreed to varying extents to this statement.

Table 5: Ratings of influence of spatial features of wards

Affordance	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	N	%	N	%	N	%	N	%	N	%
Social density positively influences patient handling (SDPH)	13	7.6	18	10.5	16	9.4	83	48.5	41	24.0
N = 171 ^a										
Ward layout positively influences structured patient observation(WLPO)	9	5.3	12	7.0	8	4.7	97	56.7	45	26.3
N = 171 ^a										
Location of nursing station enhances response time to patients (LNRT)	8	4.7	11	6.5	12	7.1	97	57.1	42	24.7
N = 170 ^a										
Type of ward supplies service enhances response time to patients (TSRT)	14	8.3	12	7.1	17	10.1	94	55.6	32	18
N = 169 ^a										

^aFigures do not add up to 173 due to missing data

The variable ‘*type of ward layout*’ (TWL) was used as the dependent variable because it is key in defining spatial characteristics of a ward. The variables SDPH, WLPO, LNRT, and TSRT were averaged to derive the aggregated variable ‘*staff activities*’ (STAC). Because the two variables involved are of nominal and interval scales respectively, Point Biserial Correlation analysis tool was used to test for this association. Results of the analysis gave an output correlation coefficient of -.033 with a significance probability point of 0.668 ($p > 0.05$). These values, given the available data, indicate a negative, very weak and non-significant relationship between the two variables, thus, accepting the null hypothesis. Hypothesis 1 therefore states that *there is no significant relationship between type of ward layout and staff activities of healthcare delivery in the study area* (See

Table 6).

Table 6: Relationship between type of ward layout and staff activities

		Staff Activities of healthcare delivery
Type of ward layout	Pearson Correlation	-.033
	Sig. (2-tailed)	.668
	N	171

Table 7 shows the relationships between the influence of identified ward spatial features as reported by the participants.

Table 7: Relationships between the influence of ward spatial features

		Social density positively influences patient handling	Ward layout positively influences structured patient observation	Location of nursing station enhances response time to patient	Type of ward supplies service enhances response time to patients to patient.
Social density positively influences patient handling	Pearson Correlation	1	.292**	.267**	.322**
	Sig. (2-tailed)		.000	.000	.000
	N	171 ^a	169 ^a	169 ^a	167 ^a
Ward layout positively influences structured patient observation	Pearson Correlation	.292**	1	.208**	.326**
	Sig. (2-tailed)	.000		.007	.000
	N	169 ^a	171 ^a	168 ^a	168 ^a
Location of nursing station enhances response time to patient	Pearson Correlation	.267**	.208**	1	.387**
	Sig. (2-tailed)	.000	.007		.000
	N	169 ^a	168 ^a	170 ^a	166 ^a
Type of ward supplies service enhances response time to patients to patient.	Pearson Correlation	.322**	.326**	.387**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	167 ^a	168 ^a	166 ^a	169 ^a

**Correlation is significant at the 0.01 level (2-tailed).

^aFigures do not add up to 173 due to missing data

DISCUSSION

This cross sectional study was conducted among staff of public tertiary health facilities in Southeast Nigeria to ascertain their perception of safety as derived from the nursing station from which they operate. Respondents were drawn from MHC workers who make ward contact with patients.

More than three-quarters of the responders in this study were females (77.1%). This imbalance aligns with previous studies on staffing ratios in hospital settings (Alhassan & Poku, 2018; Olabisi et al., 2020; Olashore et al., 2018), and supports the conclusion that females form a greater percentage (over 70%) of healthcare and social workforce in 104 countries, including African countries (Tommasi, n.d.).

The group of mental healthcare workers with less than 3 years of experience was the most common (30.8%), whereas personnel with over 9 years of experience made up only 11% of the sample. This finding is consistent with a study conducted in Botswana, where staff with 4 years of experience or less formed the majority of respondents at 50.6% (Olashore et al., 2018). Similarly, in a comparable study, Olabisi et al. (2020) found that the least experienced group of workers was the most prevalent (>6 years, 28.2%). While the difference in value labels of the variable of interest in studies may explain this disparity, a commonality can be inferred from these findings. Specifically, in specialist and teaching hospitals, residents and interns typically have 3 years of experience or less and are assigned everyday duties of healthcare delivery on the ward under the supervision of consultants and registrars.

The study found that nurses constituted the highest proportion of respondents (60.1%) compared to other healthcare personnel, a finding that is consistent with several studies across healthcare settings (Haines, 2017; Kwobah et al., 2023; Olashore et al., 2018; Ukpogon, 2011). Given their frontline position in providing patient care, nurses are likely to interact most frequently with the physical environment of the ward in the cause of healthcare delivery. A study by Sajadi et al. (2019) found that nurses were the most frequently encountered staff members by patients in psychiatric hospital settings. The study also indicated that patients had more positive interactions with nurses compared to other staff members, suggesting that nurses have a significant impact on patient experiences in mental healthcare settings.

The question guiding the study is, 'What is the relationship between spatial features of wards and staff activities?' The hypothesis posited to answer this question was tested using 'type of ward layout' *TWL* and the aggregated variable 'staff activities' *STAC* ($SDPH + WLPO + LNRT + TSRT$). Results at a

95% confidence level gave a negative non-significant result, thus accepting the null hypothesis ($r = -0.033$, $p=0.668$). Thus, within the study area, even though open ward layouts negatively correlate with overall staff activities, there is insufficient evidence to support this.

The relationship between affordances of specific physical characteristics that may influence staff activities was examined. These are: 'influence of ward layout on patient observation WLPO' and 'influence of location of nursing station on response time to patients LNRT'. A significant positive correlation was outputted, implying that an increase in WLPO results in an increase in LNRT. Thus, improved patient observation as a result of type of ward layout enhances how quickly a staff responds to a patient in the event of planned or reactive patient contact. These findings align with those of Yi (2010) and Yi and Seo (2012) who assert that increased visibility of patients in the ward allows for more direct observation, thereby improving response time to patients.

CONCLUSION AND RECOMMENDATION

The physical environment in which healthcare delivery is executed, undoubtedly, plays an important role in staff activities of direct patient care. Other factors staff competencies, organizational culture and service process design also influence user and organizational outcomes (Ulrich et al., 2010). As has been observed from this study, and unfortunately so, the principal drive in healthcare facility design (or conversion-of-use of already existing buildings for healthcare purposes) has been the provision of spaces to execute hospital functions rather than the creation of healthcare environments that are psychologically supportive mental healthcare provision.

Consequently, the study has substantiated, based on available data from the sampled facilities, the significant relationship or absence thereof, of specific physical ward features and targeted aspects of staff activities within the study area. While all the relationships between the influences of these ward features were positive and significant, certain ward features did not significantly correlate with overall staff activities, such as type of ward layout and social density. These findings, though inconsistent with previous studies, may be influenced by the differing socio-cultural context within which the study was carried out. Thus, even among healthcare providers, there is gross contempt for and lack of empathy towards the mentally ill even in the course of taking care of them, hence their responses (Chikaodiri, 2009). This ill-conceived notion thus prevents the staff from fully appreciating the affordance of the physical environment in a patient-centred mode of mental healthcare. The study therefore recommends the use of more private rooms and cubicle wards for patients with decentralized nursing stations to truly enhance staff activities,

while not downplaying patient privacy. Again, there is an urgent need for healthcare providers to be trained on patient-centred model of care.

COMPETING INTERESTS

The author declares no potential conflicts of interest with respect to the research, authorship, and publication of this article, which is part of a wider investigation involving mental health inpatients and staff.

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Writer's Brief Data



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