

**ASSESSMENT OF THERAPEUTIC RECREATIONAL SPACES IN  
ORTHOPAEDIC HOSPITALS IN MINNA, NIGER STATE**

**BY**

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**MTech/SET/2017/7459**

**DEPARTMENT ARCHITECTURE, FEDERAL UNIVERSITY OF  
TECHNOLOGY, MINNA**

**FEBRUARY, 2020**

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**A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL FEDERAL  
UNIVERSITY OF TECHNOLOGY, MINNA NIGERIA IN PARTIAL  
FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE  
DEGREE OF MASTER OF TECHNOLOGY IN ARCHITECTURE**

**FEBRUARY, 2020**

## **ABSTRACT**

There is a growing interest about the impact of the physical environment on the recovery process of patients among health care providers and designers. Healthcare settings and their surrounding outdoor spaces are regarded as the most complex and challenging of all public institutions due to the numerous activities carried out within these facilities. “We shape our buildings thereafter our buildings shape us” this notion has been recognised and emphasised by researchers in recent times. The trend now is to have hospital environments that brings patients close to nature so as to enhance their recovery. However, very little attention has been given to incorporating recreational spaces that are amenable in hospital settings as a therapeutic tool that can aid patients with limitations in mobility acquire or maintain skills that will allow them to function optimally in the society. More also, orthopaedic patients often stay longer during recovery depending on the severity of their injury. The aim of this research therefore, is to assess the impact recreational spaces that are amenable in a hospital setting. A descriptive research method was adopted for this study, both quantitative and qualitative data were obtained through reviewing of literatures, the use of observation schedule, questionnaires, and interviews. A total of 150 questionnaires were randomly administered to patients in five (5) purposively selected tertiary hospitals in Northern Nigeria of which 128 were returned. One observation schedule for each hospital while interviews were conducted. The data collected was analysed using SPSS. The results were further presented in table and charts. Findings reveals courtyards 36%, common rooms 23% are the most available recreational spaces, seating areas 29%, plants 27%, and shades 25% are the major attractors to these spaces, patients asserted that gardens 40% and covered porches 35% were located far away from the wards, conveniences 46% was highlighted as the least appealing space with the hospital. The research brings to fore certain recreational spaces such as gardens, courtyards, water bodies, indoor gym, seating areas, walkways, and active sport courts, that can be integrated in the design of health facilities due to the enormous benefits derived from them. Furthermore, these spaces should be located as close as possible to the patients in order to encourage participation. This thesis recommends that orthopaedic hospitals should have healing gardens and other active land and water based sports.

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## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1 Background to Study**

Orthopaedics is a branch of medicine that deals with prevention, correction of bones, muscles and joints disorder (Oliver, 2010). Accidents are part of everyday life; it can only be reduced to a minimal level but may not be completely eradicated. The result of accidents ranges from burns to dislocation, fractures or even death in extreme cases. These injuries or disorders of the skeletal system requires aftermath correction. However not all cases of skeletal disorder result from accidents. Some are caused by congenital anomaly, absence of a limb, or the malformation of one or more limbs. Other causes of orthopaedic impairments may be as a result of degenerative diseases which includes childhood obesity, arthritis and muscular dystrophy. These can result in difficulty in the joint movement and stiffness called contractures that would require patient to seek medical attention from traditional care givers or from a modern healthcare facility.

In Nigeria, as with other developing nations the level of accidents recorded annually still remain relatively high. According to surveys carried out by World Health Organization (WHO) and Federal Road Safety corps (FRSC) both reported an average of 7000 deaths from road accidents in 2014 of which 1098 children excluding 2708 injured victims. Aside Boko Haram crisis, one of the leading causes accounting for violent death in Nigeria is the number of road accidents recorded annually, this highlights the precarious situation commuters find themselves when plying the roads in the country (Chen, 2016). Although, not all accidents result in deaths, some leave victims needing orthopaedic care such as corrections to bones, muscles and joints. The poor state of health care delivery system in Nigeria due the state of affairs such as inadequate supply of professionals, poor distribution of health facilities, over stretching of the few available ones has resulted in a

large proportion of Nigerians especially those in the rural areas not having access affordable health care (Erinoso, 2012). Majority of this populace have had to access other alternative source of health care such as the traditional medicine which is readily accessible and affordable to them. Subsequently this has resulted in continual patronage of traditional care givers despite the advent of modern health care and the educational exposure (Orjiolioke, 2005). In Nigeria, traditional bone setting (TBS) is relatively extensive so much so that it enjoys significant patronage by the indigenous people. However, TBS treatment has its own shortcomings and the outcome of the intervention is usually poor with long time effects on the patient (Dada *et al.*, 2009).

