

INFLUENCE OF INDOOR ENVIRONMENTAL QUALITY (IEQ) ON RECOVERY AND WELL-BEING OF PATIENTS IN THE HOSPITAL WARDS OF ENUGU, NIGERIA.

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Abstract: The main focus behind enclosing natural environmental space is to improve human comfort and well-being for the purpose of facilitating various human activities. Different human activities and current state of health pose very big challenge to this pursuit. The holistic condition and quality of any enclosed space is termed Indoor Environmental Quality (IEQ). It affects occupants' indoor thermal, visual and acoustic well-being and comfort of the occupants including patients of hospital wards. The extent of this influence depends on both the occupants preferred (IEQs) and also on the intricate human health condition at the particular time of reference. This paper evaluated the influence of hospital ward indoor environmental quality on the recovery process of patients in Enugu city. For the well and on-the-spot assessment of the targeted population, the study relied on qualitative research method of direct observation and review of literature in which primary and secondary data were collected. Both descriptive and inferential statistics were used to analyze data collected using SPSS version 21. Three hypotheses were tested; Temperature variations, unwanted sound and lighting were all correlated with patients' recovery. The results indicated that all the three parameter were significantly related with patients recovery in the hospital wards of Enugu city

Keywords: Thermal Comfort, visual and acoustic comfort, Indoor Environmental Quality (IEQ), Descriptive and Inferential statistics, SPSS. Temperature variations

1.0 Introduction

Indoor Environmental Quality (IEQ) combines the interrelated concepts of thermal, acoustic visual comforts, and air quality to moderate the occupants' well-being parameters. The improvement or moderation of IEQ could be positive or negative depending on the effectiveness of the enclosed space and the health status of the occupants. However, IEQ has complex relationship with occupants' comfort and well-being. It was stressed in research conducted in Ghana that Indoor Environmental Air IEQ of hospital ward influences the recovery process of patients and productivity of health workers (Udobang and Otumo, 2023). The same research specifically concluded that thermal comfort can improve the recovery process and create conducive environment for health

workers In addition earlier study emphasized that apart from improving patients' recovery rate, comfortable indoor space can reduce the costs associated with airborne diseases by about between 9-20% (Kurnat, 2016). These are remarkable achievements because the number and complexity of airborne illness are the increase. The emergence of Corona-Virus and Monkey Pox in 2019 claimed many lives worldwide mainly due to the speed in which it was spreading through the air. Hence hospital indoor hygiene and comfortable environment cannot be over stretched.

Previous studies though established positive relationship between IEQ and patients' recovery process, but only emphasized the combined effect of the four environmental factors. of thermal, visual, acoustic and air quality. Each of the four main environmental factors is supposed to have both individual and combined influence on patients' recovery rate and well-being. But the emphasis was only on indoor thermal comfort and the direct effect on patients' perception regarding health and well-being (Dear, Akimoto, and Arens, 2013). This emphasis may not have considered other factors of IEQ which are likely to have contributed positively to patients' recovery rate. Different types of sicknesses as well as their severity will likely require one environmental factor of IEQ or combination of more than one for effective improvement. Thermal comfort is one single environmental factor that seem to determine the indoor comfort and well-being of both the sick and healthy. In tropical climate region, the temperature has been on the increase and therefore intensive cooling capacity is required for comfort condition to be improved.

Thermal comfort is the condition of the mind that expresses satisfaction with the thermal environment (Laupland, 2019). The emphasis here is on the extent of human response to temperature variations of the immediate environment. Generally indoor spaces require thermal comfort because it directly affects occupants' perception and sensation in terms of well-being and productivity (Djongyang , Tchinda and Njomo, 2014). More importantly thermal comfort is necessary in hospital environment since the nature of patients' sickness directly alters their thermal sensation, metabolic rates and regulatory responses (Udobang, et, al., 2023). How good or bad these responses will be, depend on the variability of factors of thermal comfort (air temperature, air velocity and humidity) and the personal factors (activity status, clothing and condition of health). The overzealousness attached to thermal sensation and preference have tried to over shadow the effectiveness of both visual and acoustic comfort which should have been considered for a total human well-being and satisfaction. The challenge is the necessity to evaluate the extent of influence of each environmental factor of IEQ (thermal, visual and acoustic comforts) on the recovery condition of patients in hospital wards in Enugu Metropolis. This will enable the stakeholders to know which of the four main IEQ factors that dominates others for any specific health status of patients.

