Article

# Accessing the Physical Facilities Design: A Case of the South-Western University Teaching Hospital in Nigeria.

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**Abstract**
This study assessed the South-Western University Teaching Hospitals Physical Facilities in Nigeria. This appraisal of the physical facilities results from aging facilities (built in the 1950s and 1970s) that no longer support efficient and safe care delivery. This study was limited to the Federal Universities Teaching Hospitals (FUTH) in the southwest, Nigeria. The University Teaching Hospitals offer a wide range of acute, convalescent, and terminal care using diagnostic and curative services in response to acute and chronic conditions arising from diseases, injuries, and genetic anomalies. In doing so, they generate essential information for research, education, and management. The layout, organization, Form/shape, movement pattern, accessibility, visibility, and number of windows and doors in the interior spaces were evaluated using a well-structured questionnaire that was randomly administered to 557 hospital users. These variables were analysed at univariate level using descriptive analysis. At bivariate level, Kendall-tau rank correlation coefficient was used to determine the relationship between the variables of the physical facilities. The result showed the satisfactory variation among the users and the relationship between the variables of the physical facilities of the selected FUTH. The results obtained were also supported with the information obtained through semi-structured interviews conducted with the principal officers. The study is expected to serve as reference materials to architects, healthcare researchers, facility administrators, policymakers and healthcare managers in the efficient realization of the design issues that affect University Teaching Hospitals' physical facilities in Nigeria.
**Keywords**: Assessment, Hospital, Teaching, Southwest, Physical Facilities, Nigeria,

## Introduction

The physical facilities Design refers to the process of planning, organizing, and creating spaces within a building or structure to meet the functional needs of the users while ensuring safety, efficiency, and comfort. This process is crucial for various types of facilities, including healthcare. The design of physical facilities in hospitals must consider optimal functioning, safety, and accessibility to ensure effective environments and infrastructure. The hospital's assessment form a key resource addressing user experience from the perspective of both patients and healthcare professionals, such as their subjective view on physical facilities in terms of spaces available, function, technology, usability and aesthetics. The in-patient facilities provide overnight stay for patients' medical care (Paediatrics wards, Surgical wards and Obstetrics and Gynaecology wards such as ante-natal, post-natal, labour and maternity wards among others); while the out-patients facilities provide premises for services such as drop off, registration counter, waiting area, consultation room, pharmacy and toilets (Samah, Ibrahim and Wahab, 2013). Also, attached facilities and amenities include; staff offices, staff changing room, equipment store, seminar room and amenities such as water, electricity and drainage system.

Studies have shown that the hospital physical facilities are vital and require more attention when planning the hospital environment (Fischl, 2004; Steinke, 2015; Akinluyi, Fadamiro, Ayoola & Alade, 2021). Designed spaces serving a hospital not only communicate and represent their health content, but also provide stimuli affecting the users‟ psychological well-being, satisfying his needs of humanization. (Pellitteri & Belvedere, 2011; Akinluyi, Fadamiro, Ayoola & Alade, 2021).

In an ideal situation, the healthcare physical facilities in Nigerian hospitals are expected to deliver the highest quality of healthcare services to clients (Oladejo Umeh and Ogbuefi, 2015; Akinluyi el.al, 2024). But this ideal situation is never met due to the initial design consideration of the existing facilities in terms of number of patients per ward, spaces, sizes and availability, organization, location, accessibility among other variables that could no longer meet the current demand for healthcare services. Since this has seriously affected the patients' well-being and reduced the staff performances (Johanes and Atmodiwirjo, 2015; Varni, Burwinkle, Dickinson, Sherman, Dixon, Ervice, Leyden and Sadler, 2004; Armstrong, Kane, Reid; Hurst, 2008; Joseph, Choi and Quan, 2021), research is needed to develop policy strategies for renovation and construction of new hospital buildings and environmental facilities to improve the current healthcare delivery situation in Nigeria.

Hospitals' Physical facilities are poor at meeting the needs and expectations of user (Ulrich, 1991; Akinluyi el.al, 2019). This could be due to the fact that studies on users' assessment of spatial facilities design have not been clearly understood and adequately carried out within the research circle which is suggested in this study to provide better solutions to the problem. Many studies reviewed from the literature have examined the various aspects of hospital design regarding the identified problems; for example, Davidson et al. (2007) urged that a well-designed space provides a greater patient/family control of the environment. Similarly, Verschoren et al. (2015) discussed how a hospital environment could be designed child-friendly while Price and Lu (2013) emphasized the impact of standardization such as room size, shape, layout, equipment, furniture, location, flexibility and adaptability of spaces on healthcare environments and argued that standardization of clinical areas may promote safety and efficiency and reduce possible medical errors due to lowering reliance on short-term memory. Price and Lu (2013) also recommended the involvement of users for assessment to take the correct decisions in the design process. However, applied research in solving various aspects of hospital spatial design in Southwest Nigeria remain scanty except the few studies originating from northern part of Nigeria which was conducted by Nimlyat, Anumah, Odoala and Benjamin (2018). The study focused on spatial distribution of indoor environmental quality (IEQ) in hospital wards based on the physical measurement with different architectural features.

In addition, the hospital physical facilities are defined by the spaces used by the professional staff, equipment, the building form, their furniture and fixtures (Akinluyi el al., 2019). The research on physical facilities design from the user's perspectives similar to this study have employed different methods of evaluation, such as space syntax (Setola, 2009; Khan, 2012), evidence-based method (Parke, 2007), face-to-face interview (mccurdy, Haliburton, Yadav, Yoder, Norton, Froehlich, Kaur, Kramer, Silman, Quinn, Pudlo, Terrell, and El-Mallakh, 2015), structured observations and systematic walk-through methods (Rippin, Zimring, Samuels and Denham, 2015), walk-through tool (Gill, Bailey, Waxman and Smith, 2014) without using post-occupancy evaluation that combine both qualitative and quantitative methods of assessment which could make more significant difference from the methods previously used in the past studies by other researchers. The level of the deterioration of healthcare physical facilities in Southwest, Nigeria is extensive and widespread. This is a result of lack of evidence-based framework for physical designs incorporating the assessment of the physical facilities design issues by the actual users. Hence, the gap in knowledge about how the design characteristics of the hospital physical facilities influence the users' performance in the Federal University Teaching Hospitals (FUTH) in Southwest, Nigeria. There is also the gap in the understanding of best-suited methodological approaches to the hospital physical facilities design assessment. Failure to examine these identified problems will affect the design performance of the hospital physical facilities which could negatively affect the staff performance, patient's well-being, increase mortality and morbidity rate and decrease user's satisfaction. This study is set to assess the physical facilities design in the Federal University Teaching Hospitals in Southwest, Nigeria.

## THE LITERATURE REVIEW OF RELATED CONCEPTS

### The Concept of Hospital Physical Facilities

The hospital's physical facilities is defined by the structure or building, the interior spaces of building, settings and environment, including attached facilities and amenities which help patients' quick recovery

and staff performance (Mourshed and Zhao, 2012). Ogaji, Giles, Daker-White and Bower (2015) also defined the hospital physical facilities as including different types of the buildings, amenities, adequate equipment for patient's care, records, laboratory and infrastructure for emergencies. Its form and management are shaped by vision, strategy and conceptions of the environment, work, and workers. However, the environment in which healthcare activities is performed is a multifaceted concept which can be modified and examined in a multitude of ways and in varying degrees of depth (Fornara and Andrade, 2012). The physical layout can inhibit or enhance the quality of emergency obstetrics care (Abreu and Potter, 2001).

To be effective, hospital's physical facilities require critical infrastructure such as well-designed spaces for operating theatres, lobbies, entrance hall, waiting area, consulting rooms, conveniences, in-patient wards, out-patient corridors and medical treatment for the patients offered by trained professional staff (Oladejo, Umeh and Ogbuefi, 2015).

The physical facilities setup is crucial in accessing numerous aspects of organizational functions (Elsbach and Pratt, 2007; Hatch and Cunliffe, 2012; Steinke, 2015). Gill, Bailey, Waxman and Smith (2014) listed availability of physical facilities such as the laboratory, blood bank, autoclave room, the pharmacy room and maintenance services (backup electricity, water and laundry) as critical for emergency obstetrics care. Furthermore, the physical facilities place constraints on and define the context in which work processes, services, perceptions and social interactions occur (Bitner, 1992). Hospital physical facilities provide rich and diverse quantitative descriptions of the hospital built environment configurations, particularly the hospital buildings, street networks with special focus on their arrangement and interconnections. This description allows for potential explanations of a variety of physical and psychological responses such as user movement, experiences and cognitive knowledge of place (Montello, 2007). The physical facilities of the hospital are generally classified into two; the clinical and non-clinical categories.

**The Clinical Physical Facilities**

Clinical facilities are used for medical activities such as operating theatre and surgical, children ward, orthopaedic clinics, gynaecology, ante-natal, post-natal, and ophthalmology (Santiago, 2016). The clinical facilities can further be classified into two, namely the in-patient and out-patient's physical facilities (Dinesh, Sanjeev, Prem and Remya, 2013).

