

# Efficacy of Architectural Space Design for Healing and Humanization in Lagos University Teaching Hospital, Nigeria

<sup>1\*</sup>Muyiwa L. Akinluyi, <sup>2</sup>Joseph A. Fadamiro, <sup>3</sup>Hezekiah A. Ayoola, <sup>4</sup>Morakinyo J. Alade

<sup>1\*</sup> Ph.D. Candidate, Department of Architecture, Afe Babalola University, Ado-Ekiti (ABUAD), Nigeria.

<sup>2&3</sup> Ph.D., Department of Architecture, Federal University of Technology (FUTA), Akure, Ondo State, Nigeria.

<sup>4</sup> Ph.D. Candidate, Directorate of Physical Planning and Development (DPPD) Living Faith Church Canaan Land, Ota, Nigeria.

Received 16.06.2020; Accepted 04.08.2020

**ABSTRACT:** This study reviewed the effectiveness of architectural space design for healing and humanization in Lagos University Teaching Hospital, (LUTH), Nigeria. The study adopted a semi-structured interview and physical appraisal of the selected major departments within the study area. Also, a literature review of past studies on hospital buildings was done to buttress and advocate for the importance of architectural spaces design for healing and humanization of the users in the hospital environment. Factors of architectural space design in hospital buildings were identified and classified through the literature of past studies and a conceptual framework was developed through it. These factors were categorized under the following headings. This includes functional design factors (FDF), aesthetics design factors (ADF), environmental design factors (EDF), security & safety design factors (SSDF), and Physiological & Psychosocial design factors (PPDF). The study provides information on the importance of architectural space design on overall hospital performance. This study contributes to methods of evaluating architectural space design quality in hospital buildings in Nigeria and a similar context.

**Keywords:** *Architectural Space, Design Performance, Healing, Humanization, Hospital.*

## INTRODUCTION

In recent times, Healthcare architects have come to view architectural space design in hospitals as a vital player in the overall health care experience, and progress is being made to design better hospitals. The hospital architectural space design can create a memorable and positive experience by providing orientation, instilling pride, building confidence, and helping the healing process. The knowledge that healthcare architectural space can take different forms, serve different functions, and express different patterns of use cannot be overlooked. It can be a primary space, such as lobbies, rooms, theatre, ward, treatment room, laboratory spaces, or support spaces among others.

Also, the physical environment of residential health, care, and support facilities is a critical component in providing

supportive and resident-centered care for the people at large (Joseph et al., 2015). Moreover, hospital architectural spaces do not exist in isolation. Instead, they stitch together the entire health care experience, which includes the different health care public space typologies. Some of these spaces constitute seams of human interaction, while others constitute a formal stage for this interaction. Designing spatial layout for a hospital is a challenging task because of the complexity of functions. In the past, the design of hospitals was more focused on the requirement of functional and organizational structure.

Furthermore, hospitals are attempting to develop organizational cultures more sensitive to patients (Peponis & Zimring, 1996) due to the numerous technological advances in diagnostics, medications, procedures, and modifications in health care reimbursement plans (Becker, 2008). As a result, the architects are trying to develop efficient architectural space

\*Corresponding Author Email: [akinluyimuyiwa@gmail.com](mailto:akinluyimuyiwa@gmail.com)

design quality for the hospital to improve the overall quality of the system. However, the tradition-oriented architects have given much attention to providing the magnificent scenery and beautiful spaces without paying attention to the needs of architectural spaces in relation to human society and the behavior of its users. The studies on architectural design spaces where the social activities of human beings are primarily considered based on cultural norms and values in a hospital environment have not been widely examined. The design and space organization are very important for different areas and can be decisive in the environmental, economic and social development of the whole building. The literature review shows that a few pieces of research have been reported to show the effectiveness of architectural space design for healing and humanization in hospital buildings. Therefore, to fill this gap in the literature, there is a need to develop a conceptual framework that will buttress and advocate for the importance of architectural spaces design in the healing and humanization of the users in the hospital environment.

### MATERIALS AND METHODS

This study adopted the primary method of data obtained with the use of semi-structured interviews. The semi-structured interviews consist of several key questions that help to define the areas to be explored and also allows the interviewer or interviewee to diverge in order to pursue an idea or response in more detail (Gill et al., 2008). In healthcare facilities research, semi-structured interviews can help view the data more extensively and strengthens healthcare trials by enhancing user involvement. This was carried out in four (4) buildings that engaged in pure clinical activities for medical treatment such as

Medicine, Paediatrics, Surgery, Obstetrics, and Gynaecology. The semi-structured interview was conducted during the week when there are fewer clinical activities usually on Monday and Wednesday with the principal officers/head of the selected departments, the managers, the Architects/ professionals in the maintenance selected departments in LUTH, Nigeria.

However, the physical appraisal of the selected departments within the study area was done through personal visits and observations. This study also adopted data from already collected and readily available sources such as literature review of past studies on hospital buildings, which were done to buttress and advocate for the importance of architectural spaces design for healing and humanization of the users in the hospital environment. However, maps of the study areas were obtained and digitalized from Google map.com and <http://www.nigerinmuse.com> respectively.

### The Study Area

The Lagos University Teaching Hospital (LUTH) located at latitude 6° 51'.75" N and longitude 3° 35'38"E in Idi-Araba, in Surulere Local Government Area of Lagos State was established in July 1962. From a humble beginning with three hundred and thirty (330) bed spaces, it now has seven hundred and sixty-one (761) beds and records an average of over 9,000 outpatients' attendances yearly. In terms of physical facilities, the hospital has several departments and specialties, such as Ophthalmology, Paediatrics, family medicine, internal medicine, Obstetrics and Gynaecology, and Surgical ward (Figure 1).

### The Literature Review

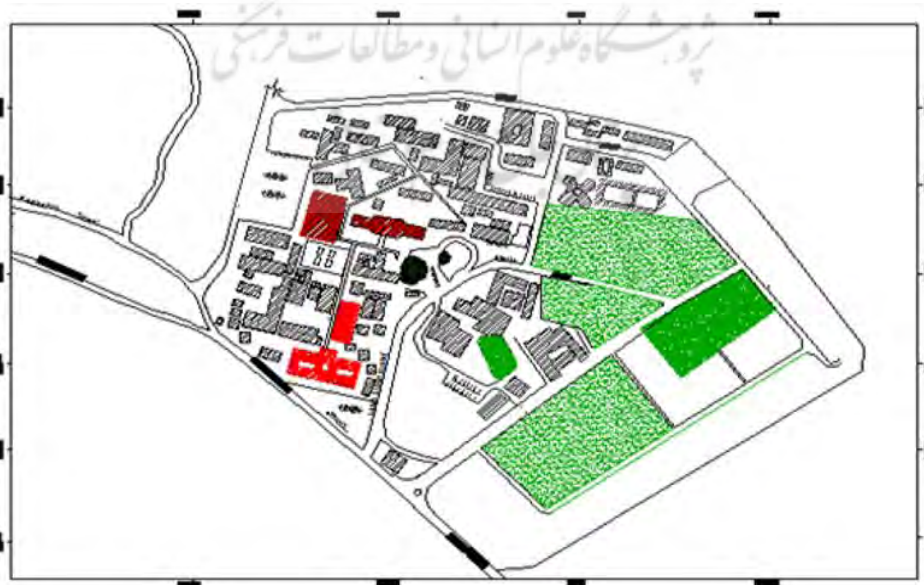


Fig. 1: Map of LUTH Showing the Selected Buildings in the Study Area (Sources: Google map)

