

# Design Quality and Level of Compliance for Out-Patient Physical Facilities: Lesson for Hospital Developers in Southwest, Nigeria

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**Abstract:** This study examined the design quality and level of compliance for out-patient physical facilities at the University College Hospital (UCH) and Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) with a view to developing better healthcare design policy that will improve the quality of hospital spaces and their environment in Nigeria. Hospital physical facilities mean the structure or building and interior spaces, settings, environment, including attached facilities and amenities. In architecture, design quality is defined as value, excellence performance to specifications, fitness for use, meeting and/or exceeding customers' expectations, and consistently delighting the customer by providing products and services according to the latest functional specifications. Through the Literature review and personal appraisal of the out-patient physical facilities carried out in the selected federal university teaching hospitals in southwest, Nigeria. Major out-patient hospital physical facilities such as entrance, record unit, reception, waiting area, counseling rooms, lobbies and corridors, pharmacy room, treatment, consulting, examination spaces and maintenance facilities was reviewed and the standard requirements design setting for each spaces was identified and appraised to check the level of design compliance. The result of the study showed the transformation of design and construction strategies that is truly needed to reach our goal of providing compassionate and safe care for the out-patients. This study will serve as reference materials to architects, healthcare researchers, facility administrators, policy-makers and healthcare managers in the efficient realization of the design issues that affect Teaching Hospitals Out-Patient physical facilities in southwest, Nigeria.

**Keyword:** Design Quality, Compliance, Out-Patient, Physical Facilities, Hospital Developers

## I. BACKGROUND TO THE STUDY

Hospital physical facilities are 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). Similarly, Akinluyi, Awe, Adeleye & Ogunraku, (2019) define hospital physical facilities as generally consisting of the in-patient, out-patient as well as the attached facilities and amenities. Also, Ogaji, Giles, Daker-White & Bower, (2015) describe 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. The environment in which healthcare activities are performed is, however, a multifaceted concept which can be modified and examined in a multitude of ways and in varying degrees of depth (Fornara & Andrade, 2012). The physical layout can inhibit or enhance the quality of emergency obstetrics care (Abreu, Potter, 2001). To be effective, hospital 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&Ogbuefi, 2015).

The physical facilities setup is crucial in accessing numerous aspects of organizational functions (Elsbach & Pratt, 2007; Hatch & Cunliffe, 2012; Steinke, 2015). Gill, Bailey, Waxman and Smith, (2014) list the 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 define and place constraints on 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's 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).

Piecemeal improvement of healthcare physical facilities in southwest also suggests an absence of evidence-based framework for physical designs incorporating the documentation of proper spaces provided in a hospital setting in Nigeria (Akinluyi, Fadamiro, Ayoola &, Alade, 2020). Hence, there is a gap in knowledge about how the out-patient

physical facilities setting should look like in southwest Nigeria. Failure to discuss these problems will affect the outpatient physical facilities performance which in turn could negatively affect the staff performance, patient's well-being, increase mortality and morbidity rate and decrease users' satisfaction (Akinluyi, Fadamiro, Ayoola &, Alade, 2020).

The result of this study will contribute to evidence-based design of the healthcare facilities in southwest Nigeria because the authors carried out a balanced review of various studies to identify and document the design problems attached to the healthcare environment. Many of the studies reviewed focused on various aspects of healthcare facilities, addressing design issues from the perspectives of the patients, visitors and healthcare professionals. The specific objectives of this study include is as stated below;

- i. What are the design characteristics of the physical facilities in the study area?
- ii. How does the physical facilities design features influence users' level of satisfaction?
- iii. What framework can inform design decisions on hospital physical facilities in the study area?

## II. THE LITERATURE REVIEW

### 2.1 Outpatient physical facilities

These are spaces where the procedures do not require hospital admission and may also be performed outside the premises of a hospital (Samah, Ibrahim and Wahab, 2013). Samah et al recognize outpatient medical care as a vital component in primary, preventive and general public healthcare services. Examples of outpatient physical facilities include facilities such as clinical spaces, waiting room/ reception, record unit, lobbies and corridors, consulting room and counselling room (Samah, Ibrahim & Wahab, 2013; Prahlad, Rajeev, Jayati, & Laxma, 2010). Dinesh, Sanjeev, Prem and Remya, (2013) consider outpatient facilities as the window to hospital services. Since patients base their opinion of a hospital's services on their experience of outpatient facilities, efforts ought to be made to ensure that users get excellent visual and spatial experience on contact with the hospital. This is particularly important for the economically disadvantaged population.

Evaluation of occupied outpatient physical facilities is essential to reveal design solutions that work. Unfortunately, research on outpatient facilities has remained largely unexplored as health care researches focused mainly on acute and inpatient care (Preiser et al., 2002).

### 2.2 Studies on Hospital Physical Facilities Design Evaluation

Srivastava, (2017) examines the perceptions of medical staff and patients about the architectural design of outpatient clinics and hospitals. Surveys were used to collect information about hospital interior design, layout, wall décor, lighting, and care levels, while interviews further elaborated on participants' emotional responses to design features. The result showed that users were less satisfied with design features perceived to

inhibit navigation around their workspace for efficient delivery of care, and concluded that architectural design can improve staff's perceived workflow and enhance patients' perceived treatment experience.

Samah, Ibrahim & Wahab, (2013) examine the interior design of an outpatient physical facilities in a healthcare environment. The authors identified the out-patient physical facilities such as drop off, registration counter, waiting area, consultation room, pharmacy and toilet facilities focusing particularly on the interior design characteristics of the physical facilities. The result showed that the interior design factors were not good enough in the estimation of users.