The in-patient physical facilities refer to medical treatment facilities that are provided in a hospital and required at least one overnight stay (Santiago, 2016), for admission in to the hospital, primarily to allow further treatment and close monitoring during the procedure and afterwards during recovery (Phiri, 2003). It could also be an admission for numerous days with continuous general nursing services in an area of an acute care facility (Bayramzadeh, 2016). Douglas and Douglas, (2005) surveyed in-patients and noted that aspects such as transportation, ground and landscape design as well as space planning, were also important factors in the hospital selection process. Wards remain the most popular in-patient hospital physical facilities and according to Alalouch, Aspinall and Smith (2016), it could attract the most public attention because patients on admission spend most of their time in wards. Patients in wards are usually weak and in a vulnerable state experiencing less control over their environment.

Out-patient means that the treatment does not require hospital admission and may also be performed outside the premises of a hospital (Samah, Ibrahim and Wahab, 2013). The authors recognized hospital out-patient service as a vital component in a medical care delivery which provides primary care that focuses on preventive and public health care services. Also, Dinesh, Sanjeev, Prem and Remya (2013) considered out-patient facilities as the window to hospital services. Its impression often influences the patient's sensitivity to the hospital and therefore, it is essential to ensure that out-patient facilities provide an excellent experience for the users for example. The outpatient's physical facilities serve and appeal especially to the economically disadvantaged population. Evaluation of occupied out-patient's physical facilities is essential to reveal design solutions that work and assessment of out-patient's facilities has remained unexplored as health care researches focused mainly on acute and in-patient care (Preiser et al., 2012). Examples of outpatient physical facilities included clinical spaces, waiting room/reception, record unit, lobbies and corridors, consulting room and counselling room (Samah, Ibrahim and Wahab, 2013; Prahlad, Rajeev, Jayati and Laxma, 2010).

## Non-Clinical Physical Facilities

Non- clinical physical facilities include attached facilities and amenities that provide support and services to both the in-patient and out-patient's physical facilities. Lavela, Etingen, Hill and Miskevics (2015) posited that the physical environment to which health care is delivered may be improved through redesign of existing physical facilities or by nurturing attached amenities. The study noted that, profit-oriented facilities are in general closer to the main physical facilities and public facility tends to be situated far from hospital activities. Fawole, Okunlola and Adekunle (2008) pointed out that amenities and attached facilities such as adequate spacing, cleanliness of the environment, good toilet facilities, adequate ventilation, availability of running water and electricity were factors that determine the quality of antenatal care in both private and public health facilities. Attached facilities identified from the lavela, el al. (2015) included the administrative facilities such as office spaces, engineering and environmental services facilities, staff rest and changing room, teaching and training facilities, security post, dirty utility/disposal room, parking facilities and conveniences. Also included are amenities in the hospital environment comprising commercial and entertainment centre, catering and restaurant, religious facilities, ATM points and banking and other public facilities.

## The Design Characteristics of the Hospital Building

The design of hospital building layout refers to the arrangement of different types of spaces, equipment, machineries and furnishing within a building envelop after considering the various objectives of the facility (Tompkins and Reed, 1996). The main objective is to design effective workflow to make space, equipment and workers more productive. An effective facility design layout ensures that there is a smooth and steady flow of production material, equipment and manpower (Teicholz, 2001). The design of a hospital building should consider various aspects that might affect the patients' experience of care, which eventually might affect the healing and curing process. It should also be based on evidence that will inform design decisions regarding the spatial arrangement and its layout (Johanes and Atmodiwirjo, 2015). Facility design, when properly carried out in healthcare building, should be able to provide an ideal relationship between the building, raw materials, equipment and manpower under safe and comfortable environment. However, its principles depend on the flexibility for expansion or modification and optimum space utilization (Levin and Joseph, 2009). Hospital design requires a careful consideration of the individual spaces to be provided and the incorporation of the requirement for optimum indoor environment which is more challenging when compared to other building types (Nimlyat, Anumah, Odoala and Benjamin, 2018)

The layout and design of spaces impact greatly on how the work is done. The key to good facility layout and design is the integration of the needs of patients, materials and equipment in such a way that they create a single, well-functioning system (Becker and Sweeney and Parsons, 2007). However, few of the many studies carried out on the architectural design of hospital facility has considered the influence of facility design empirically on patient's wellbeing and staff performance. Design layouts that allows nurses to easily supervise patients tend to deprive the patients of privacy and increases the risk of cross-infection among patients (Hughes, 2000). Furthermore, the ward layout with separated rooms for patients may also mean more effort for medical staff to perform visual supervision of the patients under their care (Johanes and Atmodiwirjo, 2015).

Becker, Sweeney and Parsons (2007) emphasized that quality of care issues are central to the fundamental business of a hospital, and have been linked to many different facets of facility design such as poor functioning spaces, ventilation systems, crowded and noisy medication rooms, flooring materials that contribute to falls in the design and layout of different units (Marberry, 2006; Becker, Sweeney and Parsons, 2007). The authors stressed that hospital facility design should be provided with adequate space, equipment and qualified personnel and be suitable for execution of activities, be spacious enough and cause no contamination to the environment. Also, the study conducted by Henriksen et al, (2007) identified design elements which are critical in ensuring patient's well-being and staff performance such as patient-centeredness, safety, effectiveness, efficiency, timeliness and equity.

According to Reiling, Hughes and Murphy (2003), the design of a structure with its fixed and moveable components can have a significant impact on human performance, especially on the health and safety of employees, patients and families. The design factors that can influence the degree of attractiveness of a facility include not only the design of the production area itself, but also the impact of the facilities on the users. The study conducted by Becker, Sweeney and Parsons, K. (2007) illustrated how research can help facility professionals, architects, and hospital administrators to make more informed facility decisions. Healthcare industries have turned to evidence-based design as a means of making more informed decisions about hospital facility designs that can help to improve patient safety and generate high levels of patient's satisfaction. Facility design has been shown through systematic research to have such a significant effect on outcomes considered essential to the long-term survival and performance of the organization (Becker and Parsons, 2007).

The design of the physical facilities in health care is important for improving health outcomes, not only for patients but also for staff (Joseph, 2006b; Sadler et al., 2011; Steinke, 2015) and is recognized as an integral part of the patients' experience and satisfaction with healthcare services (Hutton and Richardson, 1995; Reidenbach and Sandifer-Smallwood, 1990). Past research work indicated that improved design can help bring about dramatic increases in safety and quality, particularly reduced infections, falls, errors, transfers, stress/burnout, and increases in recruitment/ retention and job satisfaction (Joseph, 2006; Steinke, 2015). Major hospitals and health care systems are embracing the concept of evidence-based design as they seek to enhance quality of care and client outcomes in health care. The design of the physical setting has also been shown to be important in building employee's commitment to the organization (Hatch and Cunliffe, 2012) and effectiveness in the recruitment, retention and performance of staff, all of which have an impact on service quality (Coile, 2002).

The quality of hospital design can positively influence well-being and satisfaction of the users (Joseph, 2006; Steinke, 2015). In addition, designing healthcare physical facilities is a complex process in which medical, technical and social issues must be simultaneously considered (Caixeta and Fabricio, 2013). Such processes are also complex, given the variety of stakeholders involved and their environmental requirements. The process needs to be more dynamic and learning-based because design solutions are often developed through collaborative work whereby ideas are discussed (Eriksson, Fro¨st and Ryd, 2012).

## RESEARCH METHODOLOGY

The survey design utilized close-ended questionnaires that were tailored to address the objectives of the study. These questionnaires were distributed to users within the study areas. The research population is divided into two categories: Users: This includes staff, in-patients, and out-patients, totaling 39,787 individuals. From this group, the sample frame was determined to be 1,247, and the sample size was established at 575. Building Structures: This category consists of all building structures, totaling 198. The sample frame for this group was 45, with a sample size of 12. The assessment of the selected buildings were carried out using three major categories of hospital users: the staff (clinical & non-clinical), in-patients and out-patients. The clinical staff refers to the professional staff members who participate in the treatment of patients both directly and indirectly (doctors, nurses, pharmacists, medical psychologists, medical laboratory scientists, health technologists and technicians, among others). The non-clinical staff are the non-professional staff members who do not participate in the treatment of patient directly (health assistants, record attendants, maintenance officers and security officers). Assessment of spaces in the buildings selected were carried out at both the in-and out-patients' physical facilities.

It is both theoretically and practically impossible to sample all users across the departmental buildings in the study areas, this study adopted Krejcie and Morgan's (1970) method for determining sample size. According to this method, sample sizes were derived for the users: 210 for University College Hospital (UCH), 217 for Lagos University Teaching Hospital (LUTH), and 148 for Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), resulting in a total of 575 questionnaires being administered (refer to Table 3.1).

At UCH, Ibadan, 37.6% of the staff sample size (210), which corresponds to 79 questionnaires, and 62.4% of the patients sample size, which corresponds to 131 questionnaires, were administered. At LUTH, Lagos, 33.6% of the staff sample (217), amounting to 73 questionnaires, and 66.3% of the patients sample (144 questionnaires) were administered. At OAUTHC, Ile-Ife, 35.1% of the staff sample (148), or 52 questionnaires, and 65.0% of the patients sample (96 questionnaires) were distributed.