### The Concept of Architectural Space

Architectural space has been conceptualized by (Baykan & Pultar, 1995) as set-theoretic fashion to mean subsets of the three-dimensional extension of the world around us such that it is entered by man, includes definite material elements, especially a base, that allow one to perceive its boundaries and is perceived as a whole, serves human functions of habitation, shelter or circulation, and is intentionally built or appropriated by man to serve such functions. According to this definition, not only well-defined spaces such as halls and rooms, but also arrangements of furniture so as to define a spatial expanse, allowing it to be perceived as a whole, should be considered as an architectural space. The authors proceeded that the notion of architectural space should also be understood to include structures of space, i.e., sets of spaces so interrelated to each other that the functions they serve extend through these spaces (Baykan & Pultar, 1995).

In the architectural context, flexibility and variability provide specific conditions to create spaces that are designed to change their functional use. They are the spatial expression of the activities created by a rapidly changing way of life. Architects and planners must be able to translate the needs and resources of society into physical solutions; into the forms of buildings, landscapes, and cities that serve and express the ideals of the time. Forgas, (2000) conceptualized architectural spaces as an important component of human interaction with others, as organized, dynamic, and talented (Forgas, 2000). Gans (1961) defined a potential architectural space as a space that provides a wide range of opportunities to satisfy personal needs. Architectural space can be perceived objectively and feel directly and it can identify by its defining elements (Grüter & Stethik der, 2007). The architectural design of a space is more than just the geometric organization; it influences users' sensory perceptions. Spatial architectural designs affect staff recruitment and retention, as well as efficiency and productivity (Guenther & Vittori, 2008).

However, Pultar, (2000) explains that the important characteristic of architectural space is man's involvement in its generation and his partaking of life in it. In this sense, architectural space is diachronic in addition to its spatially expansive nature. This diachronic aspect will be indicated by the use of the term life-cycle of architectural space. (Pultar, 2000).

Sherwood (2006) shows the simplest definition of architectural space and described it as a practice of designing and building inhabited environments in outer space. Several different methods have been used to understand the concepts of architectural space such as "design quality" and its life cycle (Manav & Duyar, 2012). Although it is difficult to quantify the "quality" of architectural space, visual evaluation of architectural space (indoors and outdoors) has proven useful in various domains and also unifies issues related to the perception of design quality embodied in architectural space (Gann et al. 2003). Suvanajata, (2001) explained that only through use,

not design, will space become architectural space and begins to be very ambiguous not only in how we use space but also how we design space. The design and use of space create a bi-directional dialogue inside a piece of architecture in which we give quantity and quality to space. However, the design and use of spaces need to be classified. The classification of spaces according to design and use is explained below.

### Classification of Architectural Space in Hospital Buildings

Spaces are classified based on the function they performed in the environment. From the literature, indoor/closed, and outdoor/open spaces classification methods are identified (Pultar, 2000). The indoor/closed space refers to the physical space form which is enclosed based on certain parameters such as design and is usually refers as being private examples are room, dining, office, toilet ward, theatre spaces, etc. The outdoor/open refers to the physical space which is usually exposed to the physical environment such spaces include recreational spaces, parking lots, fountains, spaces for landscape among others (Manav & Duyar, 2012). Space is among the fundamental concepts in architecture about which many discussions have been held and the complexity and importance of these concepts were focused on.

The physical space of the hospital can be understood as a space of meanings for those who inhabit it (Corraliza, 2000). The meaning of an environment is the set of contents that allow a person to understand what space represents (Belver & Ullán, 2010). These meanings are constructed from the interpretation of the signals that are present in the environment (Belver & Ullán, 2010). This process of attributing meaning is the basis of the emotional experience of the space (Corraliza, 2000). The relationship between indoor and outdoor classification of spaces is one of the most noticeable characteristics that make each kind of architecture different. In this way, its overall character is quite simple in terms of massing (Forgas, 2000). Great care should be given to the design of the point where outdoor and indoor space meets in the hospital's environment. The outdoor and indoor parts are marked and easy to differentiate.

#### The Healing Nature of Hospital Architectural Space

Another aspect of hospital design refers to the healing nature of the hospital environment. This is primarily important and relevant within the context of sustainability in healthcare architectural facilities. The term 'Healing Architecture' according to Lawson, (2006) is adopted to invoke a sense of a continuous process; in creating an environment physically healthy and psychologically appropriate. A healing environment with appropriate physical aspects would indirectly contribute to patients' outcomes such as shorter length of stay, reduced stress, increased patients' satisfaction, and others (Ulrich et al., 2004). One may agree to the idea that sustainable hospital design in the form of a healing environment is achieved if these measurable outcomes could be quantified through appropriate design of physical aspects. Since the advent of the hospital in the late 1970s, the health industry has shown an increasing interest in

the ability of the physical environment to contribute to healing. Additionally, patient satisfaction with hospital services today extends beyond medical care and encompasses a whole hospital experience. However, the advent of new hospital architecture, especially the new physical arrangements designed to assist in healing have, in many respects, increased the exposure of hospital buildings to natural hazards. The emphasis on natural light, the use of single-patient rooms, and a greater variety of public spaces usually produce complex building designs with greater exterior perimeter and a greater number of doors and windows that frequently increase building's vulnerability to wind and windborne debris damage.

### **Hospital Design for Humanization**

Another area of hospital design identified from the literature is the hospital design for humanization, which involved in the study of the architectural psychology aspect of behaviour response to the physical environment and the special factors that involve a direct sensory activity of the design, helping to specify the quality of the environment. In the last twenty years, the hospital humanization has focused on architectural design aspects. In terms of humanization of space, it is not easy to define the architectural design quality, because it is based on principles, which in turn are not quantifiable. (Pellitteri & Belvedere, 2010). Evidence-based Design contributes to defining the concept of humanization and then contributes to the definition of the quality of contemporary hospitals, that is related also to the humanization of hospital spaces and therefore to the quality of contemporary hospital buildings. However, dealing with the concept of humanization of space and its architectural quality means to focus on the human needs and understand their interaction with the environment. (Pellitteri & Belvedere, 2010).

Designed spaces serving hospitals not only communicate and represent their health content, but they also provide stimuli affecting the user's psychological well-being, satisfying his needs of humanization (Pellitteri & Belvedere, 2010). Studies have shown that users can "save/affirm the identity of their own personal and social existence. However, the methodology used in assessing the quality of architectural space in terms of humanization derives from the study of the environmental system (UNI 10838:1999, Italian standard) based on its needs, requirements, and performances. Need is what is required for carrying out user activity; Requirement includes identification of factors and conditions that can satisfy the need and Performance means behavior of the space considered. The main activities performed have been identified for each characterizing area for humanization.