Prahlad, Rajeev, Jayati, & Laxma, (2010) measured the satisfaction of outpatient department patients in public health facilities of Madhya Pradesh in India. Factors such as users' perceptions about the public health facilities, choosing health facility, registration process, basic amenities, perception about doctors and other staff, perception about pharmacy and dressing room services. The finding showed that patients were satisfied with the physical facilities and amenities provided in public health facilities of Madhya Pradesh in India. In addition, Andrade, Lima, Devlin and Hernández, (2014) examined the outpatient physical facilities of a hospital environment and focused on physical facilities such as waiting room, reception desk, seats in the waiting area, entrance, corridor, doors of the doctor's office and treatment office. The result showed that the physical environment was of high quality and had specific significant effect on patient.

Similarly, Tsai, Wang, Liao, Lu, Sun, Lin, & Breen, (2007) examined hospital outpatient perceptions of the physical environment of the outpatient waiting areas of obstetrics-gynaecology and paediatrics in one medical centre. Four dimensions of the physical environments of the outpatient waiting areas such as visual environment (lighting, ground and landscape design, furniture layouts, colour design, and space design); the hearing environment (such as noise level, volume of paging, and broadcast services); body contact environment (air freshness, temperature, seating comfort, and sufficiency) and cleanliness of the physical facilities (such as holistic cleanliness, and cleanliness and air freshness of restrooms). The finding showed that the overall physical environment of an obstetrics & gynaecological department was enhanced by ancillary physical facilities such as a wall-mounted television, newspapers, health education brochures, water, and access to wheel chairs; together with the hearing environment, lighting, landscape design, furniture layouts, colour design, space design, air freshness, temperature, seating comfort, and sufficiency and cleanliness of the physical environment.

In a different approach, Cho, Lee, Kim, Lee, Choi, (2004) examined the relationship between service quality and outpatient satisfaction in a Korean general hospital and queried the patient satisfaction with tangible elements in waiting rooms as indicators of service quality. Design factors

relating to the pleasantness of waiting areas, the ease of using amenities, the quality and newness of the equipment, and the ease in locating care facilities. The researchers found that the perceived quality of tangible environments by patients was positively related to patient's satisfaction. Therefore, waiting area facilities for clinics should be designed to the same standard and should include a separate children's area.

Also, Prahlad, Rajeev, Jayati, & Laxma, (2010) evaluated pharmacy facility in public health facilities of Madhya Pradesh in India. The patients were more satisfied with the pharmacy facilities, the behaviour of the pharmacists and the quality of drug provided at the pharmacy store. Trap, Todd, Moore and Laing, (2000) had stated that pharmacy store must have an inventory system that is accurately maintained.

### 2.3 The Design Quality in Hospital Settings

The conception of the hospital as a space of health is especially important in the case of patient hospitalization (Ullán & Belver, 2006). Ulrich and colleagues showed that well-designed spaces have an impact on patients' recovery time, wellbeing and satisfaction. Since the second half of the twentieth century, the architectural design of the hospital building has undergone great changes and are related not only to the role that it plays within the city and the community but also to the recovery of values that are different from those of quantity and function (Pellitteri & Belvedere, 2010). The functional aspects of a hospital building often overshadow the others that characterize hospital architecture. The reason for this is concerns with the difficulty in defining the quality of the architectural space and how this can be assessed. Nonetheless, the case for creating high quality healthcare architecture has grown stronger during the last decade.

In this respect, quality has been defined as value, excellence, conformance to specifications, conformance to requirements, fitness for use, meeting and/or exceeding customers' expectations, and consistently delighting the customer by providing products and services according to the latest functional specifications which meet and exceed the customer's explicit and implicit needs and satisfy the producer/provider (Mosadeghrad, 2013). In healthcare, quality connotes other characteristics such as availability, accessibility, affordability, acceptability, appropriateness, competency, timeliness, privacy, confidentiality, attentiveness, caring, responsiveness, accountability, accuracy, reliability, comprehensiveness, continuity, equity, amenities, and facilities (Mosadeghrad, 2013).

Ulrich (2000) opines that healthcare interiors are designed primarily with a functional emphasis that tends to negate the psychological needs of patients, visitors, and staff; resulting in facilities that the regards to be psychologically "hard" and, therefore, stressful to users. Dijkstra et al. (2006) build on this argument by emphasising that design conditions that promote the betterment of users' health and wellbeing should include the use of colour, furniture, application of art and lighting. And, referring to good quality interior environment as healing

spheres, Ghazali and Abbas (2011) recommend a more comprehensive consideration to create healing interior, which include safety, ergonomics, colour, artwork, lighting, outside view, furniture and furnishings, ambience, and therapies.

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, 2010). Better hospital design could evolve if the architect exploited knowledge available in literature and was ready to conduct semi-structured interview process as a vital tool for the design and overall planning of the hospital (Alalouch, Aspinall & Smith, 2016). Also, content analysis and cross-comparison between the different studies on hospital design would be helpful in the systematic distillation of design criteria. Frost, (1992) identified the following five major challenges in designing complex healthcare environments.

- i. Healthcare architecture has during its post-war expansion acquired a reputation for being mainly functionally determined and consequently of low architectural quality.
- ii. In healthcare architecture, there is a need for increased responsiveness to the needs of client and users alongside striving for higher architectural quality.
- iii. Rapid developments in healthcare spatial requirements develop as a learning process between client, users and the architect. Puts focus on the process.
- iv. The important factors in turning experience into learning is reflection-on-action
- v. In traditional architectural education, design as product (Virtual and graphic output) has a predominance over design as an interactive, dynamic process

However, a growing body of evidence shows how appropriate hospital designs can create the healing environments that improve patient treatment outcomes and patient care in general. Increasingly, hospital designers are expected to use this new evidence-based design approach when designing new hospitals.