The sample size for the buildings was limited to four buildings that host four main departments, which in turn have given rise to other departments and engage in pure clinical activities for medical treatment. These departments include Pediatrics, Surgery, Medicine, and Obstetrics and Gynecology. Data obtained from users through a structured questionnaire were analyzed at the univariate level using descriptive methods, including frequency distribution percentages, weighted means, and standard deviations. At the bivariate level, Kendall's tau-b correlation analysis was employed to examine the relationships between the design features of physical facilities in the study areas. Furthermore, the correlation between the usage of these facilities and users' assessments of the design features was assessed using the same analytical tools. At the multivariate level, the Kruskal-Wallis test was applied to evaluate the null hypothesis (h03b), which posits that there is no significant difference in users' assessments of physical facilities among the Federal University Teaching Hospitals in Southwest Nigeria.
In addition, structured questionnaires were administered on the patients with the support of clinical staffs who are involved directly in their treatment and to other staff with the support of a team of pre-trained field assistants. The field assistants were trained on how, where and when to administer the questionnaires under the supervision of the researcher. The team consisted of twenty (20) field assistants chosen from amongst assistant lecturers, ten (10) senior instructors and 400 Level Architecture students of Joseph Ayo Babalola University, Ikeji-Arakeji Osun-state. They were engaged and deployed to the study areas for the period of three (3) weeks. The questionnaires were administered during the clinical days (Tuesdays, Thursdays and Fridays) between the hours of 8am and 4pm to capture all the categories of respondents selected across the departments of the study areas.

## DATA ANALYSIS, DISCUSSION AND RESULTS

### Analysis of the users' assessment of the physical facilities in the study area.

This section presents an assessment of the physical facilities at the Federal University Teaching Hospitals in Southwest Nigeria. The analysis utilizes both descriptive and inferential statistics, focusing on several key variables: the layout of buildings and spaces, the organization of interior spaces and furniture, the form and shape of the buildings, the flow of movement within the interior spaces, accessibility to both the buildings and interior areas, visibility within the interior spaces, and the number of windows and doors. These variables are evaluated using a 5-point Likert scale, which includes the options: strongly dissatisfied, dissatisfied, fair, satisfied, and strongly satisfied.

### Layout of the Buildings and Spaces

The assessment of the staff regarding the layout of the buildings and spaces indicated that wards and clinical areas received the highest weighted mean score of 3.747, with a standard deviation of 1.010. Out of 83 respondents, 42.3 percent rated this as "Fair." Other important areas included the work area, which had a weighted mean score of 3.718 (±0.908 standard deviation) and was rated "Satisfied" by 73 respondents (37.2 percent). The waiting room, reception, and record unit achieved a score of 3.691 (±0.985 standard deviation), also rated "Fair" by 73 respondents (37.2 percent). Lastly, laboratories, diagnostic, and counseling facilities scored 3.665 (±0.918 standard deviation), rated "Fair" by 69 respondents (35.2 percent), as shown in Table 1.0
Outpatients assessed the physical facilities based on various factors, including the layout of buildings, interior organization, furniture arrangement, building form, and movement patterns. The results revealed that the laboratories, diagnostics, and counseling facilities had the highest rated layout, with a weighted mean score of 3.773 and a standard deviation of 0.954. This was rated "Satisfied" by 86 respondents (35.5 percent). This was followed by the waiting room, reception, and record unit with a score of 3.751 (±0.935

standard deviation), rated "Satisfied" by 82 respondents (33.9 percent). Wards and clinical spaces received a score of 3.717 (±1.030 standard deviation) and were rated "Fair" by 75 respondents (31.0 percent).

In-patients also assessed the physical facilities, revealing that the layout of laboratories, diagnostics, and counseling facilities had a mean value of 3.686 (±0.828 standard deviation) and was rated "Satisfied" by 54 respondents (45.4 percent). In contrast, the layout of the ward space and work area received a weighted mean score of 3.612 (±0.806 standard deviation), rated "Fair" by 49 respondents (41.2 percent).

Overall, the assessment of the layout of the buildings and spaces used two variables: the layout of the laboratories, diagnostics, and counseling facilities, which had the highest weighted mean score of 3.717 (±0.917 standard deviation), rated "Satisfied" by the highest frequency of 207 respondents (37.2 percent). Conversely, the ward space and work area received a score of 3.705 (±0.979 standard deviation) and were rated "Fair" by 207 respondents (37.2 percent). This indicates that staff, outpatients, and inpatients generally expressed satisfaction with the layout of the buildings and spaces. Staff were particularly satisfied with the wards and clinical spaces, while both outpatients and inpatients were most satisfied with the laboratories, diagnostics, and counseling facilities. Overall, the laboratories and counseling facilities were highlighted as the most satisfactory physical spaces within the Federal University Teaching Hospitals in Southwest Nigeria.

These findings align with the SSI information obtained from LUTH and UCH, reported in Table 8.0 which affirmed that the overall layout of departments is generally good and satisfactory. However, there is room for improvement through reorganization for greater functionality and productivity. The SSI conducted at LUTH indicated that the layout of the ward and clinical spaces was poor, while the laboratory and diagnostic spaces successfully accommodated necessary activities. Although the diagnostic facilities were rated excellent, the space was reported as inadequate, and considerable attention has been directed toward structural improvements, as noted in Table 8.0. Conversely, the SSI at UCH found the layout of wards and clinical spaces satisfactory but suggested they could be further improved. The laboratory and diagnostic spaces were reported as adequate, spacious, well-structured, and satisfactory according to in Table 8.0. In contrast, the SSI from OAUTHC rated the overall building layout as only moderately satisfactory, with laboratory spaces described as narrow, as noted in Table 8.0.

This outcome supports the findings of Sadek and Shepley (2016), which emphasized design issues related to layout typologies, such as spacing, arrangement, and connection to other buildings, as significant factors influencing patient and staff satisfaction. Additionally, Hughes (2000) endorsed these findings, stating that hospital layouts enhance nurses' and medical staff's ability to supervise patients effectively and maintain visual proximity.

**Table 1.0: Layout of building and Interior Spaces**

| Respondents | Layout of building and Interior Spaces | Frequency and Percentage Distribution | | | | | Weighted Mean Score | | |
|---|---|---|---|---|---|---|---|---|---|
| Staff | | 1 | 2 | 3 | 4 | 5 | Statistic | STD | Rank |
| | Wards and Clinical Spaces | 15 (7.7) | 17 (8.7) | 83 (42.3) | 42 (21.4) | 39 (19.9) | 3.747 | 1.010 | 1 |
| | Waiting room, reception & record unit | 15 (7.7) | 23 (11.7) | 73 (37.2) | 54 (27.6) | 31 (15.8) | 3.691 | 0.985 | 3 |
| | Work areas such as consulting, operation theatre, and examination | 15 (7.7) | 18 (9.2) | 65 (33.2) | 73 (37.2) | 25 (12.8) | 3.718 | 0.908 | 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Laboratories, diagnostics, and counseling facilities | 11 (5.6) | 25 (12.8) | 69 (35.2) | 67 (34.2) | 24 (12.2) | 3.665 | 0.918 | 4 |
| **Outpatient** | Wards and Clinical Spaces | 31 (12.8) | 25 (10.3) | 75 (31.0) | 72 (29.8) | 39 (16.1) | 3.717 | 1.030 | 3 |
| | Waiting room, reception & record unit | 11 (4.5) | 31 (12.8) | 80 (33.1) | 82 (33.9) | 38 (15.7) | 3.751 | 0.935 | 2 |
| | Laboratories, diagnostics, and counseling facilities | 15 (6.2) | 32 (13.2) | 70 (28.9) | 86 (35.5) | 39 (16.1) | 3.773 | 0.954 | 1 |
| **In-patient** | Ward space & work area such as consulting & operation theatre | 7 (5.9) | 8 (6.7) | 49 (41.2) | 46 (38.7) | 9 (7.6) | 3.612 | 0.806 | 2 |
| | Laboratories, diagnostics, and counseling facilities | 7 (5.9) | 12 (10.1) | 36 (30.3) | 54 (45.4) | 10 (8.4) | 3.686 | 0.828 | 1 |
| **Overall** | Ward space & work area such as consulting & operation theatre | 53 (9.5) | 50 (9.0) | 207 (37.2) | 160 (28.7) | 87 (15.6) | 3.705 | 0.979 | 2 |
| | Laboratories, diagnostics, and counseling facilities | 33 (5.9) | 69 (12.4) | 175 (31.4) | 207 (37.2) | 73 (13.1) | 3.717 | 0.917 | 1 |

Where 1 indicates strongly dissatisfied, 2 – dissatisfied, 3 – fair, 4 – satisfied, 5 – strongly dissatisfied, wms – weighted mean score, and std – standard deviation
Source: Researcher's Field Survey, 2021

**The Organisation of Interior Spaces and Furniture**

Table 2.0 uses frequency and percentage distribution to determine the satisfaction level of staff, out-patients, in-patients on the organisation of the interior spaces and furniture. The staff believe that the work area is rated highest mean 3.717 with the standard deviation of 0.954 being rated "satisfied" by 65 respondents (33.2 percent), in reception, and waiting area (3.646 wms; ±1.000 std) it is rated "Fair" by 76 respondents (38.8 percent) and bed spaces, fixtures and furniture in the wards and clinical spaces (3.407 wms; ±0.973 std) are rated "Fair" by 77 respondents (39.3).

Results from the outpatients' respondents revealed that the organization of interior spaces & furniture shows the variable "Bed spaces, fixtures and furniture in the wards and clinical spaces" having the weighted mean score of 3.702 and the standard deviation of 0.966 rated "Satisfied" by 82 respondents (33.9 percent); work area (3.537 wms; ±1.051 std) is rated "Fair" by 69 respondents (28.5 percent) and in the reception and waiting area (3.394 wms; ±1.110 std) being rated "Satisfied" by 61 respondents (25.2 percent).