### **Architectural Space Design Factors in Hospital Buildings**

From the literature, an attempt was made to identify architectural space design factors in hospital buildings and is further grouped under the following headings discussed below:

### **Functional Design Factors (FDF)**

The functional architectural features of a building can be defined as the extent to which it provides a proper level of support to the desired activities, creates a pleasing environment for the users and also the extent to which the building is suitable for the activities the space/building is meant to perform. Functionality in use is concerned with a building's ability to support the economic and professional objectives of the user's organization. (Alexander,2008). Pellitteri & Belvedere, (2010) posit the functional aspects of a hospital building often overshadow the others that characterize hospital architecture. In the past the design of hospitals was more focused on functional requirements of the hospital organization and that this focus shifted over the years to the needs and experiences of the users (Pellitteri & Belvedere, 2010). Ampt et al., (2008) for example only carried a review of the literature on health impacts of the design of hospital facilities on patient and staff wellbeing and identified functional aspects of architecture features such as windows, provision of staff area, physical plan of the ward & overall hospital plan, adequate reception space, floor finishes as a physical design factors that have impacts on the patient and staff wellbeing in the hospital environment.

In a different approach, Parke, (2007) identified the physical design facilities of an elder-friendly hospital using evidence-based practice for the Vancouver Island health authority. The functional aspects of the physical design facilities identified include architectural features such as the physical configuration of the space, equipment, furnishings other factors include elements of physical design facilities such as the location of treatment setting, how easily patients understand signage, and find their way around the building. The report of Parke, (2007) introduced key elements of design critical to maximizing independent function in older patients and visitors. The author posits that functional ability is assumed to include physical, cognitive, and social dimensions in a person's life.

In a related study, Phiri, (2003) carried out research to identify and evaluate the one patient one room theory & practice in the Leeds Nuffield Hospital. The author identified the functional aspects of facilities such as nursing unit design, space standards & specifications, the location of the ensuite facilities, layout configuration, window design, internal circulation routes or corridor others are internal corridors, support spaces, procedural rooms, increased flexibility in the use of space and medical care, patient privacy, personal storage, treatment rooms, isolation rooms, day rooms, reception, and waiting areas and meeting rooms. However, Oladejo et al. (2015) identified the facilities such as handwashing facility, nursing units that make it difficult to observe patients, poorly functioning ventilation systems, flooring materials others factors include spaces design facilities such as the location of consulting rooms, theatres, laboratories, conveniences others include the size of laboratories and size of wards.

Tsai et al., (2007) identified some furniture layouts, space

design, seating comfort, and seating sufficiency. Other functional factors identified include Mourshed & Zhao (2012). The major physical design factors identified include spaciousness of hospital ward, location, and orientation of the space, furniture layout, provision for hand hygiene, spaciousness of working areas proximity to wards, exterior view from the space including furniture layout of the space and indoor plants were identified to influence the working outcome of health providers. However, the study of space usability is very important in the study relating to functional quality factors. Haron et al. (2010) have explained how spaces in the hospital function and influence the quality of the hospital design. Haron et al. (2010), emphasized that usability principles and concepts are mostly determined by the following three key factors such as effectiveness, efficiency, and satisfaction. It is whether a product is efficient, effective, and satisfying for those who use it, and it depends on what kind of goals the user holds.

In summary, from the literature above the functional design features can, therefore, be accessed using criteria such as adequacy, location, form & shape, arrangement & organization, accessibility, size & proportion, availability, flexibility and quality of materials (Lankford et al., 2003).

#### **Aesthetics Design Factors (ADF)**

Tsai et al. (2007) identified features such as lighting, ground, landscape design, and color design. Golembiewski (2010) identified features such as views to the outside, least images of nature, and a variety of lighting options.

In a related study, Mourshed & Zhao (2012) discovered aesthetics design features such as availability of daylight, space pleasant color, exterior landscaping, presence of coordinated art objects, and presence of coordinated art objects. Also, Caspari et al. (2007) conducted a study to find out how the patients evaluate the aesthetics quality in the general hospitals. The aesthetics influential factors identified from the literature include the evaluation of paintings, pictures, tapestries, sculptures, decorations, mosaic works, and water decorations fountains, etc. The results in general showed that aesthetic surroundings are important for health and wellness. The aesthetics in the hospital environment was evaluated and generally considered to be less than satisfactory by the patients (Caspari et al., 2007). Daykin et al. (2008) posit that participatory arts in healthcare; art forms such as music, drama, play, and dance influence the overall hospital performance. Tsai et al. (2007) identified features such as lighting, ground, landscape design, and color design. Golembiewski (2010) identified features such as views to the outside, least images of nature, and a variety of lighting options.

Also, the presence of the gardens can be one of the most positive aspects of psychiatric treatment. It was believed that viewing the landscape had positive effects on the patients, and therefore buildings were designed so the landscape could be viewed from inside the building as well. Design features included verandas, conservatories, airing courts, ornate

aviaries, pagodas, and even a Chinese gallery. The theme of gardens includes open spaces within the precincts of the hospital. Subthemes include therapeutic gardens, Alzheimer's facility, historical perspective, moral therapy, landscapes, therapeutic relationships, natural environments, directed attention, attention restoration theory, restorative experience, and environments for renewal/stress relief (Ulrich et al. 2004).

#### **Environmental Design Factors (EDF)**

From the literature, the meaning of the environment becomes an emotional meaning, capable of provoking diverse emotional experiences in people (Ullán & Belver, 2006). Petros & Georgi, (2011) identified and evaluated environmental design facilities such as footpaths, resting areas, social and public spaces, personal spaces, water features, and therapeutic hospital gardens facilities. However, Tsai et al. (2007), Golembiewski (2010) identified environmental factors such as noise level, air freshness, temperature, and cleanliness of the environment where treatment takes place. Ampt et al. (2008) identified factors such as ambient environment (noise), social and specific features. Also, Mourshed & Zhao (2012), major environmental factors identified include cleanliness and ease of maintenance, air quality, noise level, thermal comfort, adequate illumination and others features relating to the sensory environments such as visual, acoustic, olfactory, the working pattern and length of service had associations were identified to influence the working outcome of health providers.

In summary, from the literature above the environmental architectural space features identified are illumination, indoor air quality, water sources, drainage system, refuse collection and disposal, street lighting, as footpaths, resting areas, social and public spaces, personal spaces, water features, and therapeutic hospital gardens facilities and maintenance of the hospital environment (Mourshed & Zhao, 2012; Petros & Georgi, 2011; Tsai et al., 2007).