1.2 Problem Statement

The rate of recovery and discharge of patients in Hospitals at Enugu Metropolis is relatively very slow. This more prevalent in state owned hospital like Parklane teaching hospital where on many occasions prospective patients have been rejected on the basis of lack of bed space. The present State government embarked on recruitment qualified medical personnel in a bid to fulfill its policy health delivery to the citizens of the State. These efforts are not yielding commensurate results of rate of patients' recovery and discharge. This calls for an investigation on one of the contributory factors like environmental condition of the ward where patients spend greater part of their stay in the hospital. Some the environmental factors that are likely influence the health condition of patients in hospital wards include, temperature, noise level and extent natural illumination.

1.3 Objectives

The following research objectives were postulated.

- ❖ To examine the extent to which temperature variations influence patients' recovery
- ❖ To evaluate the influence of noise on the recovery process of patients' in the hospital wards in Enugu Metropolis
- ❖ To examine the degree to which lighting affects the recovery of patients in the ward.

1.4 Hypotheses

Ho₁= Temperature variations do not significantly affect patients' recovery in hospital wards in Enugu city.

Ho₂= Unwanted sound and patients' recovery improvement are not significantly related

Ho₃ = There is no significant relationship between lighting and patients' recovery.

2.0 Literature Review

The primary essence of buildings as shelters for humans is for the protection against adverse environmental factors of the ecosystem. The shelter (shield or envelope) forms an indoor environment that can as well be challenging to human comfort especially in hospital environments where the impact can pose severe health complications. As a consequence, the indoor thermal comfort provided by health facilities presents important consideration at the design stage with emphasis on a therapeutic environment to enhance well-being, quick recovery, healing of patients and improved productivity of health workers. Hence, an indoor environment which enhances the occupants' well-being, health contentment and productivity should be a vital priority for Architects to achieve environmental sustenance and ultimate green standards. (Fisk, 2000; Frontczak et al., 2012a,b; Cao et al., 2012; Bailey et al., 2013). However, most studies on IEQ, lay more emphasis on indoor thermal environment and less on other components and indicators such as indoor air quality, wind speed, relative humidity and noise level (Agyekum et al. 2021). IEQ, can be evaluated through weighing all the variables as well as tenants'/occupants/users perception with the provided environment. The priority is on architecture that provides hospital wards with high IEQ standards to impact on patients' quick recovery (Nimlyat, 2022).

Human bodies especially the sick can be exposed, to various heat sources performing at varied rates of exchange. Moderating the heat exchange is important for thermal comfort in hospital wards (Heerwagen, 2004). Thermal comfort itself hinges on factors which include air temperature and mean radiant temperature. If both or either of the two rises beyond acceptable threshold, the body experiences overheating (Olufowobi, 1987). The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) (2004) and International Standard Organization ISO-7730 (2005) defined thermal comfort as the "condition of the mind that expresses satisfaction with the thermal environment" (ASHRAE, 2004; ISO-7730, 2005; Laupland, 2019). If a body maintains its temperature, that body is assumed to be in thermal equilibrium with its environment. Odum (2006) defined optimum total comfort as the sensation of complete physical, psychological and mental well-being. Heat exchange in humans occurs at the air - skin interface via radiation, evaporation and convection.

2.1 Indoor air quality (IEQ)

Health institutions such as hospitals are undoubtedly an environment with unique health characteristics which is different from other forms of habitation such as places of business and dwelling homes. This is because the occupants' hospital wards run high the risk of infectious diseases (Eames et al., 2009; Pérez-Padilla et al., 2010; Verde et al., 2015). Good IEQ performance is vital against exposure and susceptibility to airborne microbes (Leung and Chan, 2006; Verde et al., 2015). Microbial load in health facility environments can have a negative health impact on patients and care givers through contamination with resultant health complications from

opportunistic infections. Hospitals and indeed all health facilities should be designed to aim at high IEQ performance (Wan et al., 2011; Shrivastava et al., 2013; Verde et al., 2015). This is to ensure patients' recovery and healing process as well as guarantee efficiency of health workers and patient's relatives,