According to the in-patients' assessments of the organisation of interior spaces and furniture, the work area has the highest weighted mean score of the value 3.626 and a standard deviation of 0.900 rated "Satisfied" by 45 respondents (37.8 percent), while the organisation of bed spaces, fixtures, and furniture in the wards and clinical spaces (3.537 wms; ±0.925 std) are rated "Fair" by 41 respondents (34.5 percent). The results from all the respondents from the study areas show that the organisation of interior spaces and furniture in the work area has a mean value of 3.622 and a standard deviation of 0.987, being rated "Satisfied" by 177 (31.8 percent), while the bed spaces, fixtures and furniture in the wards and clinical spaces (3.569 wms;

0.968 std) rated "Fair" by 193 (34.6 percent). This implies that among the variables used to measure the organisation of interior spaces and furniture in the selected study areas, the organisation within the work area is the most satisfying physical facility according to the patients and staff of the selected study areas.

The SSI conducted at LUTH as displayed in Table 8.0 showed that the organisation within the work area is most satisfactory and is conducive in a way. The organisation of the theatre and the examination room are good and well satisfactory but the consulting room is not conducive. The theatre space is spacious and conducive to work while the consulting rooms are shared and not too conducive to carry out daily activities. The work areas (theatre, counseling, examination, and consulting rooms) are okay with adequate ventilation, but the facilities are old. The SSI at UCH and OAUTHC reported in Table 8.0 also showed that the work areas consist of old buildings and need to be refurbished. The theatre and counseling rooms are averagely satisfactory while the examination and consulting rooms are not very spacious and adequate. However, the work area is satisfactory. The contents analysis at OAUTHC also affirmed that the work area (theatre, counseling, examination and consulting rooms) are too narrow but, it's better for the newly constructed building. This result is in harmony with the study of Koch and Steen, (2012) which agrees that the morphology of hospital spatial facilities focused on different specializations of physical flow in the hospital environment which is considered as the interplay between spatial, organisational and the configuration of work area processes and routines within the hospital environment.

**Table 2.0: Organisation of Interior Spaces and Furniture**

| Respondents | Organisation of Interior Spaces And Furniture | Frequency and Percentage Distribution | | | | | Weighted Score | | Mean |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | Statistic | WMS | Rank |
| **Staff** | Bed spaces, fixtures and furniture in the wards, and clinical spaces | 19 (9.7) | 36 (18.4) | 77 (39.3) | 48 (24.5) | 16 (8.2) | 3.407 | 0.973 | 3 |
| | In reception and waiting area | 15 (7.7) | 26 (13.3) | 76 (38.8) | 49 (25.0) | 30 (15.3) | 3.646 | 1.000 | 2 |
| | Work areas such as consulting, operation theatre, and examination | 12 (6.1) | 26 (13.3) | 64 (32.7) | 65 (33.2) | 29 (14.8) | 3.717 | 0.954 | 1 |
| **Out-patients** | Bed spaces, fixtures and furniture in the wards, and clinical spaces | 19 (7.9) | 32 (13.2) | 75 (31.0) | 82 (33.9) | 34 (14.0) | 3.702 | 0.966 | 1 |
| | In reception and waiting area | 34 (14.0) | 65 (26.9) | 59 (24.4) | 61 (25.2) | 23 (9.5) | 3.394 | 1.110 | 3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Work areas such as consulting, operation theatre, and examination | 22 (9.1) | 55 (22.7) | 69 (28.5) | 67 (27.7) | 29 (12.0) | 3.537 | 1.051 | 2 |
| **In-patients** | Bed spaces, fixtures and furniture in the wards, and clinical spaces | 9 (7.6) | 19 (16.0) | 41 (34.5) | 40 (33.6) | 10 (8.4) | 3.537 | 0.925 | 2 |
| | Work areas such as consulting, operation theatre, and examination | 11 (9.2) | 12 (10.1) | 40 (33.6) | 45 (37.8) | 11 (9.2) | 3.626 | 0.900 | 1 |
| **Overall** | Bed spaces, fixtures and furniture in the wards, and clinical spaces | 47 (8.4) | 87 (15.6) | 193 (34.6) | 170 (30.5) | 60 (10.8) | 3.569 | 0.968 | 2 |
| | Work areas such as consulting, operation theatre, and examination | 45 (8.1) | 93 (16.7) | 173 (31.1) | 177 (31.8) | 69 (12.4) | 3.622 | 0.987 | 1 |

Where 1 indicates strongly dissatisfied, 2 – dissatisfied, 3 – fair, 4 – satisfied, 5 – strongly dissatisfied, wms – weighted mean score and std – standard deviation.

**Source: Researcher's Field Survey, 2021**

**Form/shape of Building and Spaces**

The result reveal in Table 3.0 show the variables used to measure staff assessments on form/shape of building and spaces show that the waiting room, reception, and record unit has the weighted mean score of 3.708 and the standard deviation of 0.933 being rated "Fair" by 68 (34.7 percent); the general form/shape of the building within the hospital (3.681 wms; ±0.858 std) is rated "Satisfied" by 82 respondents (41.8 percent); the form of the work area (3.655 wms; ±0.867 std) rated "Satisfied" by 76 respondents (38.8 percent) and form of the wards and the clinical spaces (3.650 wms; 0.880 std) is rated "satisfied" by 71 respondents (36.2 percent).

However, the result of the analysis displayed by the out-patients' respondents show that the general form/shape of the buildings within the hospital has the weighted mean score of (3.597) with the standard deviation of 1.071 which is rated "Satisfied" by the frequency and percentage distribution of 70 respondents (28.9 percent), followed by waiting room, reception and record unit (3.586 wms; ±1.012 std) which is rated "Satisfied" by 79 respondents (32.6 percent), and form of the wards and clinical spaces (3.518 wms; ±0.999 std) is rated " Fair" by 73 respondents (30.2 percent).

Meanwhile, the in-patients deduced that the form of the ward space and work area has the mean (3.562) and the standard deviation (0.838) which is rated "Satisfied" by 52 respondents (43.7 percent) and the general form/shape of the building within the hospital (3.545 wms; ±0.849 std) is rated "Satisfied" by 49 respondents (41.2 percent).

According to all the respondents from the selected study areas, the general form/shape of the buildings within the hospital has the highest mean value of 3.614 with the standard deviation of 0.955 being rated "Satisfied" by 200 respondents (35.9 percent) while the form/shape of the ward and clinical spaces (3.573 wms; ±0.925 std) are rated "Satisfied" by 194 respondents (34.8 percent). The general form/shape of the buildings within the hospital is the most satisfying form/shape of the building and shape as identified by the staff, the out-patients and the in-patients.

The results from the SSI at LUTH and UCH as reported in Table 8.0 also yielded quite similar results to further buttress the fact that the assessment of the forms and the shape of the building in the hospital are very good and satisfactory but requires a better arrangement of the interior spaces. The exterior views of the building generally have a very good form and shape but the forms of the interior spaces are not too good in terms of form, shape and material used. The SSI at OAUTHC revealed that the forms and the shapes of the building in the hospital generally both externally and internally are fairly satisfactory as showed in Table 8.0 .The results of the above analysis are in harmony with the study of Pitt, Chotipanich, Issarasak, Mulholland and Panupattanapong, (2014) which affirmed that the main issues for developing and improving the level of satisfaction are based on the functionality of facilities, with good form/shape of the building and interior spaces as the main variables that impact users wellbeing, performance and satisfaction (Pitt, Chotipanich, Issarasak, Mulholland and Panupattanapong, 2014).

**Table 3.0: Form/shape of Building and Spaces**

| Respondents | Form/shape of Building and Spaces | Frequency and Percentage Distribution | | | | | Weighted Score | Mean | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | Statistic | WMS | Rank |
| **Staff** | The general form/shape of the buildings within the hospital | 11 (5.6) | 22 (11.2) | 62 (31.6) | 82 (41.8) | 19 (9.7) | 3.681 | 0.858 | 2 |
| | Form of the Wards and Clinical Spaces | 9 (4.6) | 24 (12.2) | 71 (36.2) | 71 (36.2) | 21 (10.7) | 3.650 | 0.880 | 4 |
| | Waiting room, reception & record unit | 10 (5.1) | 25 (12.8) | 68 (34.7) | 65 (33.2) | 28 (14.3) | 3.708 | 0.933 | 1 |
| | Form of the Work area such as consulting, operation theatre | 13 (6.6) | 19 (9.7) | 69 (35.2) | 76 (38.8) | 19 (9.7) | 3.655 | 0.867 | 3 |
| **Out-patients** | The general form/shape of the buildings within the hospital | 23 (9.5) | 55 (22.7) | 61 (25.2) | 70 (28.9) | 33 (13.6) | 3.597 | 1.071 | 1 |
| | Form of the Wards and Clinical Spaces | 15 (6.2) | 57 (23.6) | 73 (30.2) | 72 (29.8) | 25 (10.3) | 3.518 | 0.999 | 3 |
| | Waiting room, reception & record unit | 17 (7.0) | 55 (22.7) | 63 (26.0) | 79 (32.6) | 28 (11.6) | 3.586 | 1.012 | 2 |
| **In-patients** | The general form/shape of the buildings within the hospital | 12 (10.1) | 12 (10.1) | 40 (33.6) | 49 (41.2) | 6 (5.0) | 3.545 | 0.849 | 2 |
| | Form of the ward space & work area e.g consulting, operation theatre | 8 (6.7) | 17 (14.3) | 36 (30.3) | 52 (43.7) | 6 (5.0) | 3.562 | 0.838 | 1 |
| **Overall** | The general form/shape of the buildings within the hospital | 46 (8.3) | 90 (16.2) | 163 (29.3) | 200 (35.9) | 58 (10.4) | 3.614 | 0.955 | 1 |
| | Form of the ward space & work area e.g consulting, operation theatre | 32 (5.7) | 98 (17.6) | 181 (32.5) | 194 (34.8) | 52 (9.3) | 3.573 | 0.925 | 2 |

Where 1 indicates strongly dissatisfied, 2 – dissatisfied, 3 – fair, 4 – satisfied, 5 – strongly dissatisfied, wms – weighted mean score and std – standard deviation.
Source: Researcher's Field Survey, 2021.