#### **Security and Safety Design Factors (SSDF)**

The security and safety stretch across literature concerning all users of facilities, including patients, staff, and visitors. The subthemes emerging from the literature are spatial analysis and spatial mapping, violence, crowding, environmental stress, quality of care, stigma, risk management; nurse safety, safe practice, prevention strategies, and assessment. Bayramzadeh, (2017) aimed to understand the incident patterns from the lens of the five levels of safety framework, which categorizes spaces according to the level of patient supervision in psychiatric facilities, as follows: service areas, corridors, dayrooms, patient rooms and bathrooms, seclusions and admissions and the overall findings support the five levels of safety pattern confirming that most incidents occurred inpatient rooms and bathrooms; moreover, relatively fewer incidents happened in dayrooms and corridors. Elopements are higher in hallways and dayrooms. Suicide is most common inpatient rooms and bathrooms, and violence is more frequent in dayrooms. Wasson

et al. (2006) identified violence, assaults, and crowding as potential risk factors for safety issues while density and control are major contributing factors.

Safety features that reduce employee injuries resulting from repetitive movement, patient lifting, mobilization, and transfers; visual access of patients from nursing stations or documentation alcoves; security designs to enhance protection of staff from hostile visitors; and staff stress reduction with the design of respite rooms (Reiling,2006). Brickell and McLean (2011) focused on patient security in terms of quality of care, stigma and health outcomes while Reiling, (2006) identified safety design principles & facilities such as noise reduction facilities, scalability, adaptability, flexibility in design, visibility of patients to staff, patients involved with their care, standardization, automate where possible, minimizing fatigue, immediate accessibility of information, close to the point of service, minimizing patient transfers/handoffs and design around precarious events. Langan and McDonald's (2008) studies addressed patient dignity via the clothes they are permitted to wear in the units. Enser and MacInnes (1999) examined a serious issue concerning secure facilities the link between building designs and escape such as the provision of perimeter fencing, roofs, internal and external windows.

Donald et al. (2007) reported fewer falls of geriatric patients on vinyl floors compared with carpeted floors in a rehabilitation ward. However, Healey (1994), on the other hand, reported that patients suffer more injuries when they fall on vinyl floors compared with carpeted floors. Also, Simpson et al. (2004) reported that subfloors might impact the injury from falls, with the risk of fracture being lower for wooden subfloors compared with concrete subfloors. Hospital design may help improve patient safety directly by reducing nosocomial infections, patient falls, medication errors, and, sometimes, even by reducing patient morbidity and mortality. Hospital design also helps improve patient safety indirectly by reducing staff stress, staff walking, and patient transfer, and by improving handwashing compliance. In contrast, very little has been reported recently on the role of hospital design as a barrier to adverse events in hospitals. There is convincing evidence that noise is a latent condition for errors in hospitals, and strategies must be adopted to reduce noise. Visibility to patients also seems to be related to perceived safety. Factors of design security and safety identified from the literature include the experience of a greater number of escapes, the height of the fence provided in the garden space. Design features that add security without compromising patient care include secure bedrooms overlooking an inner courtyard, any covering of that courtyard modified by a feature that cannot be climbed, fencing with a double overhand, the installation of closed-circuit television, airlocks and alarms on exit doors, and new and secure window fittings (Healey 1994).

#### Psychological and Psycho-Social Design Factors (PPDF)

The main psychological needs of the patient based on the Hierarchy of users' needs identified by Jordan, (1999) are

recognition, acceptability, usability, territoriality, and amenity. The performances and requirements related to space identified from the literature include; visibility, representativeness, and spatiality, acceptability requirements which include (variety and comfort), usability requirements which include (continuity and orientation), territoriality requirements include (privacy, socialization, and formularization) and amenity requirements include (sensory and unity). The performance factors related to the hospital entrance identified from the literature are comfort, sensory, spatiality, and privacy. Besides, the major psychological factors relating to natural light which is linked to the following issues in the literature: eating disorders, depression, circadian rhythm, sensory stimulation, therapeutic design, and therapeutic patient rooms.

The patient-centered design was identified in the literature which included; rehabilitation, ambient features, social features, nursing stations, staff perceptions, program evaluation, the Plan tree approach, positive design, multidisciplinary input, architectural change, and psychiatric intensive care units. Also, Parke, (2007) identified are cognitive and social capabilities that enable an individual to perform self-care activities independently.

#### The Socio-Cultural Design Factors (SCDF)

The most striking social economic & cultural factors identified from the literature are; length of stay in the hospital, gender, education, income & occupation, ethnicity & race, family size, religion, political affiliation, geographic region, level of interaction, attending events such as visiting events, art exhibitions, theater of concerts, reading books, patient cooperation with treatment, patient illness type, language speaking, mortality rate, respects, helpfulness, education and literacy, intelligence level, confidence level, relationship and trust in health providers and communication skills, family problem/challenge (Mosadeghrad 2014).

Pitt et al. (2014) identified factors such as cultural and local preference factors that affect the choice of service delivery in the hospitals which include the level of communication between staff and patients, competence, skills and experience of service providers, facility quality, positive staff reaction toward patients and cost of treatment versus patient expectations. Other factors identified by the patients that affect the quality of service are doctors, drugs, diagnosis, duration, affordability, and prompt service. Survey feedbacks of factors that most impact users towards facilities experiences and given services were identified.

Kathleen et al. (2013) reviewed that "dedicating space for social interaction has effects on overall patient healing; indicating a room's intended use; making areas visually distinct so intended use of different parts can be delineated from their appearance. The literature reviews also identified subthemes which include the phase of illness model of care, therapeutic space and inpatient care, bio-psycho-social approach, built environment, length of stay, homelessness, and engagement.

Key design principles recommended were a balance between connection with the community and retreat, retail as a buffer between life in the facility and life in the larger community, Integrated building form, Interactive wayfinding, and facility design should support multiple levels of interaction. Other factors identified from the literature are attendance at cultural events, which included visiting museums, art exhibitions, theaters or concerts, reading books, and singing in a choir, which had a positive influence on the survival rates of the patients (Bygren et al., 1996). Mosadeghrad, (2014), Patient-related factors such as (patient socio-demographic variables, patient cooperation, type of patient illness), provider-related factors such as (provider socio-demographic variables, provider competency, provider motivation, and satisfaction), environmental factors such as (healthcare system, recourses, and facilities, leadership and management, collaborative and partnership development).

According to Altman and Chemers (1980), culture “includes what people believe to be true of the world, their lives, and the environment. Altman and Chemers (1980) contend that culture is consensual and passed down to subsequent generations and that culture “appears in objects and the physical environment,” both in nature and the built environment. The cultural behavior has been identified to have primary considerations for international healthcare spatial design. The expression of proxemic behavior was coined by Edward Hall in 1963 which is well related to human topology, chronology (the study of organized space), and chaology (the study of boundaries) (Hall, 1963). Masuda and Nisbett (2001) suggest that perceptual experience varies across geo-cultures and Hunt (1970) acknowledges that people may prefer familiar environments, particularly when they are stressed. Researchers have noted that a familiar physical health facility environment is critical to patient comfort (e.g., Dalstrom, 2013). Despite some commonalities, preferences in healthcare settings might not be universal (Gesler & Kearns, 2002).