2.2 Noise Level (Acoustics)

Sound is an important indicator component of IEQ, sound levels above threshold of permissible decibel is regarded as noise and in clinical parlance it is considered a major source of stress or "stressor" (Xie et al., 2009). Noise violates good mental hygiene if it is an unpleasant, high intensity sound. Noise level is capable of reducing the level of calmness in any situation and is termed as noise pollution (Girish, 2023). In health facilities especially, hospital wards, noise can prevent or violate sleep at the detriment of patients' recovery (Hofhuis et al., 2012; Wayne et al., 2013). This point to the fact that noise has negative effect on patients' recovery rate which in severe cases can complicate patient's health condition. Such health complications may include physiological and psychological well-being such as memory issues, high agitation, unusual aggressive behaviour, moody, and disordered mind in psychiatry (Elmenhorst et al., 2012; Helton et al., 2009; Joseph and Ulrich, 2007; Ryherdet al., 2008; Short et al., 2011).

2.3 Lighting (Illumination)

The IEQ of healing environments can significantly have positive impact on the health of patients in the areas of opportunistic infections and this affects patients' stress and mood (Joseph, 2006; Alfa and Öztürk 2019, Ulrich, 1991; Beute and Kort, 2014). To achieve these parameters, Mackrill et al., (2014) suggested installation of high window-to-wall ratios to admit more daylight as means of improving visual comfort with relative energy reduction in patients' rooms. Clear indoor illumination as well as room - outdoor scenic views are major design considerations in health facility (Calama-González et al., 2019). Poorly illuminated or darkened rooms can be detrimental to patient's health recovery and overall well-being. A study on how occupants' response to antidepressant of daylighting was carried out by Benedetti et al. (2001). Their result showed a reduced patients stay in hospital as a result of direct exposure to daylighting. Also Alfa and Öztürk (2019) corroborated Raanaas et al. (2012) that scenic views through windows can reduce stress which in turn, minimizes patients' long-stay in hospitals (Alfa and Öztürk 2019)

3.0. Study Area

The origin of Enugu city was dated far back at about 1915 after the discovery of coal. It has total land area of 556km², lies between latitudes 06°21'0"N and 06°30'0"N, and longitudes 07°26'0"E and 07°37'0"E (Okeke, Eziyi, Udeh and Ezema, 2020). Enugu city is situated the south east geopolitical zone of Nigeria and has neighbourhood villages like Nkwo, Nike, Amaechi and others (Nwalusi et al., 2022). From 1929, Enugu became the capital of eastern provinces and has then remained the administrative of Eastern Region, East Central States, Anambra State and now Enugu State. This many years of functioning as administration hub for different governments, Enugu Metropolis, have been experiencing rise in urban population and concentration of some social facilities like schools and hospitals. Enugu Metropolis grew from a population of 62,764 in 1952 to 505,280 inhabitants spread within 18 neighbourhoods across the city in 1991 and rose to about 722,664 according to 2006 national census (NPC, 2006). The population was projected to about 1.2 million in 2022. Many social institutions are therefore located in Enugu city to take care of the teeming population. Presently there are many Federal and State owned tertiary, and secondary schools and hospitals in the city. For instance, University of Nigeria Enugu campus

(UNEC), including the teaching hospital (UNTH) Parklane teaching hospital and some health centres sited at different neighbourhoods as shown in Table 1 below.

4.0 Methodology

4.1 Population

The target population for this study includes all the adult patients in government owned hospitals in Enugu Metropolis. Private owned hospitals are not included because the environments in which they operate are entirely different from that of governments' hospitals. Some private hospitals even operate in buildings not originally designed as hospitals and therefore could present different scenario as regards to environmental conditions of the wards. State government owned hospital and health centres are selected for purposes of uniformity in terms of financing, policy of administration, common architectural design concepts and employer- worker relationship. One teaching hospital and five health centres are selected as shown in Table 1 below.

Table 1 Hospitals/ Health Centers Studies Including the Number of Patients

S/n	Hospital/Health Centres	Number of Respondents
1	Parklane Teaching Hospital Enugu	106
2	Primary Health Centre Abakpa	30
3	Uwani Primary Health Centre	30
4	Primary Health Centre Ndiagu Amachi Uwani	30
5	Asata Health Centre	30
6	New Haven Health Centre	30
	<i>Tottal</i>	256 Respondents

4.2 Sample Techniques and Size

Purposive sample techniques is adopted in which only patients who adults (18 years and above) and must have stayed in hospital wards for not less than three weeks (21days and above) were selected. This type of sampling procedure is necessary to select only the patients who have experienced the specific hospital ward environment to a reasonable extent required to attend to the questionnaires on indoor environmental quality. Adults who are taking care of patients, and must have satisfied the minimum duration including having monitored the progressive improvements of patients can also be selected.