**The Movement Pattern/ Flow within Spaces**

The movement pattern/flow within the interior space is another factor considered under the users' assessment of the physical facilities. Assessments of staff on movement pattern/ flow within spaces were measured with two variables: within the wards and clinical spaces and the work area. Within the wards and clinical spaces has the highest mean score of 3.666 and the standard deviation of 0.969 being rated "Fair" by 69 respondents (35.2 percent), within the work area has the mean value of (3.649) and the standard deviation of 0.922 which is rated "Fair" by 72 respondents (36.7 percent). For out-patients, the two variables used to measure the movement pattern/flow within the interior space has the highest weighted mean score of 3.730 with the standard deviation of 1.006 which is rated "Satisfied" by 82 respondents (33.9 percent) and within the wards and clinical spaces having the weighted mean score of 3.554 and the standard deviation of 0.998 which is rated "Satisfied" by 83 respondents (34.3 percent). The in-patients' assessment of the movement pattern/flow within the physical facilities was also measured with the movement pattern within the work area having the highest mean value of (3.606 wms, ±0.875 std) and rated "Satisfied" by 46 respondents (38.7 percent); movement flow within the wards has the weighted mean score and standard deviation of (3.533 wms, ±0.824 std) rated "Satisfied" by 50 respondents (42.0 percent) as shown in Table 4.0.

The result for the movement pattern/flow by all the respondents in the study areas show that the movement pattern/ flow within the work area has the highest weighted mean score of 3.675 and the standard deviation of 0.951which is rated "Satisfied" by 192 respondents (34.5 percent) and the movement pattern/flow in the wards and clinical spaces has the weighted mean score of (3.590 wms; 0.954 std) which is rated "Satisfied" by 193 respondents (34.6 percent). This implies that respondents are not satisfied with the movement pattern/ flow within the wards and the clinical spaces, but they are satisfied with the movement pattern/ flow within the work area, such as consulting, operation theatre, among others. In addition, only the staff out of the three sets of the respondents are satisfied with the movement pattern/ flow within the wards and the clinical spaces.

The SSI conducted at the three FUTH as displayed in Table 8.0 offers a contrary opinion different from the above and claimed that generally, the movement pattern/flow is conducive and satisfactory for both patients and staff within the ward and clinical spaces. However, movement pattern/flow is difficult in some spaces, surgical wards, among others at the LUTH. The study of Hendrich et al., (2008) recommends that movement flow or pattern allows easy movement between the patients' wards/ clinical spaces, and it also helps in spending more time on patient care activities and improves greater documentation, coordination of care, medication administration and movement around the unit. Moreover, the movement flows in the building environment are mainly determined by the spatial configuration of the physical facilities, which places more emphasis on physical form and human behaviour (Yang, Lib and Shen, 2015) and influence users' sensory perceptions which affect staff efficiency and productivity (Guenther and Vittori, 2008).

**Table 4.0: Movement Pattern/Flow within the Interior Spaces**

| Respondents | Movement Pattern/Flow within the Interior Spaces | Frequency and Percentage Distribution | | | | | Weighted Mean Score | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | Statistic | WMS | Rank |
| **Staff** | Within the wards and clinical spaces | 16 (8.2) | 24 (12.2) | 69 (35.2) | 60 (30.6) | 27 (13.8) | 3.666 | 0.969 | 1 |
| | Within the Work area such as consulting, operation theatre | 11 (5.6) | 25 (12.8) | 72 (36.7) | 64 (32.7) | 24 (12.2) | 3.649 | 0.922 | 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Out-patients** | Within the wards and clinical spaces | 18 (7.4) | 56 (23.1) | 61 (25.2) | 83 (34.3) | 24 (9.9) | 3.554 | 0.998 | 2 |
| | Within the Work area such as consulting, operation theatre | 18 (7.4) | 42 (17.4) | 62 (25.6) | 82 (33.9) | 38 (15.7) | 3.730 | 1.006 | 1 |
| **In-patients** | Within the wards | 11 (9.2) | 12 (10.1) | 41 (34.5) | 50 (42.0) | 5 (4.2) | 3.533 | 0.824 | 2 |
| | Within the work area such as consulting, operation theatre | 7 (5.9) | 16 (13.4) | 40 (33.6) | 46 (38.7) | 10 (8.4) | 3.606 | 0.875 | 1 |
| **Overall** | Within the wards | 45 (8.1) | 92 (16.5) | 171 (30.7) | 193(34.6) | 56 (10.1) | 3.590 | 0.954 | 2 |
| | Within the work area such as consulting, operation theatre | 36 (6.5) | 83 (14.9) | 174 (31.2) | 192(34.5) | 72 (12.9) | 3.675 | 0.951 | 1 |

Where 1 indicates strongly dissatisfied, 2 – dissatisfied, 3 – fair, 4 – satisfied, 5 – strongly dissatisfied, wms – weighted mean score and std – standard deviation.
**Source: Researcher's Field Survey, 2021**

**Accessibility to the Building and Interior Spaces**

Accessibility is another factor of the assessment of the physical facilities in the Federal University Teaching Hospital in Southwest, Nigeria. The response from the staff, out-patients, in-patients, and the overall responses are considered in Table 5.0.

According to the staff, accessibility to the building and interior spaces shows that wards and clinical spaces have the highest mean value of 3.776 and the standard deviation of 0.936 rated "Fair" by 67 respondents (34.2 percent); hospital building in general (3.686 wms; ±0.896 std) is rated "Satisfied" by 77 respondents (39.3 percent); reception, waiting and record units (3.662 wms; ±0.879 std) are rated "Satisfied" by 74 respondents (37.8 percent), and laboratories, diagnostic and counseling facilities (3.641 wms; 0.957 std) are rated "fair" by 73 respondents (37.2 percent).

The accessibility to the building and interior spaces were also measured by the out-patients' respondents; the variable with the highest weighted mean score is "wards and clinical spaces" having the mean value of 3.743 and the standard deviation of 1.042 being rated "Satisfied" by 73 respondents (30.2 percent); followed by "the laboratories, diagnostics and counseling facilities (3.702 wms, ±1.049 std) are rated "Satisfied" by 70 respondents (28.9 percent); reception, waiting and record units (3.691 wms; ±1.043 std) are rated "Satisfied" by 73 respondents (30.2 percent) and hospital buildings in general (3.687 wms; ±1.051 std) are rated "Satisfied" by 72 respondents (29.8 percent).

According to the in-patients, accessibility to the hospital buildings in general is regarded as the highest mean among the variables with the mean value of (3.650) and the standard deviation of (0.794) being rated "satisfied" by 50 respondents (42.0 percent); laboratories, diagnostics and counseling facilities (3.562 wms; ±0.915 std) are rated "satisfied" by 49 respondents (41.2 percent) and wards spaces (3.550 wms, ±0.950 std) are rated "Satisfied" by 47 respondents (39.5 percent).

Generally, the accessibility to the building and interior spaces were assessed by all the respondents and the result showed that the ward and clinical spaces have the highest weighted mean score of 3.716 with the standard deviation of 0.990 and rated "Satisfied" by the highest frequency and percentage distributions of 186 respondents (33.4 percent), while the accessibility to the hospital buildings in general (3.679 wms; ±0.945 std) are rated "Satisfied" by 199 respondents (35.7 percent) and accessibility to the laboratories, diagnostics and counseling facilities (3.651 wms; ±0.991 std) are also rated "Satisfied" by 177 respondents

(31.8 percent). The results have proven that accessibility to the wards and clinical spaces are the most satisfying factors for staff, out-patients and the overall responses while among the in-patients, accessibility to the hospital building is the most satisfying factor of the assessment of the physical facilities.

Also, the results of the SSI obtained from the three FUTH as reported in Table 8.0 yielded the same results and affirmed that the hospital and departments have easy and satisfactory accessibility including the interior spaces generally with adequate labeling of spaces in most interior spaces. However, the accessibility of the building and interior spaces of some facilities such as Dentistry, Children's Ward, and Family Medicine facilities is considered to be poor and unsatisfactory. The study conducted by Khan, (2012) suggests that physical and visual accessibility of spatial layout, (wards and clinical spaces) through their effects on patients' movement, helps to reduce travel time, waiting time and increase patient satisfaction which improves operational efficiency in healthcare settings.