## RESULTS AND DISCUSSION

The semi-structured interview carried out in four (4) major buildings that engaged in pure clinical activities for medical treatment such as Medicine, Paediatrics, Surgery, Obstetrics and Gynaecology in the study area shows the importance of architectural spaces design factors for healing and humanization of the users in the hospital environment. The semi-structured interview was conducted with the principal officers/head of the selected departments, the healthcare professionals, the managers, the Architects/ building professionals in the maintenance departments of LUTH, Nigeria. The summary of the information given about the architectural design space factors of the selected department is given in Table 1.0. The factors identified from the literature include; Functional Design Factors (FDF), Aesthetic Design Factors (ADF).

Environmental Design Factors (EDF) Physical Components Design Factors (PCDF), Safety and Security Design Factors

(SSDF) and the Social- Cultural Design Factors (SCDF). However, the physical appraisal of the selected departments within the study area was also done through personal visit and observations.

### Functional Design Factors (FDF)

In this study, the functional design quality refers to the extent to which the building is suitable for the activities that are meant to perform. It is one of the most very important architectural space design factors for healing and humanization across the selected buildings in the study area. The functional design features (FDF) refers to the factors such as space location, arrangement & organization, space form & shape, size & proportion, adequacy, space accessibility, adaptability & flexibility & performance, space availability and the arrangement of fixtures and fittings. Figure 2 and Table 1 showed the importance of functional design factors based on the information obtained from the selected buildings in the study area.

### Aesthetic Design Factors (ADF)

The Aesthetic Design Features (ADF) is the second most important architectural space design factors for healing and humanization across the selected buildings in the study area. However, information from the interview affirmed that Aesthetic Design Features (ADF) are less important in the O & G department. It was conceptualized in this study, involving factors such as space beauty, attractiveness & impressiveness, pleasant and homely, decoration & lighting in a space, painting, sculptures, and water fountains. Figure 3 and Table 1 showed the importance of aesthetic design features based on the information obtained from the selected buildings in the study area.

### Environmental Design Factors (EDF)

The Environmental Design Factors is also of the most important architectural space design factors for healing and humanization across the selected buildings in the study area. But, information from the interview affirmed that the Environmental Design Factors are less important in the Medicine department. The environmental features as conceptualized in this study refers to factors such as air quality, maintenance and cleanliness, thermal comfort, artificial and natural lighting condition, and the ambient noise. Figure 4 and Table 1 showed the importance of Environmental Design Factors based on the information obtained from the selected buildings in the study area.

### Physical Components Design Factors (PCDF)

Information obtained through the interview conducted confirmed the high level of Physical Components Design Factors important across all the selected buildings in the study area. The space physical components design quality factors as conceptualized in this study refers to the quality of the physical components such as ceiling height, evidence of structural durability and stability, the performance of roof/decks,

Table 1: Showing Architectural Space Design Factors at the study Area

s/n	Luth Departs	Design Factors	Less important	important	V. Important
1	medicine	FDF			*
		ADF		*	
		EDF	*		
		PCDF			*
		SSDF		*	
		SCDF		*	
2	pediatrics	FDF		*	
		ADF			*
		EDF		*	
		PCDF			*
		SSDF		*	
		SCDF	*		
4	surgery	FDF			*
		ADF			*
		EDF		*	
		PCDF		*	
		SSDF			*
		SCDF			*
5	O and G	FDF			*
		ADF	*		
		EDF		*	
		PCDF			*
		SSDF	*		
		SCDF			*