### III. THE STUDY AREA AND RESEARCH METHODOLOGY

This study was carried out in South-western Nigeria because the zone is in the forefront of healthcare development in Nigeria and, therefore, harbours the first generations of Federal University Teaching Hospitals in the country. Two Federal University Teaching Hospitals were selected randomly at Oyo and Osun states. University College Hospital, Ibadan and Obafemi Awolowo University Teaching Hospital, Ile-Ife, emerged as the Federal University Teaching Hospitals in Southwest Nigeria.

The University College Hospital, (UCH) Ibadan, Oyo in Oyo State is located at latitude  $7^{\circ} 23' 99''$ N and longitude  $3^{\circ} 54' 59.99''$ E. It was established by an act of parliament in November 1952 in response to the need for the training of medical personnel's and other healthcare professionals for the country and the West African Sub-Region. The University College Hospital (UCH) was strategically located at Ibadan and the physical facilities development of the Hospital was formally commissioned after completion on 20<sup>th</sup> of November, 1957. The initial design of the new teaching hospital was done by Mr. Alexander Gray, F.R.I.B. The Consulting Architect was for a 493 bedded hospital comprising six main blocks made up of a central area and wings. The University College Hospital was initially commissioned with 500 bed spaces but currently the hospital has 850 bed spaces and record average of over 6,000 outpatients' attendances yearly. The UCH housed various departments and specialties, such as Ophthalmology, Paediatrics, family medicine, internal medicine, Obstetrics and Gynaecology and Surgical ward (Figure 1.0).

Obafemi Awolowo University Teaching Hospitals Complex, Ile Ife falls within the latitude  $07^{\circ} 30' 0.0$  to  $07^{\circ} 31' 6.71''$  N and within the  $4^{\circ} 33' 0.0''$  to  $3^{\circ} 34' 30.64''$ E. Conceived as a

clinical facility for the Obafemi Awolowo University medical school, it was established in July 1975. The philosophy provides for an integrated health care delivery system with emphasis on comprehensive health care such as primary, secondary and tertiary services, designed to secure improvement in the physical, mental and socio-economic wellbeing of Nigerians. See Fig. 2.0

Through the literature review, the major out-patient physical facilities for healthcare performance identified in this hospitals include; entrance, record unit, reception, waiting area, counseling rooms, lobbies and corridors, pharmacy room, and maintenance facilities. However, recommendations with respect to the design settings standard and organization for hospital spaces were analysed based on evidence from the literature review. Three major departments such as paediatrics, obstructers and gynaecology and surgical department were selected randomly for appraisal.

Also, through personal appraisal, level of design standard compliance was checked using the selected spaces across the two Federal University hospitals selected. These spaces were analysed using the three scales of analysis '*complied, fairly complied and not complied*' as represented in (Table 1.0).

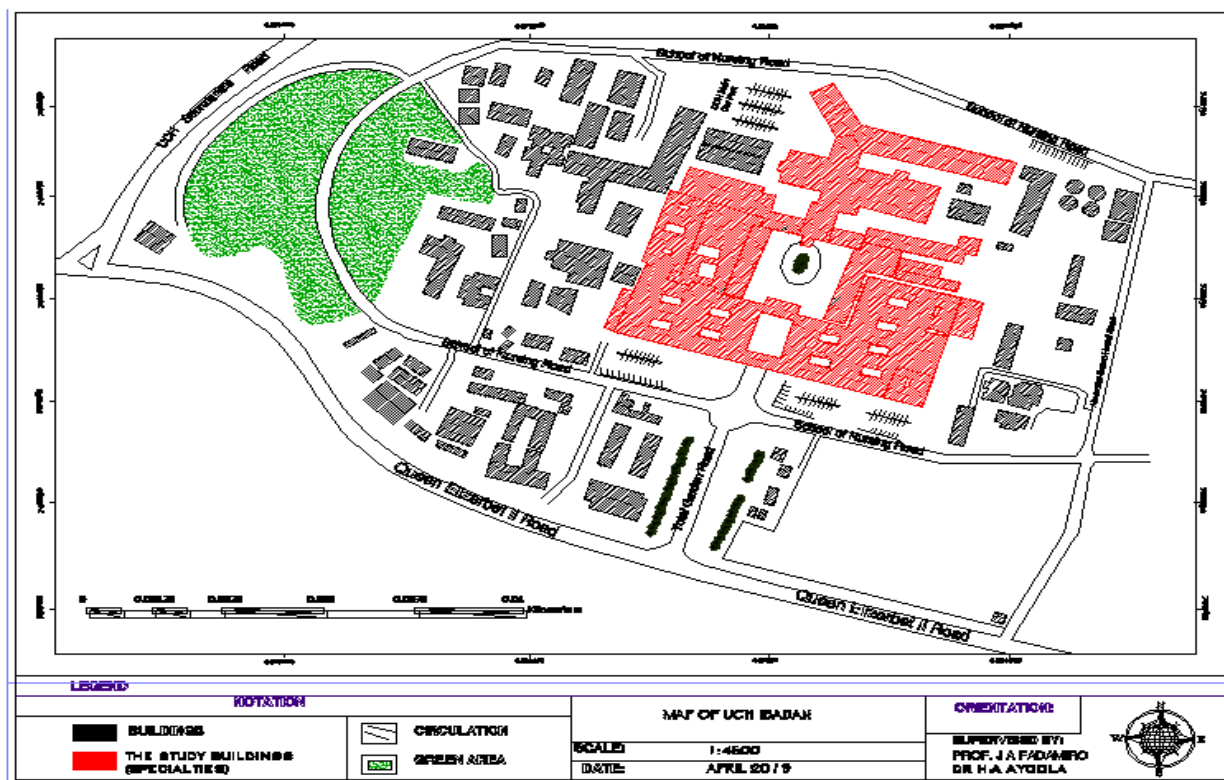


Figure 2.0; Master Plan of UCH showing the Selected Buildings for the Study in the Study Area  
Sources: Google map.com (Digitalized by the Author, 2019)