4.3 Data Collection

Data for this study are collect by the use of structured questionnaires. This type of closed and fixed response questionnaires is adopted because it is less time consuming and easy to be filled by the respondents. A total of two hundred and fifty six (256) questionnaires were administered but only two hundred and fifty (250) copies were returned. These questionnaires were only administered to patients who have spent at least three weeks so that they can be significantly acquainted with the environmental conditions of the hospital wards. The care givers of the patients were allowed to assist the ones who cannot fill the questionnaires themselves.

4.4 Data Collection and Analysis

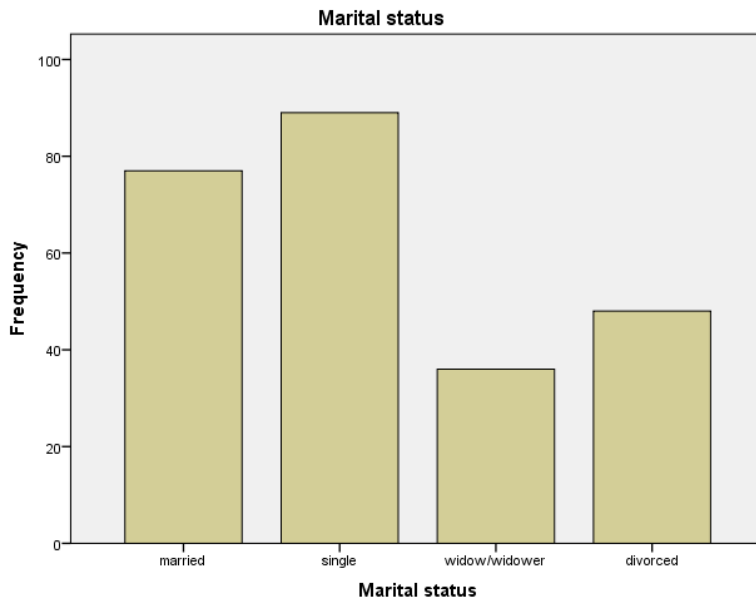
Descriptive Statistical Analysis

Table 4.1: Frequency Table Showing Gender Distribution of the Respondent in Hospital Wards in Enugu City

Gender Distribution	Frequency	Percent	Valid Percent	Cumulative Percent
male	132	52.8	52.8	52.8
Valid female	118	47.2	47.2	100.0
Total	250	100.0	100.0	

Source: Field survey 2024 [SPSS Version 21 COMPUTATION]

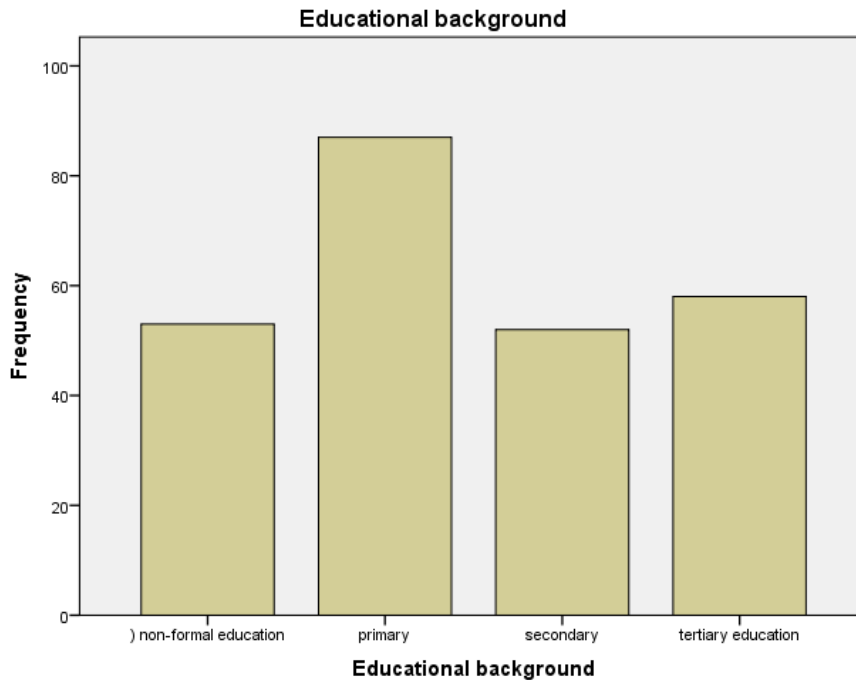
Table 4.1 Shows that out of 250 respondents, 132 (52.8%) were male while 118 (47.2%) were female