**Table 6.0: Accessibility to Building and Interior Spaces**

| Respondents | Accessibility to Building and Interior Spaces | Frequency and Percentage Distribution | | | | | Weighted Score | | Mean Rank |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | Statistic | WMS | |
| **Staff** | To the hospital buildings in general | 10 (5.1) | 27 (13.8) | 60 (30.6) | 77 (39.3) | 22 (11.2) | 3.686 | 0.896 | 2 |
| | To wards and clinical spaces | 14 (7.1) | 17 (8.7) | 67 (34.2) | 66 (33.7) | 32 (16.3) | 3.776 | 0.936 | 1 |
| | To the reception, waiting &record units | 8 (4.1) | 26 (13.3) | 67 (34.2) | 74 (37.8) | 21 (10.7) | 3.662 | 0.879 | 3 |
| | To the laboratories, diagnostics, and counseling facilities | 13 (6.6) | 26 (13.3) | 73 (37.2) | 58 (29.6) | 26 (13.3) | 3.641 | 0.957 | 4 |
| **Out-patients** | To the hospital buildings in general | 19 (7.9) | 49 (20.2) | 63 (26.0) | 72 (29.8) | 39 (16.1) | 3.687 | 1.051 | 4 |
| | To wards and clinical spaces | 12 (5.0) | 53 (21.9) | 60 (24.8) | 73 (30.2) | 44 (18.2) | 3.743 | 1.042 | 1 |
| | To the reception, waiting &record units | 17 (7.0) | 50 (20.7) | 63 (2.0) | 73 (30.2) | 39 (16.1) | 3.691 | 1.043 | 3 |
| | To the laboratories, diagnostics, and counseling facilities | 17 (7.0) | 49 (20.2) | 65 (26.9) | 70 (28.9) | 41 (16.9) | 3.702 | 1.049 | 2 |
| **In-patients** | To the hospital buildings in general | 8 (6.7) | 6 (5.0) | 46 (38.7) | 50 (42.0) | 9 (7.6) | 3.650 | 0.794 | 1 |
| | To ward spaces / clinical spaces | 17 (14.3) | 15 (12.6) | 32 (26.9) | 47 (39.5) | 8 (6.7) | 3.550 | 0.950 | 3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | To the laboratories, diagnostics, and counseling facilities | 10 (8.4) | 21 (17.6) | 31 (26.1) | 49 (41.2) | 8 (6.7) | 3.562 | 0.915 | 2 |
| **Overall** | To the hospital buildings in general | 37 (6.6) | 82 (14.7) | 169 (30.3) | 199 (35.7) | 70 (12.6) | 3.679 | 0.945 | 2 |
| | To ward spaces / clinical spaces | 43 (7.7) | 85 (15.3) | 159 (28.5) | 186 (33.4) | 84 (15.1) | 3.716 | 0.990 | 1 |
| | To the laboratories, diagnostics, and counseling facilities | 40 (7.2) | 96 (17.2) | 169 (30.3) | 177 (31.8) | 75 (13.5) | 3.651 | 0.991 | 3 |

Source: Researcher's Field Survey, 2021

**Visibility within the Interior Spaces**

Information from the staff in the study areas reveals that visibility in the ward spaces generally as displayed in Table 7.0 have the highest weighted mean score of 3.717 wms and the standard deviation of 0.944 is rated "Fair" by the highest frequency and percentage distributions of 76 respondents (38.8 percent) while that of clinical spaces have (3.629 wms; ±0.937 std) and rated "Fair" by 83 respondents (42.3 percent).

Also, the visibility within the interior clinical spaces was assessed by the out-patient respondents within the hospital environment across the study areas. The variable was assessed with the weighted mean score of 3.693 and the standard deviation of 0.997 rated "Satisfied" with the frequency and percentage distributions of 76 respondents (31.4 percent). However, the visibility inside the work area (3.582 wms; ±0.958 std) according to the in-patients, is rated the highest mean with the frequency and percentage distributions of 46 respondents (38.7 percent) being rated "satisfied" and wards spaces generally (3.546 wms, ±0.949 std) rated "satisfied" by 40 respondents (33.6 percent). The results obtained from the staff confirmed high experience of visibility inward spaces generally and out-patients are satisfied with the visibility standard of the clinical spaces while the in-patients experience the highest visibility in the work area. This implies that there is high visibility experienced in the ward, clinical, and work area spaces in the selected study areas.

Results from the contents analyses as reported in Table 8.0 revealed that more visibility is experienced during the day and the night. The users experienced adequate visibility in the interior spaces such as wards and clinical spaces. At the UCH, easy movement with corridors that has good aeration was experienced and visibility within the interior spaces is limited due to the COVID_19 pandemic. Satisfactorily visibility was also experienced in most interior spaces at OAUTHC as reported in Table.

In addition, Johanes and Atmodiwirjo, (2015) conducted a study to address the spatial configuration of a hospital in-patient's ward with the degree of visibility as an important aspect of patient care in the ward. The finding supported the result obtained from the respondents above which opined that visibility has some implications for improving the performance of spatial organization of hospital in-patient wards.

**Table 6.0: Visibility within the Interior Spaces**

| **Respondents** | **Visibility within the Interior Spaces** | **Frequency and Percentage Distribution** | | | | | **Weighted Score** | | **Mean** |
|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** | **Statistic** | **WMS** | **Rank** |
| **Staff** | Inside the ward's spaces generally | 15 (7.7) | 16 (8.2) | 76 (38.8) | 59 (30.1) | 30 (15.3) | 3.717 | 0.944 | 1 |
| | Inside the clinical spaces | 13 (6.6) | 16 (8.2) | 83 (42.3) | 62 (31.6) | 22 (11.2) | 3.629 | 0.889 | 2 |
| **Out-patients** | Inside the clinical spaces | 13 (5.4) | 45 (18.6) | 71 (29.3) | 76 (31.4) | 37 (15.3) | 3.693 | 0.997 | **1** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **In-patients** | Inside the ward's spaces generally | 7 (5.9) | 24 (20.2) | 37 (31.1) | 40 (33.6) | 11 (9.2) | 3.546 | 0.949 | 2 |
| | Inside the work area e.g consulting, operation theatre | 13 (10.9) | 19 (16.0) | 31 (26.1) | 46 (38.7) | 10 (8.4) | 3.582 | 0.958 | 1 |

Where 1 indicates strongly dissatisfied, 2 – dissatisfied, 3 – fair, 4 – satisfied, 5 – strongly dissatisfied, wms – weighted mean score, and std – standard deviation.

**Source: Researcher's Field Survey, 2021**

**Number of Windows and Doors within the Interior Spaces**

The satisfaction level of the staff on the number of windows, doors, reception, waiting area and record unit is categorized using different variables and analyzed accordingly. The staff assessment reveals that the number of windows and doors in the reception, waiting for the area and the record has the highest weighted mean score of (3.690 wms; ±0.937 std); followed by the number of windows and doors in the work area (3.614 wms; ±0.884 std) rated "Fair" by 74 respondents (37.8 percent) and wards and clinical spaces facilities (3.596wms; ±0.919 std) are rated "fair" by 68 respondents (34.7 percent) as displayed in Table 7.0.

Furthermore, the users' assessment of the physical facilities in the study areas was determined by the out-patients through the assessments of the number of windows and doors in the clinical facilities and work areas, reception, waiting area and record unit. The highest mean of the two variables is the clinical facilities and work area with the weighted mean score of (3.707 wms) and the standard deviation of (1.032) rated "Satisfied" by 72 respondents (29.8 percent) and the second variable is "in the reception, waiting area and record unit" with the weighted mean score of (3.636) and the standard deviation of (1.045) which are rated "Satisfied" by 70 respondents (28.9 percent). In addition, assessments of the number of windows and doors were done by the in-patients and the result shows that the windows and doors in the work area with the weighted mean and standard deviation of (3.623 wms; ±0.969 std) being rated "satisfied" by 51 respondents (42.9 percent), and windows and doors in the ward spaces (3.561 wms; ±0.894 std) rated "satisfied" by 53 respondents (44.5 percent).

Moreover, the overall assessment of the respondents reveals that the number of windows and doors in the ward space has the mean value of 3.637 with the standard deviation of 0.967 being rated "Satisfied" by the frequency and percentage distribution of 193 respondents (34.5 percent). This indicates that the assessment of all the respondents on the number of windows and doors in the waiting area, reception and the recording unit are different. The respondents are satisfied with the number of windows and doors in all the spatial facilities assessed. This implies that the quality and an adequate number of windows and doors in an interior space is integral architectural elements which have implications on the overall satisfaction of the hospital users. It is also evident from the result of the study conducted by Ching (2005) which opined that interior spaces within buildings are defined by the architectural elements of structure and enclosures which include doors, windows, walls, doorways and stairways. The author concluded that interior elements are fit for visual and functional purposes that incorporate aspects of materials, construction and technology which has great importance on the staff performance, increase patients' wellbeing and determine their overall satisfaction.