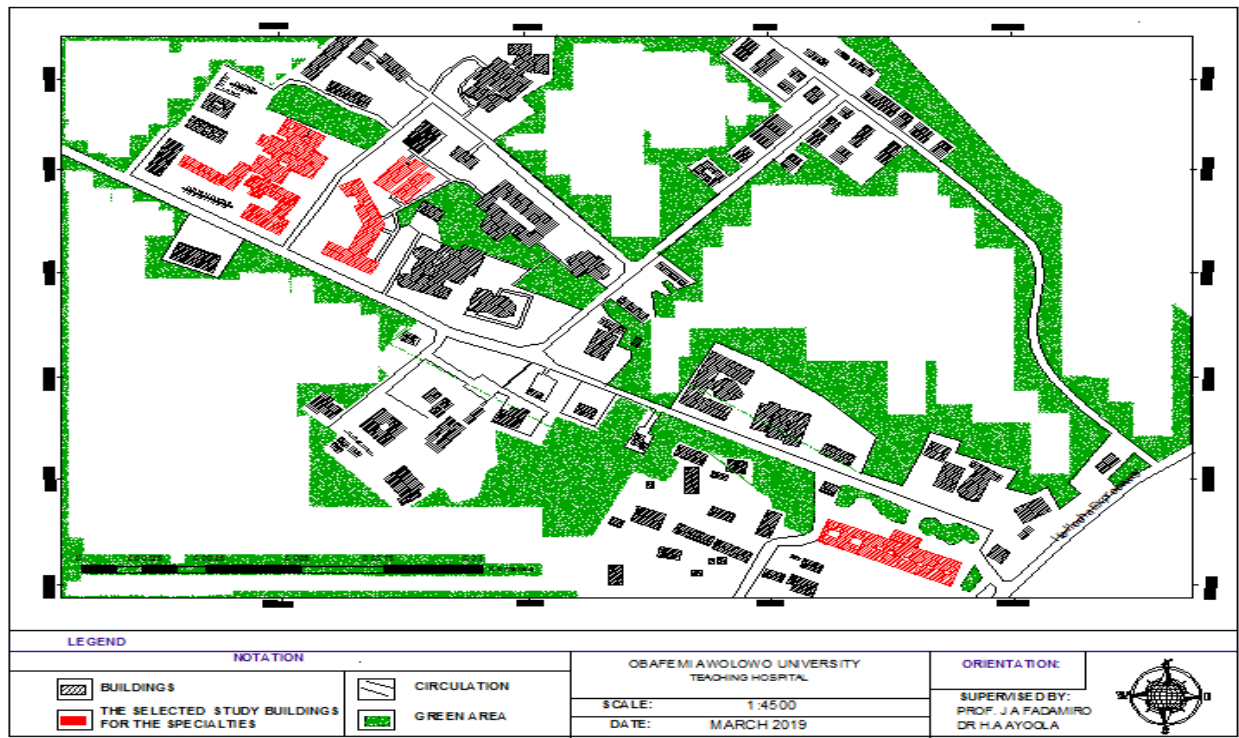


Figure 1.0; Master Plan of OAUTHC showing the Selected Buildings for the Study in the Study Area  
Sources: Google map.com (Digitalized by the Author, 2019 )

### 3.1 The Out-Patient Physical Facilities and Standard

#### 3.1.1 The Entrance Facilities

The entrance is the most natural hub of interactions in a hospital and the first aspect of a hospital building that most users encounter. It is particularly important, therefore, it must be both functional and aesthetically pleasing (NHS, 2014). The design of this area will play a vital part in ensuring patients feel welcome. The availability of professional, friendly staff to meet, greet and assist patients and visitors is even more important. The entrance is associated with the following: arrivals and departures (for many different departments), waiting, meeting and socializing, obtaining information and assistance. When all these functions are delivered effectively, they contribute significantly to the user's whole experience of hospital care. Hospital entrance should be designed to accommodate all users, including patients, visitors and staff arriving in ambulance, public or private transport or on foot. Other essential facilities are entrance lobby, refreshment facilities, public telephones, baby changing facilities, infant feeding facilities, wheelchair parking and trolleys (Department of Health Estates and Facilities Division, 2007).

Many hospitals have several different entrances; therefore, clear directions to the main entrance should be immediately obvious at each entrance. Separate signs should be provided for drivers and those on foot. The hospital entrance should express welcome in their design and wording. Hospitals that have a number of entrances should aim to avoid confusion among users. Ideally, the main entrance should be identifiable

as soon as the front of the building comes into view. The route to the main entrance should also be identifiable as soon as the front of the building comes into view and should be well signposted, especially for drivers. When the main entrance is not in sight, clear signposting should indicate the direction and distance to the entrance (Jordan, 1998).

Based on the above information, the level of compliance with the entrance design facilities at UCH is higher when compared with its counterpart of OAUTHC which did not comply with the standard. See table 1.0

#### 3.1.2 The Record Unit

Health records contain private and confidential information and personal details about patients and people associated with them. It is essential that health records are seen by as few staff as possible. A fundamental requirement is to have integrated records with all staff complying with the regulations on confidentiality (Department of Health Estates and Facilities Division, 2007). A number of points should be noted in respect of the management of the records unit. The health records should leave the clinic only under exceptional circumstances; it is essential that they be stored securely in the hospitals, and the record store should have direct access from the clinic reception. Also, the distribution of health records around the clinic between the different health professionals should be considered in terms of both the quantity of traffic and the security of the paper notes. Consideration should also be given to the space required for computer terminals and other IT hardware in every record room (Department of

Health Estates and Facilities Division, 2007). Based on the above information, the level of compliance with the record unit design facilities at UCH is fair when compared with its counterpart of OAUTHC which do not complied with the standard. See table 1.0

### 3.1.3 The Reception

The reception area is usually the first place that patients have face-to-face interaction with staff. The design provides an opportunity to project a positive impression. It is particularly important, therefore, that it is both functional and aesthetically pleasing (Vickery, 2012). Hospital reception should be welcoming and easy to find. It should be designed to accommodate dropped soffits, custom-designed reception desks, contrasting finishes and changes in the colour, texture or pattern of floor, wall or ceiling finishes help direct patients. Clear signage integrated with overall facility signage helps patients avoid confusion and reduces stress. Reception design should cater for comfort with the introduction of HVAC systems that maintain indoor environmental comfort (Jordan, 1998). Mechanical engineers must consider the qualities of interior spaces, the orientation of a clinic's entry and the characteristics of the building envelope to size, configure, and locate heating, cooling, and ventilation.