Source: Field survey 2024 [SPSS Version 21 COMPUTATION]

Figure 4.1 Bar chart showing the marital status of the respondents on hospital wards of Enugu city

From figure 4.1 above the respondents who were single topped the list with frequency value of 89 (35.6%), followed by married with frequency of 77 (30.8%) and the least was widow and widower with frequency of 36 (14.4%).



Source: Field survey 2024 [SPSS Version 21 COMPUTATION

Figure 4.2 Bar chart showing the educational background of the respondents in the hospital wards of Enugu city.

The chart indicated that the respondents with primary education had the highest frequency of 82 followed by tertiary and non-formal education with values 58 53 respectively. and the list was secondary with frequency of 53

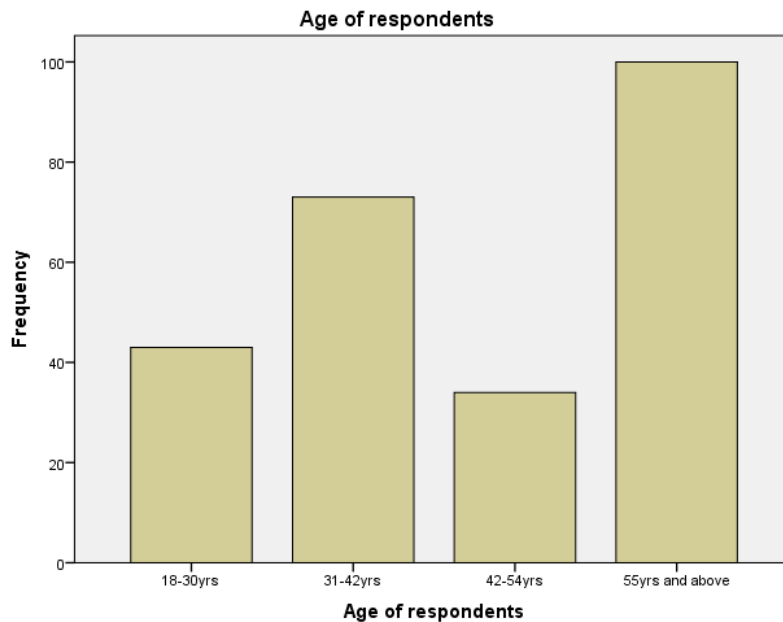


Figure 4.3; Chart showing frequency age distribution of the respondents

Respondents who were 55years and above had the highest frequency of 100 which is 40% followed by patients within age bracket 31-42 years which is 73 (29.2%). The least group was 42-54years with frequency of 43 being 13.6

Table 4.2: Showing Frequency Distribution of Occupational Status of the Respondents in Hospital Wards of Enugu City

	Occupational Status of Respondents	Frequency	Percent	Valid percent	Cumulative percent
Valid	public servants	103	41.2	41.2	41.2
	self-employed	45	18.0	18.0	59.2
	unemployed	102	40.8	40.8	100.0
	Total	250	100.0	100.0	

Source: Field survey 2024 [SPSS Version 21 COMPUTATION]

Frequency distribution table of occupational status showed that patients (respondents) in public service had the highest frequency of 103 (41.2%) closely followed by unemployed with value of 102 (40.8%). The least frequency was self-employed with value of 45 (18.0%)

Table 4.3 Shows the Mean Scores and Standard Deviations of the Respondents'

Opinion on the 3 Constructs Statements from the Influence Temperature Variation on Patients Recovery Process in the Hospital Wards of Enugu City

N/S	Temperature Variation	N	Mean	Std. Deviation
1	Temperature of the outdoor environment of the hospital wards adversely affects me	250	3.86	1.566
2	Temperature in the hospital wards is not being moderated by either the use of fans or air conditions	250	3.86	1.313
3	High temp. of hospital wards in Enugu city is unfavourable to me	250	3.52	1.522
	Valid N (listwise)	250		

Source: Field survey 2024 [SPSS Version 21 COMPUTATION]

Results

From Table 4.6 mean values of the score on the 3 construct from the influence of temperature variations on recovery process of patients are 3.86, 3.86 and 3.52 respectively. These values are above the threshold value of agreement zone of 3.00. This indicates acceptance of all the questionnaire items

Findings

These indicated that temperature in hospital wards is influenced by outdoor environment and not much is being done to moderate it and hence unfavourable to patients in the ward.