**Table 7.0: Number of windows and doors within the Interior Spaces**

| **Number of windows and doors within the Interior Spaces** | | **Frequency and Percentage Distribution** | | | | | **Weighted Score** | | **Mean** |
|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** | **Statistic** | **WMS** | **Rank** |
| **Staff** | In the wards and clinical facilities | 15 (7.7) | 26 (13.3) | 68 (34.7) | 68 (34.7) | 19 (9.7) | 3.596 | 0.919 | 3 |
| | In the work area such as offices spaces | 13 (6.6) | 21 (10.7) | 74 (37.8) | 69 (35.2) | 19 (9.7) | 3.614 | 0.884 | 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | In the reception, waiting Area & Record Unit | 15 (7.7) | 21 (10.7) | 68 (34.7) | 66 (33.7) | 26 (13.3) | 3.690 | 0.937 | 1 |
| **Out-patients** | In the wards and clinical facilities | 18 (7.4) | 44 (18.2) | 68 (28.1) | 72 (29.8) | 40 (16.5) | 3.707 | 1.032 | 1 |
| | In the reception, waiting Area & Record Unit | 14 (5.8) | 57 (23.6) | 65 (26.9) | 70 (28.9) | 36 (14.9) | 3.636 | 1.045 | 2 |
| **In-patients** | To the hospital buildings in general | 8 (6.7) | 6 (5.0) | 46 (38.7) | 50 (42.0) | 9 (7.6) | 3.650 | 0.794 | 1 |
| | To ward spaces / clinical spaces | 17 (14.3) | 15 (12.6) | 32 (26.9) | 47 (39.5) | 8 (6.7) | 3.550 | 0.950 | 3 |
| **Overall** | In the ward / clinical space | 47 (8.4) | 86 (15.4) | 166 (29.8) | 193 (34.5) | 65 (11.7) | 3.637 | 0.967 | 1 |

Where 1 indicates strongly dissatisfied, 2 – dissatisfied, 3 – fair, 4 – satisfied, 5 – strongly dissatisfied, wms – weighted mean score, and std – standard deviation.

**Source: Researcher's Field Survey, 2021**

**Table 8.0: Contents Analysis (Semi-Structured Interview)**

| S/N | QUESTIONS | LUTH | UI | OAUTHC |
|---|---|---|---|---|
| **1** | Do you think this hospital is performing with the currently available physical facilities? If yes or no, state reasons for your opinion | The hospital is trying their best as well as performing because they are serving the purpose to which they are built. The hospital is not performing at all, almost all their facilities need restricting and re-organizing. Yes, the hospital is performing in a way but the physical facilities need refurbishment renovation of spaces, and replacement of most components. However, available physical facilities are an important component of hospital performance generally. No, the hospital is not performing in terms of facilities because it needs renovation, and replacement of many facilities. Yes, the statistical report proved that we are the most attended health facility in Lagos State, even with 2 other teaching hospitals in the southwest. | Yes, presently there is an ongoing refurbishment of facilities in most of the departments. It is under renovation and reconstruction. Yes, bunts to pattern university college London. Yes, the physical space is adequate and there is regular maintenance of our facilities. | Yes, they are performing because they have available and appropriate physical facilities Yes, they are building new structures and are trying to renovate the old. |
| **2** | How do you perceive your wards / clinical spaces generally using the following: | The hospital has a great layout. A better way of organizing interior spaces. The layout of the hospital is bad and not adequately organized. The layout of the department and organization, in general, are very | The layout of the wards and the clinical spaces are good but can be better and improve for | Averagely, the layout and organization of the building are satisfactory and |

| | | | | |
|---|---|---|---|---|
| | Layout & Organization of the Buildings and Interior Spaces | good. But colder still be one by re-organization process for more functionality, performance, and productivity. The layout of the ward and clinical spaces are very bad and not adequately organized. Purposely built at inception made theatre conducive within availability. | better use. The layout and organization of the building and interior spaces are okay. The layout and the organization of the building and the interior spaces are adequate and satisfactory. | they are not in the best state. |
| **3** | Form/Shape of Building & Interior Spaces | The forms and the shapes of the building are very okay but it requires a better arrangement of the interior spaces. Very good form and experienced. The interior of spaces generally has a very good form both externally and internally. They have a good form in the exterior but the forms of the interior spaces are not good in terms of shape and material used. | The shape of the building in the family medicine is good and the interior spaces are moderately okay. The shapes and the forms of the building are okay. Adequate in terms of the shape and form of the interior spaces. The shape is also satisfactory to some extent. | The Form/Shape of Building & Interior Spaces are averagely okay and Fair. |
| **4** | Movement and Visibility within the Interior Spaces | The movement is conducive for both patients and staff to move around. More visibility is experienced during the day and the night. Movement within the ward and clinical spaces are very okay. Also, there is good visibility. Generally, movement and visibility in the interior spaces are very okay. But I also experience difficulty in movement in some spaces, surgical wards among others. There is adequate movement in the interior spaces such as wards and clinical spaces. They have adequate visibility in the interior spaces. Approximately spaced, easy movement with corridors that has good aeration. | Good. The movement and visibility within the interior spaces are limited due to the COVID_19 pandemic. Spaces are enough to move freely and there is an adequate and spacious movement within the interior spaces. | The Movement flow pattern in the ward and clinical spaces is satisfactory likewise the visibility within the interior spaces such as ward is satisfactory |
| 5 | Accessibility to Building and Interior Spaces | The hospital and departments have easy accessibility including the interior spaces. Very good | The accessibility is satisfactory. Perfect | Accessibility to Building and Interior Spaces are |

| | | | | |
|---|---|---|---|---|
| | | accessibility to the building and interior spaces generally. The hospital its self is very much accessible, also the department. Adequate labeling of spaces is more experienced in most interior spaces. The accessibility of the building and interior spaces is poor. The health facilities provide well-adopted accessibility means for all the buildings. | accessibility to the building and the interior spaces. | satisfactory and very okay |

Where 1 indicates strongly dissatisfied, 2 – dissatisfied, 3 – fair, 4 – satisfied, 5 – strongly dissatisfied, wms – weighted mean score, and std – standard deviation.

**Source: Researcher's Field Survey, 2021**

**Bivariate Analysis: Kendall's tau-b Correlation Analysis**

Kendall's tau b correlation analysis was used to determine the relationship between the layout and the other variables is analyzed in Table 9.0. All the variables show a positive correlation with the layout of the buildings and spaces in the study areas. Two of the variables that show a strong positive relationship with the layout of the buildings and spaces are Organisation of interior spaces and furniture ($\tau = 0.608$, $p = 0.000$), and Form/shape of building and spaces ($\tau = 0.527$, $p = 0.000$). Other variables showing a weak positive correlation include Movement pattern/flow ($\tau = 0.489$, $p = 0.000$); accessibility to building and interior space ($\tau = 0.479$, $p = 0.000$); visibility ($\tau = 0.493$, $p = 0.000$) and numbers of windows and doors ($\tau = 0.434$, $p = 0.000$). All the variables used to measure the users' assessment of the physical facilities are significant with the layout of the buildings and spaces.

For the organisation of interior spaces and furniture, three of the five variables are significant and have a strong positive relationship. The variables include form/shape of building and spaces ($\tau= 0.607$, $p = 0.000$), movement pattern/flow ($\tau= 0.546$, $p = 0.000$) and accessibility to building and interior spaces ($\tau= 0.545$, $p = 0.000$) while two variables show a weak positive relationship which include visibility ($\tau= 0.492$, $p = 0.000$) and number of windows and doors ($\tau= 0.464$, $p = 0.000$). These variables are significant with the organisation of interior spaces and furniture.

Form/shape of building and shapes show a strong positive relationship between the variables. The variables include movement pattern/form ($\tau= 0.660$, $p = 0.000$), accessibility to building and interior spaces ($\tau= 0.634$, $p = 0.000$), visibility ($\tau= 0.569$, $p = 0.000$) and number of windows and doors ($\tau= 0.567$, $p = 0.000$). These variables are significant with form/shape of building and shapes.

Movement pattern/flow within the interior spaces show a significant and a strong positive relationship with accessibility to building and interior spaces ($\tau= 0.658$, $p = 0.000$), visibility ($\tau= 0.573$, $p = 0.000$) and number of windows and doors ($\tau= 0.572$, $p = 0.000$). Accessibility to building and interior spaces show a strong positive relationship with visibility ($\tau= 0.617$, $p = 0.000$), and number of windows and doors ($\tau= 0.608$, $p = 0.000$). Furthermore, the relationship between the visibility and the number of windows and doors shows a strong positive relationship having the value ($\tau= 0.645$) and is significant at P-value (0.000) $< 0.01$ and 0.05 respectively.

Moreover, the result of the strong positive relationship shows that as one of the variables increases, the other also increases in a rapid form while that of the weak positive relationship shows that as one of the variables increases the other increases in a minimal form.