The main reception area is, therefore, an all-important place. Hospitals that have multiple receptions should ensure users are directed to the appropriate one. The reception area should be comfortably cool, well-lit and free from unwelcome smells.

It may be very busy at times but should be sufficiently spacious never to be crowded or excessively noisy. The reception area and facilities should be adequate to cater for the peak number of users and their requirements. All elements of the reception area should reflect the needs of users: toilets, seating and water dispenser should all be immediately obvious and located reasonably close to the reception area.

The most important feature of the reception area, the reception desk (NHS, 2014), should be immediately recognizable and not placed so close to the entrance doors as to interfere with the flow of people. An open counter, with a feature or sign at eyelevel, is ideal. A clock should be plainly visible at the desk. The size of the desk and the number of staff manning it should be appropriate for peak usage so that any waiting is brief and queues never form. The furniture arrangement and organization should be well done, with comfortable seats, small tables and up-to-date magazines. Privacy is often important in the reception area as receptionists often exchange confidential information. Strategies for preserving patient privacy include positioning waiting room seating away from the reception desks, ensuring staff computers face away from the waiting areas, physically separating the reception from the waiting room, using sound-masking systems, and locating staff telephones in a sound-proof office (Vickery, 2012).

Based on the above information, the level of compliance with the reception design facilities at OAUTHC is higher when

compared with its counterpart at UCH which does not complied with the standard. See table 1.0

### 3.1.4 Waiting Area

The waiting area is an important space for Out-patients department in a clinic/hospital; it is a space designed for a large group of people to wait for the medical consultants. Twenty per cent of furniture in the waiting room should be capable of supporting larger patients and visitors. Such furniture should be integrated with standard sized seating so as to avoid stigmatization (Department of Health Estates and Facilities Division, 2007). According to Cho, Lee, Kim, Lee, Choi, (2004), core design factors relate to the pleasantness of waiting areas, the ease of using amenities, the quality and newness of the equipment, and the ease in locating care facilities.

In assessing the spatial requirements for hospital waiting area, the following should also be taken into account: provision for walk-in attendees in addition to those with appointments, the demographics of the local community. Although a single waiting area is ideal for all clinic users, certain groups/ethnic minorities will expect/require separate male and female waiting areas, the provision of separate,

Waiting areas for attendees who are particularly distressed or who are attending for some specialist clinics. Others considerations include the number of patients, friends, family and children attending, and the average length of stay, and the provision of payphone facilities. Where a clinic is specifically designed for young people, consideration should be given to appropriate interior design, use of background music and, possibly, internet access. Also, provision of television or music can be beneficial as a distraction and as an aid to acoustic privacy for discussions at reception. Depending on the size and design of the clinic, consideration should be given to the provision of a sub-waiting area within the consultation/examination/treatment suite. Sub-waits should be observable from a staffed area (for example, a communications base). Separate WCs for male and female attendees should be provided near the main waiting area and should include facilities for wheelchair access (Department of Health Estates and Facilities Division, 2007). Based on the above information, the two (OAUTHC and UCH) selected hospitals displayed higher level of compliance with the waiting room design facilities standard. See table 1.0

### 3.1.5 The Counselling Room

The counselling room is a space used for counselling and interview purposes in the hospital environment. Interview and counselling rooms should be located close to consulting and examination rooms, they should ensure maximum privacy and confidentiality, and have a non-clinical environment. They are required for clinic attenders, partners, families and friends, and can serve a number of purposes, including attendee registration, interview and discussion, counselling and triage. Based on the above information, the level of compliance with

the counselling room design facilities at UCH is higher when compared with its counterpart at OAUTHC which fairly complied with the design standard. See table 1.0

### 3.1.6 Lobbies and Corridors

The prime function of the lobby is to control and prevent wind and rain from entering. In exceptionally exposed locations, a second set of doors is provided to form a modifying draught lobby. The lobby enclosure needs to be fully glazed to enable users to proceed safely and confidently. The lobby area should have absorbent and dirt-retaining flooring, over a sufficiently large area, to minimize damp and dirt being taken into the hospital. However, the size and shape of the lobby should: allow the smooth flow of users into and out of the building and provide a modifying environment between the outside and inside of the hospital. If other facilities are provided within the draught lobby, such as seats and payphones, they should not obstruct the passage of users. Corridors should be as short as possible to reduce disorientation, noise and make wayfinding easier, especially for the elderly (Karlin and Zeiss, 2006).