Table 4.4; Shows the Mean Score and Standard Deviation of the Respondents’ Opinion on the 3 Constructs from the Influence Sound and Acoustics Variation on Patients in the Hospital Wards of Enugu City

N/S	Questionnaire items on Sound and Acoustics	N	Mean	Std. Deviation
1	Unwanted sound filtering into the hospital ward from outdoor environment causes internal tress and disturbance to me	250	4.49	1.106
2	There is relatively the absence of serene and quiet environment in the hospital wards	250	3.22	1.260
3	The level of noise in the hospital is inconveniencing	250	3.64	1.537
	Valid N (listwise)	250		

Source: Field survey 2024 [SPSS Version 21 COMPUTATION]

Results

From Table 4.7 mean values of the score on the 3 construct from the influence of unwanted sound variations on recovery process of patients are 4.49, 3.22 and 3.64 respectively. These also are above the threshold value of agreement zone of 3.00. This indicates acceptance of all the items

Findings

These indicated that prevalence of unwanted sound in the hospital wards and this situation affects the patients in the ward. The hospital wards lacked that serene and quiet environment required of hospital

Table 4.5 Shows the Mean and Standard Deviation of the Respondents’ Opinion On The 3constructs from the Influence Lighting and Illumination Variation on Patients in the Hospital Wards of Enugu City

S/n	Questionnaire items on Lighting and illumination	N	Mean	Std. Deviation
1	Lighting and illumination in the hospital wards is below my expectation	250	3.80	1.390
2	The lighting condition affects my health and vision negatively	250	3.62	1.532
3	Morning natural lighting and shadow formation is relatively inadequate in the hospital wards	250	2.59	1.446
	Valid N (listwise)	250		

Source: Field survey 2024 [SPSS Version 21 COMPUTATION]

The mean value for the three questionnaire items regarding the effect of lighting and illumination on the patients are 3.80, 4, 62 and 2.59 respectively. The two items are above agreement average of 3.0 while item number 3 is below agreement score and hence rejected.

Findings

Results of the mean and standard deviation indicates that though lighting and illumination was below expectations in the hospital wards, but however natural lighting and shadow formation was not an issue of concern for patients in the hospital wards

Table 4.6 Shows the Mean and Standard Deviation of the Respondents’ Opinion on the 3 Constructs from the Influence Recovery Conditions of Patients in the Hospital Wards of Enugu City

S/n	Questionnaire item of Recovery	N	Mean	Std. Deviation
1	I feel that my health condition as at now has not improved	250	3.6960	1.30013
2	From doctors’ assessment my health has not become better than it was	250	3.5960	1.34761
3	From the results of Temp and blood pressure checks there is an indication of non-improvements in my health condition	250	3.4400	1.52831
	Valid N (listwise)	250		

Source: Field survey 2024 [SPSS Version 21 COMPUTATION]

Mean values for the patients’ recovery condition in the wards for the 3 items are 3.69, 3.59 and 3, 44. This indicates acceptance of all the construct statements. The low value of standard deviation minimal dispersion and implies that the mean results can be relied upon.

Findings

Patients’ health condition in the hospital wards of Enugu city was not improving because the elements of indoor environmental conditions were not favourable

Inferential Statistics Test of Hypothesis

Table 4.7 Showing the result of correlations statistics to test hypothesis one ‘*Temperature variations can significantly affect patients recovery in hospital wards of Enugu city*’

Correlations

		Temperature Variation	Recovery
	Pearson Correlation	1	.717**
Temperature Variation	Sig. (2-tailed)		.000
	N	250	250
	Pearson Correlation	.717**	1
Recovery	Sig. (2-tailed)	.000	
	N	250	250

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

Results

The research hypothesis posits that temperature variations significantly affect patients’ recovery in the hospital wards of Enugu city. The result from Table 4.7 shows r-value of 0,717 and P<0.705, and this suggests that the

relationship claimed above is significant. The researcher concludes that there is adequate statistical evidence to infer that temperature variation affects patients; recovery in the hospital wards of Enugu city.