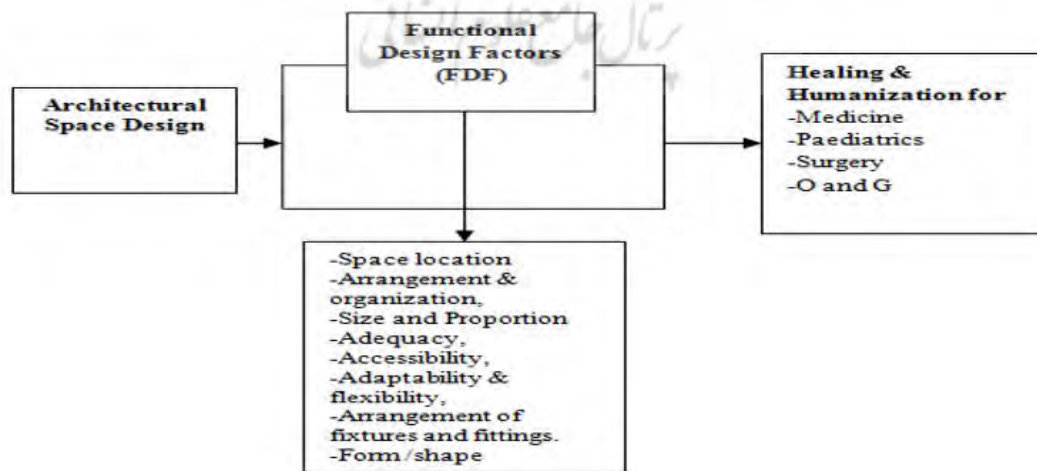


Fig. 2: Functional Design Factors



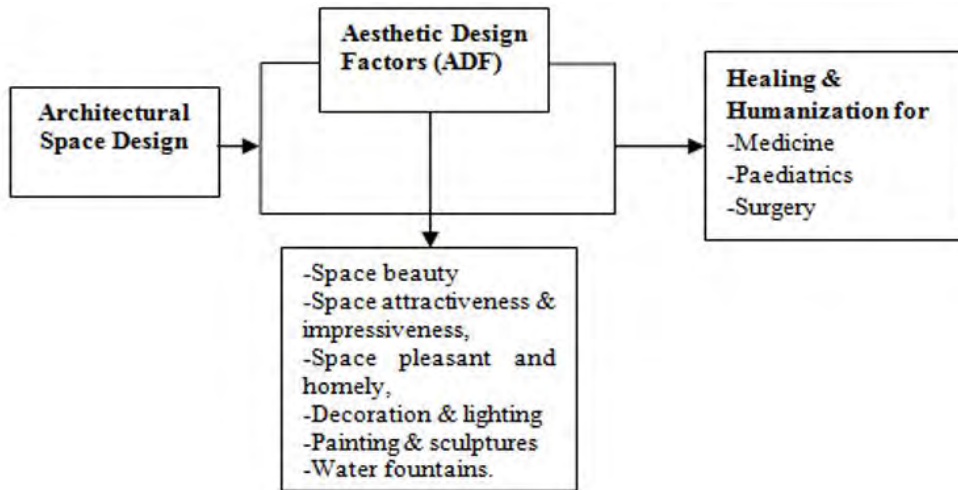


Fig. 3: Aesthetic Design Factors

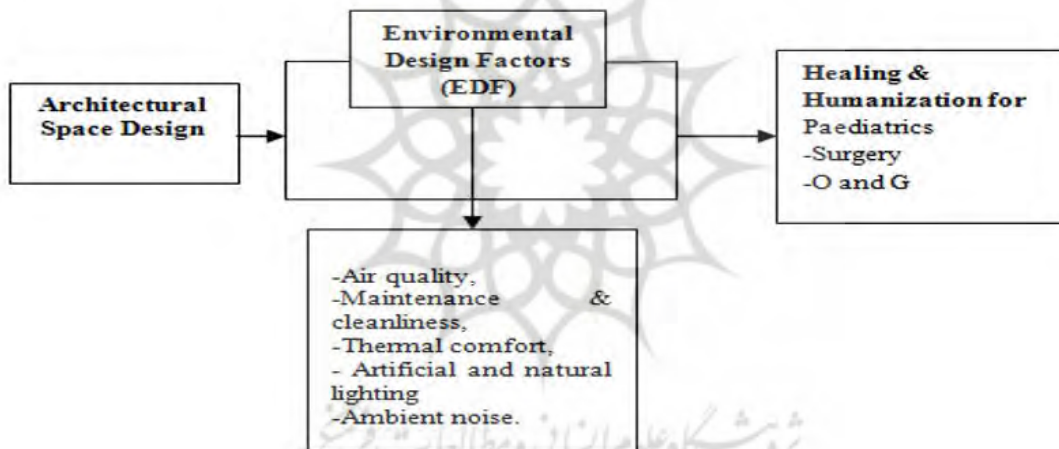


Fig. 4: Environmental Design Factors

operation of electrical fittings, wall & floor quality, doors and windows, column and beams.

Figure 5 and Table 1 showed the importance of physical components design quality factors based on the information obtained from the selected buildings in the study area.

#### Safety and Security Design Factors (SSDF)

Space Safety & Security Space is also of the most important architectural space design factors across the selected buildings in the study area. But information from the interview affirmed that they are less important in the O & G department. See table 1 Safety & Security design factors as conceptualized in this study refers to factors such as safety from slippery & indoor injuries,

lighting condition in space. Others include a greater number of escapes routes, the height of the garden fence, fencing with a double overhand, the installation of closed-circuit television, airlocks, and alarms on exit doors, and secure window fittings and burglary proof. See Figure 6.

#### The Social- Cultural Design Factors (SCDF)

Social-Cultural Design Factors are considered to be more behavioral and not physical. It determines the functionality of other factors. It is considered as one of the important architectural space design factors for healing and humanization across the selected buildings in the study area. However, information from the interview affirmed that the Social- Cultural Design

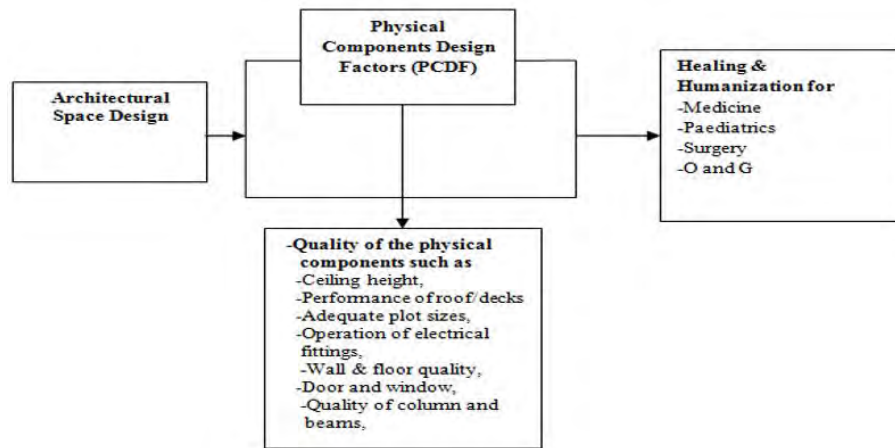


Fig. 5: Physical components design quality factors

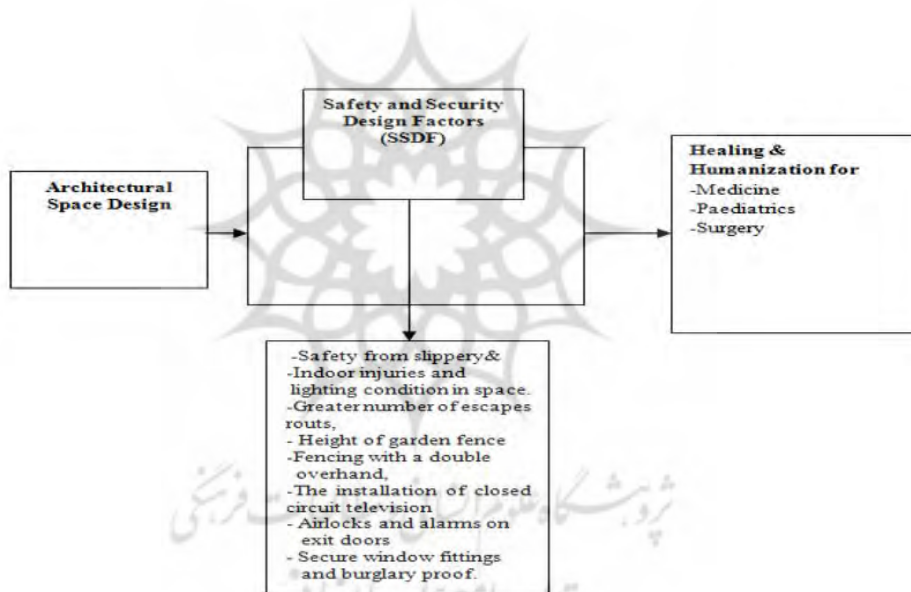


Fig. 6: Physical components design quality factors,

Factors is less important in the pediatric department. Social-Cultural factors identified from the literature and considered in this study are; Gender, Educational level, Economic status, Age, Occupation, Ethnicity & Race, Family size, Religion, Length of stay & Physical Challenge. Figure 7 and Table 1 showed the importance of Environmental Design Factors based on the information obtained from the selected buildings in the study area.

### The Conceptual Framework to the Study of Architectural Space in Hospital Buildings

The conceptual framework for this study is derived from the literature review and theoretical background discussed previously. This framework suggests that architectural space design features are influenced by socio-cultural attributes of the hospital users