Corridors provide patients, relatives and staff access to all parts of the departments, including service areas, the storage, and equipment that is needed frequently or urgently. The size of the corridors in the clinical areas must be designed to allow 2 trolleys/wheelchairs to pass side by side easily with associated equipment. A minimum width of 3m is recommended. Access to service areas will need width suitable for purpose e.g. garbage disposal areas may need access for large refuse bins, equipment stores will need trolley. Based on the above information, the two (OAUTHC and UCH) selected hospitals displayed fairly level of compliance with the lobbies and corridors design facilities standard. See table 1.0

### 3.1.7 Pharmacy or Medication Room Design Facilities

A pharmacy or medication room is used for storage and dispensing of medications and the preparation of drugs. Depending on the hospital size, location and practice, common drugs required for care of attendees will be stored and dispensed from the hospital (Department of Health Estates and Facilities Division, 2007). However, attendees may be required to go to the pharmacy department for some drugs. A pharmacy store may be provided separately or included within the clean utility. The size of the pharmacy/medication room/clean utility room should be a minimum 12m<sup>2</sup> (Australasian College for Emergency Medicine, 2014). The pharmacy store must have an inventory system that is accurately maintained (Prahlad, Rajeev, Jayati, & Laxma, 2010, Trap, Todd, Moore and Laing, 2000).

The pharmacy should be functional to secure electronic medication storage solution, storage space and shelving for all categories of medications. The pharmacy/medication room needs to be easily accessible to all clinical areas. It should be provided with facilities such as secure electronic medication storage (including power and data points); shelving for

storage of medications; syringes, labels, containers and other equipment required for the preparation of medication; lockable cupboard for restricted medications; cupboard for take-home and after-hours medication; lockable steel cabinet secured to the wall for restricted schedule drugs; and digital keypad access to make the drugs safe and enable tracking. Other considerations include possible storage of bulky items and contraceptives; temperature control within the storage facility being maintained within the limits defined for the product stored; and provision of non-infectious waste bin, computer electronic medication charts, cold-water dispenser and space for a medication trolley. Based on the above information, the level of compliance with the pharmacy room design facilities at OAUTHC is higher when compared with its counterpart at UCH which fairly complied with the standard. See table 1.0

### 3.1.8 The Treatment Design Facilities

Treatment room refers to the space designed to perform treatment activities in the hospital environment. A treatment room provides facilities for a range of purposes: general procedures during a routine clinic, specific procedures such as vasectomy, colposcopy, gynaecological procedures and skin biopsy (Department of Health Estates and Facilities Division, 2007; Akinluyi, Fadamiro, Ayoola &, Alade, 2020 ).

Also, additional equipment in a treatment room may include diathermy, cryosurgery, a cold coagulator, a loop coagulator and a colposcope (possibly with a teaching arm or video camera/television screen). Many procedures will generate heat and odours that will need to be removed by means of appropriate mechanical ventilation (Akinluyi, Fadamiro, Ayoola &, Alade, 2020). However, depending on local requirements, some rooms may be multi-use and may combine treatment and examination procedures.

Based on the above information, the level of compliance with the reception design facilities at OAUTHC is higher when compared with its counterpart at UCH which does not comply with the standard. See table 1.0. Based on the above information, none of the selected hospitals (OAUTHC and UCH) displayed level of compliance with the treatment design facilities standard as studied from the literature. See table 1.0

### 3.1.9 Consulting and Examination Design Facilities

Consulting and examination rooms in hospitals should be suitable for use by male or female clinic attendees for consultation, interview, clinical examination, collection of specimens, minor treatments, giving injections and dispensing drugs (Department of Health Estates and Facilities Division, 2007; Akinluyi, Fadamiro, Ayoola &, Alade, 2020). Consulting and examination rooms should, therefore, ideally be provided with double-sided access to the couch, appropriate for male and female general and genital examinations. Couches for female examination may have variable geometry, facilitating internal examination (Akinluyi, Fadamiro, Ayoola &, Alade, 2020). There should be

sufficient space around the coaches to enable them to be converted from a lithotomy style to flat if the attendee needs to be placed in the supine position. A ceiling-mounted examination lamp, clinical washbasin, apron and glove dispenser, waste and sharps bin should be provided. Consideration may be given to providing one room with single-sided couch access and a wall-mounted examination light for some clinical procedures, particularly male examinations. Free-standing examination lights should not be the standard provision, but should be available (See figure 3.0 as described by Department of Health Estates and Facilities Division, 2007 ; Akinluyi, Fadamiro, Ayoola &, Alade, 2020)

Consulting and examination rooms offer the most flexible use of space, and are generally used for most contraception and sexual/reproductive healthcare consultations. The following points should be considered in the design and use of consulting and examination rooms in the hospitals: space is required for equipment; the arrangement of the consulting and examination room should allow sufficient space for training; and one or two rooms should have black-out blinds to allow them to be used for scanning. In the consulting room, there should be sufficient space for an escort, children and also a buggy/push-chair and/or wheelchair. The rooms may be used for teaching purposes, so there should also be space for an observer. The use of interconnecting doors between consultation and examination rooms should be discouraged to maintain acoustic privacy between rooms (Department of Health Estates and Facilities Division, 2007; Akinluyi, Fadamiro, Ayoola &, Alade, 2020). Based on the above information, none of the selected hospitals (OAUTHC and UCH) displayed level of compliance with the consulting and examination design facilities standard as studied from the literature. See table 1.0

### 3.1.10 Maintenance and Engineering Services

Engineering and environmental services draw upon unique technical expertise aspects of healthcare facility design and maintenance. High quality equipment and installation are critical for the engineering plant and services to function safely and efficiently in the hospital. It is, therefore, essential that the building design should incorporate adequate space for the full range of installation, services and maintenance of the plant, ductwork, pipe work and cabling. Space for plant and services should provide for easy and safe means of access, secure accommodation protected from unauthorized access, adequate space around the plant services to permit inspection maintenance and replacement. Service distribution to a particular area should be contained within service spaces on that floor. In addition, plant rooms, particularly for air-conditioning and ventilation, should be located as close as possible to the areas they serve, thus minimizing the amount of space necessary to accommodate large ducts. Moreover, care should be taken to ensure that noise and structure-borne vibration cannot be transmitted beyond the plant room (Health Technical Memorandum, 2014).