**Table 9.0: Kendall's tau b correlation analysis of the users' assessment of the physical facilities**

| | LAYBS | ORGISF | FOSH-BS | M-FLOW | AC-BIS | VIS-INT | SIZE-NEW |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| LAYBS | 1.000 | | | | | | |
| ORGISF | .608*** (0.000) | 1.000 | | | | | |
| FOSH-BS | .527*** (0.000) | .607*** (0.000) | 1.000 | | | | |
| M-FLOW | .489*** (0.000) | .546*** (0.000) | .660*** (0.000) | 1.000 | | | |
| AC-BIS | .479*** (0.000) | .545*** (0.000) | .634*** (0.000) | .658*** (0.000) | 1.000 | | |
| VIS-INT | .493*** (0.000) | .492*** (0.000) | .569*** (0.000) | .573*** (0.000) | .617*** (0.000) | 1.000 | |
| SIZE-NEW | .434*** (0.000) | .464*** (0.000) | .567*** (0.000) | .572*** (0.000) | .608*** (0.000) | .645*** (0.000) | 1.000 |

LAYBS=Layout of the buildings and spaces, ORGISF=Organization of interior spaces and furniture, FOSH-BS= Form/shape of building and spaces, M-FLOW= Movement pattern/flow within the interior spaces, AC-BIS = Accessibility to building and interior spaces, VIS-INT =Visibility within the interior spaces and SIZE-NEW =Number of windows and doors

Where *** indicates P-value < 0.01, ** indicates P-value < 0.05, and * indicates P-value < 0.1. Also, $\tau = 0$ – no correlation, $\tau < 0.5$ – weak correlation, $\tau = 0.5$ – moderate correlation, $\tau > 0.5$ – strong correlation.

**Source: Researcher's Field Survey, 2021.**

**Testing of Hypothesis 3 ($h_0$3a):**

This hypothesis intends to find out whether a significant relationship exists between the use of physical facilities and the users' assessment of the design features in the study areas. It was analyzed using the Kendall tau b correlation coefficient as displayed in (Table 10.0).

The null hypothesis states that there is no significant relationship between the use of physical facilities and the users' assessment of the design feature in the study area and the decision rule states that if the probability value is (p-value) < 0.05 (5% level of significance, approximately 95% confidence interval), reject the null hypothesis, otherwise do not reject the null hypothesis.

The degree of the relationship between the design features of the physical facilities and the users' assessment of the physical facilities in the study areas shows a weak positive relationship with the Kendall tau b correlation coefficient given as $\tau = 0.358$. This means that as the design features of the physical facilities in the three study areas increase, the users' assessment of the physical facilities also increases. Though both variables increase, it is on a low level. The increases of the variables (design features and the users' assessment of the physical facilities) are minimal.

Since the variables show a weak positive relationship, there is a need to know whether the variable is significant. The result of the analysis shows that the null hypothesis stated that there is no statistically significant relationship between the use of the physical facilities and the users' assessment of the design features in the study areas. The probability value ($p = 0.000$) is less than 0.05, this shows that the null hypothesis is rejected at P-value < 0.05. This implies that a statistically significant relationship is established between the use of the physical facilities and the users' assessment of the design features in the study areas.

**Table 10.0: Kendall tau b correlation coefficient: Use of the Physical Facilities and the Users' Assessment of the Design Features**

| | Design features of the physical facilities | Users' assessment of the physical facilities |
|---|---|---|

| | | |
|---|---|---|
| Design features of the physical facilities | 1.000 | 0.358*** (0.000) |

Where *** indicates P-value < 0.01, ** indicates P-value < 0.05, and * indicates P-value < 0.1. Also, $\tau = 0$ – no correlation, $\tau < 0.5$ – weak correlation, $\tau = 0.5$ – moderate correlation, $\tau > 0.5$ – strong correlation.
**Source: Researcher's Field Survey, 2021.**

## SUMMARY AND CONCLUSION

An assessment of physical facilities in the Federal University Teaching Hospitals in Southwest Nigeria indicated that respondents are generally satisfied with the layout of laboratories, diagnostic areas, and counseling facilities. Staff rated the wards and clinical spaces the highest, but the layout of laboratories, waiting rooms, reception, and record units received the lowest satisfaction ratings. Outpatients also reported low satisfaction with clinical space layouts. These findings highlight the need for improved design considerations for hospital facilities. The Semi- Structured Interview (SSI) from Lagos University Teaching Hospital (LUTH) and University College Hospital (UCH) showed that overall department layouts are satisfactory, while Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) gave an average rating. LUTH's ward and clinical space layouts were particularly poor, indicating a need for reorganization to enhance functionality. Patients found the organization of work areas, like theaters and consultation rooms, to be generally satisfactory, but aging facilities require refurbishment. OAUTHC respondents noted that although the work areas are somewhat narrow, improvements have been noted in newly constructed buildings. Overall, the general form and shape of hospital buildings were rated positively, particularly regarding waiting rooms and reception areas.

However, the shapes of wards and clinical spaces received low ratings, indicating the need for redesign to facilitate better arrangements of furniture and fixtures. These factors significantly impact user wellbeing and performance, reinforcing the importance of thoughtful hospital design, as noted by Pitt, M, Chotipanich, S, Issarasak, S., Mulholland and Panupattanapong P. (2016). The findings from this study reveal a dissatisfaction among respondents regarding the movement patterns and flow within the wards and clinical spaces. In contrast, they express satisfaction with the movement patterns and flow in work areas, such as consultation rooms and operating theaters. Notably, only the staff members, among the three groups of respondents, reported satisfaction with the movement patterns in the wards and clinical areas. Further insights from the Semi-Structured Interviews conducted at the three FUTH facilities indicate a differing perspective, suggesting that, overall, the movement patterns and flow are satisfactory and conducive for both patients and staff within the wards and clinical spaces. However, at LUTH, some areas, particularly the surgical and pediatric wards, present challenges in terms of movement patterns and flow.

These findings suggest that the movement patterns and flow in these interior spaces are insufficient and necessitate urgent reorganization, especially in the wards and clinical areas. Enhancing this aspect should be a priority in future hospital design considerations. Effective movement flow is critical, as it facilitates easy navigation between patient wards and clinical spaces, allowing staff to devote more time to patient care activities. Moreover, it improves documentation, coordination of care, medication administration, and overall movement within the unit, as emphasized by Henriksen et al. (2008).

The findings of this study indicate that accessibility to the wards and clinical spaces is the most satisfying factor for all respondent categories. Among in-patients, the accessibility of the hospital building is perceived as the most satisfactory aspect of the physical facilities. However, data from the survey revealed that the accessibility of certain areas, such as dentistry, the children's ward, and family medicine facilities, is deemed poor and unsatisfactory. These results underscore the need for significant improvements in accessibility design standards. It is crucial that these standards be integrated into the planning and design of new hospitals in Southwest Nigeria.

The staff and outpatients have expressed a high level of satisfaction with visibility in the ward and clinical spaces overall. In particular, inpatients report the highest satisfaction with visibility in the work areas. This indicates that visibility is generally good in the ward, clinical, and work area spaces studied.

However, spaces such as laboratories and consulting rooms are not meeting expectations in terms of visibility, indicating a need for improvement. Enhancing visibility is an important aspect of patient care within the hospital environment.

## THE STUDY RECOMMENDATIONS

This study highlights the need for improved layouts and organization of wards, clinical spaces, waiting rooms, reception areas, and record units, particularly at Lagos University Teaching Hospital (LUTH) and University College Hospital (UCH). It emphasizes that the arrangement of interior fixtures, such as bed spaces, furniture in wards and clinical areas, and the organization of reception and waiting areas requires urgent attention. The study recommends a thorough reevaluation of the current physical facilities through restructuring, reorganizing, and re-planning of the affected spaces. Furthermore, it advocates for the involvement of professional architects and urban planners in the design of hospital buildings and environments. This is vital for ensuring that new hospital designs in Nigeria take these aspects into account from the outset. The study stresses that the assessment of forms and shapes within hospital interiors is crucial for achieving operational efficiency and meeting usability standards, especially in the Obafemi Awolowo University Teaching Hospital Complex (OAUTHC). It suggests that the design and form of wards, clinical spaces, and work areas such as consulting and operating theatres should be revisited through refurbishment and reconstruction. This redesign should prioritize shapes that enhance operational efficacy and user satisfaction, making it a key design consideration in the evolution of hospital facilities.

Additionally, the study confirms that the movement patterns and flow within interior spaces are inadequate, particularly in wards and clinical areas. It recommends redesigning, reorganizing, and refurbishing these spaces to accommodate better movement patterns for both furniture and equipment, especially at OAUTHC. The design process for hospital buildings should include considerations for easy movement flow, which should be a requirement set by hospital approval agencies in Nigeria. This can be achieved by providing adequate and comfortable spaces that facilitate movement and the necessary interior furnishings and equipment. The findings also suggest that more can be done to enhance accessibility design standards, particularly regarding travel distances for people with disabilities. This includes ensuring public sidewalks, transportation stops, and parking are well-equipped to facilitate access to building entrances and provide accessible routes requiring minimal effort. Accessibility should be a fundamental design factor in the development of new hospitals in Southwest Nigeria.

Moreover, visibility in certain areas, such as laboratories and consulting rooms, is lacking and needs improvement, as visibility is critical for patient care. Therefore, the study recommends that architects, policymakers, and other hospital design professionals pay closer attention to visual perception parameters, such as the visual field, to enhance comprehensive visualization within the required hospital interior spaces.

1. Federal University Teaching Hospitals in Nigeria should initiate the refurbishment of physical facilities by undertaking renovations, reconstructions, and reorganization of existing structures, as well as constructing new buildings to complement older facilities. This should involve collaboration with professionals in the built environment, including architects, urban planners, interior designers, landscape architects, and engineers.

2. Stakeholders and government authorities should establish feedback mechanisms to inform the development of hospital physical facilities in Nigeria. Understanding the impact of previous projects on users is essential for making improvements in future designs.

3. Additionally, researchers in healthcare facilities and the built environment should actively advocate for further studies on behavioral healthcare architecture, focusing on design-related issues affecting hospital physical facilities.

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