Factors of architectural space design in the hospital as

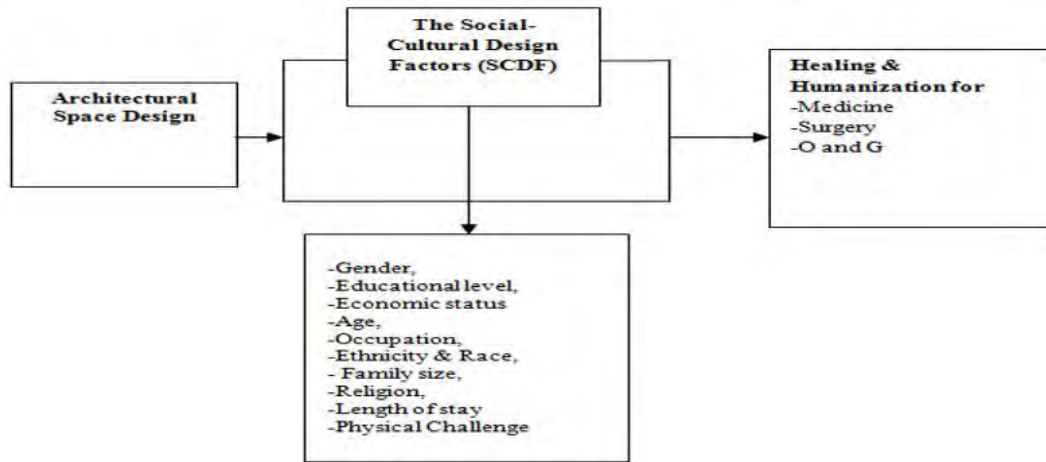


Fig. 7: The Social- Cultural Design Factors

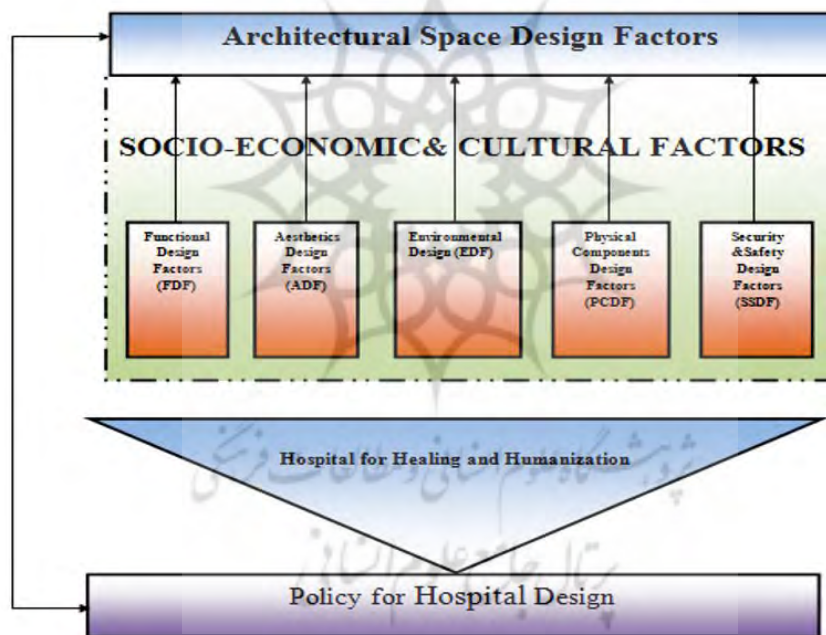


Fig. 8: Conceptual Framework Derived from the Models of Past Studies

conceptualized in this study are categorized under the following headings. This includes the functional design features (FDF), aesthesis design features (ADF), environmental design features (EDF), physical components design features (PCDF), security and safety design features (SSDF) and the socio-cultural design features (SCDF) in this study remain constant to text the architectural space design quality in hospital buildings.

From the conceptual framework as presented in Figure 8

the relationship between architectural space designs such as functional design, aesthetic design, environmental design physical component design, security and safety factors, and the socio-cultural characteristic of users has been displayed. It shows that architectural space design quality has a great influence on hospital users, depending on individual socio-cultural factors.

To this end, a model of determinants of architectural space

design quality was developed. The pictorial presentation of the model is presented in Figure 8.

## CONCLUSION

The research is based on a critical review of the state-of-the-art in current practices in healthcare building design, the healing and humanization aspects of the built environment advance in architectural space design, and relevant policies and strategies guiding the hospital building design.

It is evident from the recent literature, that patients expect more from the hospital in addition to a high quality of health service, such as standard architectural spaces to effectively perform their various functions.

Review of different spaces was done and various design issues were identified and classified as functional design factors, aesthetic design factors, environmental design factors, physical components design factors, safety, and security design factors and the social-cultural design factors. However, these architectural space design standards were examining through the literature, and their relationship was described as evolving a conceptual framework necessary for healing and humanization characteristics of healthcare facilities.

The influence of a hospital's architectural space design on patient wellbeing has been subject to much debate over the years.

As more patient-focused healthcare facilities are being built, ensuring patients' wellbeing is not the only standard in a modern hospital. Besides the clinical spaces, the healthcare environment around a patient plays a very important role during their stay. A well-designed/refurbished hospital is, therefore, the cornerstone of the high standard any reasonable government is aiming to achieve. The considerations of the architectural space design factors identified in this research work are essential in the process of design and refurbishment of the proposed hospital buildings in the future. The complex and often conflicting interrelationship that exists between some of the factors may require the stakeholders to work collaboratively during all lifecycle stages, starting from inception or concept development.

This study had developed a framework that can inform design decisions on hospital buildings in both the developed, developing, and underdeveloped nations. This study will also contribute to the evidence-based design of healthcare buildings and provide information on the efficacy of the architectural space design to the hospital environment and the influence on the health of the users.

## REFERENCES

Alexander, K. (2008). The applicability of usability concepts in the built environment. *J. Facil. Manage*, 4 (4), 262-270  
Altman, I., & Chemers, M. (1980). *Culture and environment*. Monterey, CA: Brooks/Cole.  
Ampt, A., Harris, P., & Maxwell, M. (2008). *The health*

*impacts of the design of hospital facilities on patient recovery and wellbeing, and staff wellbeing: A review of the literature*. Centre for Primary Health Care and Equity: University of New South Wales: Sydney.

Baykan, C. & Pultar, M. (1995). "Structure of Space-Activity Relations in Houses" *Proceedings of International Conference on Spatial Analysis in Environment-Behaviour Studies*, Eindhoven.

Bayramzadeh, S. (2017). An assessment of levels of safety in psychiatric units. *HERD: Health Environments Research & Design Journal*, 10(2), 66-80. DOI: 10.1177/1937586716656002

Becker, F. (2008). Ambulatory facility design and patient's perception of healthcare quality. *Health Environments Research & Design*, 1(4), 35-54.

Belver, M. H., & Ullán, A. M. (2010). Symbolic environmental mediators in health settings: The role of art in the humanization of children's hospitals. *Arte, individuo y sociedad*, 22(2), 73-81.

Brickell, T. A., & McLean, C. (2011). Emerging issues and challenges for improving patient safety in mental health: A qualitative analysis of expert perspectives. *Journal of Patient Safety*, 7(1), 39-44.

Bygren, L. O., Johansson, S. E., Konlaan, B. B., Grjibovski, A. M., Wilkinson, A. V., & Sjöström, M. (2009). Attending cultural events and cancer mortality: A Swedish cohort study. *Arts & Health*, 1(1), 64-73.

Caspari S., Eriksson K. & Naden D. (2007) Why Not Ask the Patient? An Evaluation of the Aesthetic Surroundings in Hospitals by Patients. *Quality Management in Health Care*, 16, 280-292.

Corraliza, J. A. (2000). Emoción y ambiente. In *Psicología ambiental* (pp. 59-76). Pirámide.

Dalstrom, M. (2013). Shadowing modernity: The art of providing Mexican healthcare for Ameri-cans. *Ethnos: Journal of Anthropology*, 78(1), 75-98.

Daykin, N., Byrne, E., O'Conner, S. & Soteriou, T. (2008). The Impact of Art, Design and Environment in Mental Healthcare: A Systematic Review of the Literature. *Perspectives in Public Health*, 128, 85-94. Doi: 10.1177/1466424007087806.