Other facilities expected include mechanical services such as piped medical gases, heating, ventilation, hot and cold-water systems, acoustics and internal drainage including fire safety facilities such as fire detection and control systems. Others include electrical services such as lighting systems, electromagnetic compatibility, main intake switchgear and distribution boards, emergency electrical supplies, small power distribution systems, IT and telephone wiring systems, patient/staff emergency call systems. However, all engineering plant and equipment associated with the internal environment should, where possible, be controlled, monitored and regulated by a building management system (BMS) (Health Technical Memorandum, 2014) See table 1.0. Based on the above information, UCH did not comply with the maintenance and engineering services design facilities while the standard was just fairly complied with, at OAUTHC. See table 1.0

## IV. LEVEL OF COMPLIANCE WITH THE DESIGN STANDARD OF THE OUT-PATIENT SPACES IN THE SELECTED STUDY AREAS

Below are the major spaces identified in the selected study areas and also generated from the literature review of the previous studies.

However, the personal observation was made on the selected spaces at the study areas to check the level of their compliances with the design standard and settings using the three measuring scales; *complied, fairly complied and not complied*.

Table 1.0: Showing the level of compliance for out-patients physical facilities design standard

S/N	Spaces	University College Hospital (UCH, Ibadan)	Obafemi Awolowo University Teaching Hospital (OAUTHC)
1	Entrance	Complied	Not complied
2	Record Unit	fairly complied	Not complied
3	Reception	not complied'	Complied
4	Waiting Area	Complied	Complied
5	The Counselling Room	Complied	fairly complied
6	Lobbies and Corridors for Out patient	fairly complied	fairly complied
7	Pharmacy space	fairly complied	Complied
8	Treatment Room	Not complied	Not complied
9	Consulting and Examination Space	Not complied	Not complied
10	Maintenance and Engineering Area	Not complied	fairly complied

## V. CONCLUSION

This study has examined the design quality and level of compliance for out-patient physical with a view to developing



better healthcare design policy that will improve the quality of hospital spaces and their environment in southwest, Nigeria. Prominent out patients physical facilities spaces such as entrance, record unit, reception, waiting area, counseling rooms, lobbies and corridors, pharmacy room, treatment, consulting, examination spaces and maintenance facilities was reviewed and the standard requirements design setting for each space has been identified through the literature review of past studies and physical appraised to check the level of design compliance.

The result showed that University College Hospital (UCH, Ibadan) *complied* with the design standard and settings for the entrance, waiting area and counselling room, while the college hospital were *fairly complied* with spaces like record unit, lobbies and corridors, pharmacy, and the University College Hospital did *not complied* with the design standard and settings of out-patient facilities such as reception space, treatment room, maintenance unit, consulting and examination room respectively.

Also, the result at the Obafemi Awolowo University Teaching Hospital (OAUTHC) showed the *higher level of compliance* with the design standard and settings for the reception, waiting area and pharmacy spaces, while the teaching hospital were *fairly complied* with spaces like counselling, maintenance, lobbies and corridors and did *not complied* with the design standard and settings of out-patient facilities for entrance, record unit, treatment room, consulting and examination room respectively. The result of the study has displayed the transformation of design and construction strategies that is truly needed to reach our goal of providing compassionate and safe care for the out-patients. This study will serve as reference materials to architects, healthcare researchers, facility administrators, policy-makers and healthcare managers in the efficient realization of the design issues that affect Teaching Hospitals Out-Patient physical facilities in southwest, Nigeria.