Table 4.8 Showing the result of correlations statistics to test hypothesis two *‘Unwanted sound and patients’ recovery in hospital wards of Enugu city are significantly related ’*

Correlations

		Unwanted Sound	Recovery
	Pearson Correlation	1	.898**
Unwanted Sound	Sig. (2-tailed)		.000
	N	250	250
	Pearson Correlation	.898**	1
Recovery	Sig. (2-tailed)	.000	
	N	250	250

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

Results

Research hypothesis 2 claimed that unwanted sound and patients’ recovery in the hospital wards of Enugu city are significantly related. From correlation results in Table 4.8, r value is 0.898, and P<0.705 which suggests that relationship posited above is significant. Based on the statistical result, the researcher concludes that unwanted sound and patient’s recovery are related.

Table 4.9; Showing the result of correlations statistics to test hypothesis three *“There is a significant relationship between lighting and patients’ recovery in hospital wards of Enugu city”*

Correlations

		Lighting and illumination	Recovery
	Pearson Correlation	1	.812**
Lighting and illumination	Sig. (2-tailed)		.000
	N	250	250
	Pearson Correlation	.812**	1
Recovery	Sig. (2-tailed)	.000	
	N	250	250

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

Results

Research hypothesis 3 stated there is significant relationship between lighting and patients ‘recovery in the hospital wards. The result from Table 4.9 shows that r value 0.812 and P<0.705, this implies that relationship posited above is significant. Hence the alternative hypothesis as claimed above is accepted

Findings

Results from both descriptive and inferential statistical analysis point that temperature variations, unwanted sound and lighting are major environmental parameters that influence patients' recovery in the hospital wards of Enugu city. From earlier studies by, (Agyekum et al. 2021, Udobang et, al.2023), temperature was highlighted as the only indoor environmental quality that affects patients' health well-being and recovery. Though this paper agrees to this position but also maintained that results from statistical analysis conducted showed that both unwanted sound or noise and lighting affect patients recovery in hospital wards in Enugu. Emphasis on temperature the major IEQ parameters that affect patients' health condition could be due to recent increase in global heat caused by climate change.

Conclusion

Hospital administrator should not focus on only drugs in handling various ailments but in addition consider the environmental condition of the wards and other hospital spaces. Architects and other related professional should incorporate sound proofing materials to cushion the effect of noise on patients.

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Appendix

Questionnaire

SECTION A Socio-Economic Characteristics Of Respondents

- (1) Sex (a) male (b) female
- Occupation status of respondents (a) Public servant (b) Self employed
- (c) Unemployed
- (2) Marital status (a) married (b) single (c) widow/widower
- (d) divorced
- (3) Educational background (a) non-formal education (b) primary
- (c) Secondary (d) tertiary education
- (5) Age of respondents (a) 18-30yrs (b) 31-42yrs
- (c) 42-54yrs (d) 55yrs and above

SECTION B Assessment of the Environmental surroundings of the Hospital

- (6) Layout location of the Hospital (a) within high density (b) medium density
- © low density
- (7) Which of these comm. facilities is within close range of the hospital?
- (a) market (b) church/mosque (c) refuse dump (d) filling station

(e) industry (f) none

SECTION C

(8) Indicate the extent of influence of any of the Indoor Environmental Quality (IEQ) parameters patients’ recovery in the hospital wards of Enugu Metropolis

Heat/Temperature variation

S/N		Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
1	Temperature of the outdoor environment of the hospital wards adversely affects me					
2	High temp. of hospital wards in Enugu city is unfavourable to me					
3	Temperature in the hospital wards is not being moderated by either the use of fans or air conditions.					

Noise or Unwanted sound

S/N		Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
1	Unwanted sound filtering into the hospital ward from outdoor environment causes internal tress and disturbance to me					
2	There is relatively the absence of serene and quiet environment in the hospital wards					
3	The level of noise in the hospital is inconveniencing					

Lighting and illumination

S/N		Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
1	Lighting and illumination in the hospital wards is below my expectation					
2	The lighting condition affects my health and vision negatively.					
3	Morning natural lighting and shadow formation is relatively inadequate in the hospital wards					

Patients' recovery

S/N		Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
1	I feel that my health condition as at now has not improved					
2	From doctors' assessment my health has not become better than it was.					
3	From the results of Temp and blood pressure checks there is an indication of non-improvements in my health condition					