Enser, J., & MacInnes, D. (1999). The relationship between building design and escapes from secure units. *Journal of the Royal Society for the Promotion of Health*, 119(3), 170-174. Doi: 10.1177/146642409911900307.

Forgas, J. P. (2000). *Psychology and social interaction: interpersonal behaviour*, translated by Firouzbakhsh.M. and Khashayar Beigi, Tehran: Mahd Publications.

Gans, H. J. (1961). Planning and social life: Friendship and neighbor relations in suburban communities. *Journal of the American Institute of Planners*, 27(2), 134-140.

Georgi, N. J., & Anthopoulos, P. K. (2011). Landscape preference evaluation for hospital environmental design. *Journal of Environmental Protection*, 2, 639-647 doi:10.4236/

jep.2011.

- Gesler, W., & Kearns, R. (2002). *Culture/place/health*. London, England: Routledge.
- Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British dental journal*, 204(6), 291-295.
- Golembiewski, J. A. (2010). Start making sense: Applying a salutogenic model to architecture design for psychiatric care. *Facilities*, 28(3/4), 100-117. Doi: 10.1108/02632771011023096.
- Grutter, J. K. (2007). *Asthetik der Architektur: Grundlagen der Architektur-Wahrnehmung*, translate by Jahanshah Pakzad & Abdolreza Homayoon. Tehran: University of Shahid Beheshti Publications.
- Guenther, R., & Vittori, G. (2008). *Sustainable healthcare architecture*. John Wiley & Sons.
- Hall, E. T. (1963). A system for the notation of proxemic behavior. *American anthropologist*, 65(5), 1003-1026.
- Haron, S.N. Hamid, M. Y. & Talib, A. (2010). Towards Healthcare Service Quality: An Understanding of the Usability Concept in Healthcare Design. *Proceedings Of ASEAN Conference On Environmental-Behaviour Studies*, Sarawak.
- Healey, F. (1994). Does flooring type affect risk of injury in older in-patients? *Nursing times*, 90 (27), 40-41.
- Hunt, J. (1970). Attentional preference and experience: I. Introduction. *The Journal of Genetic Psychology*, 117(1), 99-107.
- Jordan, P. W. (1999). Pleasure with products: Human factors for body, mind and soul. *Human factors in product design: Current practice and future trends*, 206-217.
- Joseph, A., Choi, Y. S., & Quan, X. (2016). Impact of the physical environment of residential health, care, and support facilities (RHCSF) on staff and residents: A systematic review of the literature. *Environment and Behavior*, 48(10), 1203-1241. DOI: 10.1177/0013916515597027
- Karlin, B. E. & Zeiss, R. A. (2006). "Environmental and therapeutic issues in psychiatric hospital design: Toward best practices. *Psychiatric Services*, 57(10), 1376-1378.
- Kathleen C., Mads G., Damien R, Clemence D, Amanda R & Mustillo, (2013). Stressed Spaces: Mental Health and Architecture. *Health Environments Research & Design Journal*. 6(4), 127-168.
- Kopec, D., & Han, L. (2008). Islam and the healthcare environment: Designing patient rooms. *Health Environments Research & Design Journal*, 1(4), 111-121.
- Langan, C., & McDonald, C. (2008). Daytime night attire as a therapeutic intervention in an acute adult psychiatric in-patient unit. *The Psychiatrist*, 32 (6), 221-224.
- Lankford, M. G., Zembower, T. R., Trick, W. E., Hacek, D. M., Noskin, G. A., & Peterson, L. R. (2003). Influence of role models and hospital design on the hand hygiene of health-care workers. *Emerging infectious diseases*, 9 (2), 217.
- Lawson, B. (2006). *How designers think: The design process demystified*. Routledge.
- Manav, B. & Duyar, H. (2012). *An Approach to Measure the Quality of Architectural Space*. TC Istanbul Kultur University. Department of Interior Architecture and Environmental Design B.Manav@Iku.Edu.Tr , H.Duyar@Iku.Edu.Tr.
- Masuda, T., & Nisbett, R. E. (2001). Attending holistically versus analytically: Comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology*, 81(5), 922-934.
- Mosadeghrad, A. M. (2014). Factors affecting medical service quality. *Iranian journal of public health*, 43(2), 210. doi: 10.15171/ijhpm.2014.65.
- Mourshed, M. & Zhao, Y. (2012). Healthcare providers' perception of design factors related to physical environments in hospitals. *Journal of Environmental Psychology*, 32(4), 362 - 370.
- Oladejo, E., Umeh, O., & 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*, 5(5), 35-43.
- Parke, B. (2007). *Physical Design Dimension of an Elder Friendly Hospital: An evidence-based practice review undertaken for the Vancouver Island Health Authority*. University of Victoria.
- Pellitteri, G., & Belvedere, F. (2010, June). Characteristics of the hospital buildings: changes, processes and quality. *In Proceedings from 2010 ARCC\_EAAE International Conference on Architectural Research* (pp. 23-26).
- Phiri, M. (2003). *One Patient One Room - Theory and Practice: An Evaluation of the Leeds Nuffield Hospital*. University of Sheffield, School of Architecture.
- Pitt, M., Chotipanich, S., Issarasak, S., Mulholland, K., & Panupattanapong, P. (2016). An examination of facility management, customer satisfaction and service relationship in the Bangkok healthcare system. *Indoor and Built Environment*. 25(3), 442-458.
- Pultar, M. (2000). *A Structured Approach to Cultural Studies of Architectural Space*. Ethics and the Built Environment. Ed. Warwick Fox. London: Routledge.
- Reiling, J. (2007). *Safe by design: Designing safety in health care facilities, processes, and culture*. Oakbrook Terrace: Joint Commission Resources.
- Sherwood, B. (2006). *"Organizing Ourselves: Schema To Build The International Space Architecture Community"* Concluding Address. San Jose, CA: AIAA.
- Suvanajata, R. (2001). *Relations in architectural space: designs and effects in space of the traditional Thai houses and temples* (Doctoral dissertation, University of London).
- Tsai, C. Y., Wang, M. C., Liao, W. T., Lu, J. H., Sun, P. H., Lin, B. Y. J., & Breen, G. M. (2007). Hospital outpatient perceptions of the physical environment of waiting areas: the role of patient characteristics on atmospheric in one academic medical center. *BMC health services research*, 7(1), 198. Doi:

10.1186/1472.

Ullán, A. M., & Belver, M. H. (2006). *Gestión de espacios infantiles hospitalarios*. Sedisa XXI, 2, 24-31.

Ulrich, R., & Zimring, C. (2004). *The role of the physical environment in the hospital of the 21st century: A once in a lifetime opportunity*. Concord, CA: Robert Wood Johnson

Foundation, Center for Health Design.

Wasson, J. H., Johnson, D. J., Benjamin, R., Phillips, J., & MacKenzie, T. A. (2006). Patients report positive impacts of collaborative care. *The Journal of Ambulatory Care Management*, 29(3), 199-206.