#### REFERENCES

- [1] Abreu E, Potter D. (2001). Recommendations for renovating an operating theatre at an emergency obstetric care facility. *Int J GynecolObstet* 2001;75: 287–94.
- [2] Alalouch, C., Aspinall, P.A and Smith, H., (2016). Design Criteria for Privacy-Sensitive 10.7763/IJET.2016.V8.854 32. Vol. 8, No. 1, February.
- [3] Akinluyi, M.L , Folusho Charles Awe, F.C , Adeleye O.O, Ogunraku, M.P (2019 ). Paediatric Physical Facilities Design Characteristics in Southwestern Nigerian University Teaching Hospital: Lesson from Netherland Children Hospital. *Universal Journal of Public Health*. 7(6): 233-254, 2019 <http://www.hrpub.org> DOI: 10.13189/ujph.2019.070602 Received December 2, 2018; Revised March 21, 2019; Accepted March 28, 2019
- [4] Akinluyi M. L, Fadamiro J. A, Ayoola H.A., Alade M.J. (2020) . A Review of Physical Facilities Design Settings: Standard for Hospital Building Performance in Southwest, Nigeria. Vol. 6(4), pp. 638- 658, December 2020, ISSN 2315-5396, DOI: 10.14412/SRI2020.658 Available online at <http://www.scienceparkjournals.org/SRI>
- [5] Alalouch, C., Aspinall, P.A and Smith, H., (2016). Design Criteria for Privacy-Sensitive 10.7763/IJET.2016.V8.854 32. Vol. 8, No. 1, February.
- [6] Andrade, C.C , Lima, M.L ,Devlin A.S , & Hernández, B. (2014). Is It the Place or the People? Disentangling the Effects of Hospitals' Physical and Social Environments on Well- Being. *Environment and Behavior*, Vol. 48(2) 299–323. Approach, London: Sage Publication
- [7] Bitner, M. J. (1992). Servicescapes: The impact of physical surroundings on customers and employees. *Journal of Marketing*, 56(2), 57-71.
- [8] Cho WH, Lee H, Kim C, Lee S, Choi KS.(2004). The impact of visit frequency on the relationship between service quality and outpatient satisfaction: a South Korean study. *Health Serv Res*. 2004;39:13–33. doi: 10.1111/j.1475-6773.2004.00213.x.
- [9] Department of Health Estate & Facilities Division (2007). On design healthcareportal: ASPECT toolkit, NHS estates. Retrieved from <http://www.design.dh.gov.uk> on March 18, design: Toward best practices. *Psychiatric Services*, 57, 1376–1378.
- [10] Dinesh T.A, Sanjeev, S., Nair, P., Remya, T R, (2013). Reducing Waiting Time in Outpatient Services of Large University Teaching Hospital; A Six Sigma Approach; *Management In Health* Vol 17, No 1
- [11] Dijkstra, K. (2006) Physical Environmental Stimuli That Turn Healthcare Facilities into Healing Environments Through Psychologically Mediated Effects: Systematic Review. *Journal of Advanced Nursing*. 56(2)166-181.
- [12] Easterby-Smith, M.(1991).Management research: an introduction, Sage Publications London
- [13] Fornara, F., & Andrade, C. C. (2012). Healthcare environments. In S. D. Clayton (Ed), *The Oxford handbook of environmental and conservation psychology* (pp. 295–315). New York, NY: Oxford University Press. University of Technology, Sweden Pp 1-96
- [14] Frost, P. (1992). Representing Space Designing Arenas for Human Action, in design spaces, Ed. Thomas Binder, Maria Hellstrom. Edita IT-Press Finland, 2005.
- [15] Ghazali, R., & Abbas, M. Y. (2011). Pediatric Wards: Healing Environment Assessment. *Asian Journal of Environment-Behaviour Studies (Aje-Bs)*, 2(4), Pp. 63-76.
- [16] Gilla, T, P. Baileyb, R. Waxmana, J.B. Smithba AMDD (2004). A tool for assessing 'readiness' in emergency obstetric care: The room-by-room 'walk-through'. *International Journal of Gynecology and Obstetrics* (2005) 89, 191–199.
- [17] Health Technical Memorandum, (2014). Policies Principles of healthcare engineering. *Department of health*. March. 2014
- [18] Hatch, M., and Cunliffe, L. (2012). *Organization theory: Modern, symbolic, and postmodern perspectives*. New York, NY: Oxford University Press.
- [19] Jordan P.W., (1998) *Pleasure with products: human factors for body, mind and soul* in Jordan P.W. and Green W.S., "Humanfactors in product design", 1999, Taylor & Francis, p. 209.
- [20] Karlin, B. E., and Zeiss, R. A. (2006). Environmental and therapeutic issues in psychiatric hospital design: Toward best practices. *Psychiatric Services*, 57, 1376–1378.
- [21] Mosadeghrad AM. ( 2014). Factors influencing healthcare service quality. *Int J Health Policy Management* 2014; 3: 77–89. doi: 10.15171/ijhpm.2014.65.
- [22] Mourshed, M. & Zhao, Y. (2012). Healthcare providers' perception of design factors related to physical environments in hospitals. *Journal of Environmental Psychology*, 32(4), pp. 362 - 370.
- [23] Montello, D. R. (2007). The contribution of space syntax to a comprehensive theory of environmental psychology. In A. S. Kubat, O. Ertekin, Y. I. Gu'ney, & E. Eyu'bolou (Eds.), *Proceedings of the Sixth International Space Syntax Symposium* (pp. 1–12). Istanbul, Turkey: ITU Faculty of Architecture.
- [24] National Health Policy, (2004). Federal Republic of Nigeria, Ministry of Health, Abuja

- [25] NHS, (2014). The NHS Outcomes Framework and the wider health and care system. Department of Health. <http://indicators.ic.nhs.uk/webview/>
- [26] Ogaji, D.S., Giles, S., White G.D and Bower, P., (2015). Systematic review of patients' views on the quality of primary health care in sub-Saharan Africa 3: Pp 1-11
- [27] Oladejo, E, Umeh, E, Ogbuefi, J., (2015). An Examination of Impact of Tertiary Healthcare Facility Design on User Needs and Satisfaction in South East Nigeria. *Journal of Environment and Earth Science* Vol.5, No.5, ISSN 2224-3216.
- [28] Preiser, W. F. E., & Schramm, U. (2002). Intelligent office building performance evaluation. *Facilities*, 20, 279–287.
- [29] Samah, Z.A, Ibrahim, N, Wahab, M.H, (2013). Users' Assessment on Interior Environment of a Hospital Outpatient Unit in Malaysia. *Asian Journal of Environment-Behaviour Studies*, Vol. 4, Number 11, January/February.
- [30] Srivastava, C., (2017), Effect of Clinic Design on Patient Care: Perceptions of Medical Staff and Patients. *Intersect*, Vol 10, No 2; Stanford University.
- [31] Steinke, C. (2015). Assessing the physical service setting: A look at emergency departments. *Health Environment Research and Design Journal*, 8, 31–42.
- [32] Trap B, Todd C, Moore H, Laing R.(2001). The impact of supervision on stock management and adherence to treatment guidelines: a randomized controlled trial. *Health Policy Plan*;16:273– 80.
- [33] Tsai, C. Y., Wang, M. C., Liao, W. T., Lu, J. H., Sun, P. H., Lin, B. Y., & Breen, G. M. (2007). Hospital outpatient perceptions of the physical environment of waiting areas: The role of patient characteristics on atmospherics in one academic medical center. *BMC Health Services Research*, 7, 198. doi:10. 1186/1472-6963-7-198.
- [34] Ullán, A. M., & Belver, M. H. (2006). Gestión De Espacios Infantiles Hospitalarios. *Sedisa XXI*, 2, 24-31.
- [35] Vickery, C.G (2012). Clinic Design: Reception and Check-In Healthcare Design Pp1-22.
- [36] Ulrich, R., (2000). Effects of Healthcare Environmental Design on Medical Outcomes. *Design and Health World Congress and Exhibition (WCDH), USA: The International Academy For Design And Health (IADH)*, 2000. Unit.