The Eastern part of Nigeria is mainly dominated by the Igbo ethnic group. Traditionally, the tribe is elaborate about its cosmology that connects wellbeing, illness, healing and deviance. According to Nwoko (2009), who stated that in Igbo ideology the belief is that every sickness consists of two main components; the unseen, or spiritual origin and the seen or the physical origins. Consequently, various healers are classified as Dibia under the Igbo therapeutic system. The healer is believed to have the ability to serve the role of a mediator between the invisible and the visible realms. Similarly, the Yoruba healers (babaláwo) are accustomed to playing the role of diviners, engaging the use water based rituals to confront spirits and gods, who are often viewed as principal cause of deviance or madness (Rinne, 2001). Furthermore, Onuminya (2005), opined that among others, the notion that ailments and accidents have spiritual components that ought to be attended to alongside treatment is one among many reasons why TBS treatment still enjoys enormous patronage. However, Epko *et al.* (2005), argues that poverty, superstition and ignorance are the main factors responsible for continues patronage enjoyed by traditional health givers despite complications. Subsequently, Ogunlusi *et al.*, (2007) suggests that both traditional and modern medicine can efficiently coexist

simultaneously while enjoying patronage by patients. Nevertheless, the researcher believes that there are certain knowledge aspects of traditional medicine that cannot be disputed. This explains why different regions in the country pass this vital knowledge down the generational line. Unfortunately, most at times the outcome of their intervention in trauma care frequently results into permanent loss of the limbs, lifelong deformities and sometimes in extreme cases leads to death. Hence, the practice is a relevant issue of public health which requires a thorough study. A thorough study of this practice is therefore an issue of public health importance.

Healthcare facilities and their extended outdoor surrounding are some of the largest and most complex of all public institutions, because of the various activities carried out within this setting. Generally, people tend to be phobic about visiting (Yücel, 2013). Moreover, it is segregated spatially, in the urban layout in people's mind and entered sole in the case of an emergence or only when the need arises (Neducin *et al.*, 2010). However, to soften this public perception it is important to introduce a different design approach away the old philosophy of hospital planning which regards these institutions as a place solely for treatment of ailments (Adams, 2008). However, to eliminate this psychological perception of the sick being segregated and distanced from the public there is need for a more patient centred approach to hospital planning and design with the growing understanding on the impact the physical environment can have on the quality of health care and safety of patients, visitors and staffs. particularly with scenic green areas and more outdoor spaces considered as a supportive extension of the interior areas which set aside for the treatment of patient and have traditionally been prioritized. The environment within the hospital ought to have the basic things that encourage the enjoyment of nature and to promote a healthy life. It should help forget weakness, worries and encourage a positive outlook, everything in it should be serene and happy. No scene of melancholy,



no memorial of mortality should be permitted to intrude (Ulrich, 2002). The increasing interest in research studies all over the world on the benefits of physical surrounds as it affects health and well-being is based on the realization that good indoor and outdoor design do not only procreates functional efficiency, but also strengthen health processes (Dilani, 2001). Furthermore, Gupta *et al.*, (2017) highlight's that The surrounding landscapes of the hospital is deemed not only essential but also of good benefit.

The importance of nature in hospital environment has resulted in renewed interest with research within this scope documenting the fore deal of nature as being able to subside stress, improve healthcare satisfaction and enhance mood (Ananth, 2008). There is, therefore, the need for a patient-centred architectural design of healthcare facilities among landscape architects and other service providers (Reiling, 2006). Patient-centred design (PCD) involves a process were close attention is paid to the design and evaluation of the users of a facility with regards to the outcome of healing processes and the human factors that affects them. The health care designers are required to put in effort as to shaping and reshaping the healing environment, assessing patients need while providing satisfactory healing experiences and achieving a favourable outcomes of perceived service quality (Gutteling *et al.*, 2008).

## **1.2 Statement of the Research Problem**

Orthopaedic patients are often required to stay relative longer recovering in the wards depending on the severity of their injury, there is a glaring lack of recreational spaces (indoor and outdoor) that can aid the patient's recovery. This lack affects health care service delivery in the field orthopaedics in government owned hospitals in Niger Sate.

### **1.3 Aim of the Study**

The aim of the research is to design an orthopaedic hospital that integrates therapeutic recreation within the hospital environment in order to aid in therapeutic healing.

### **1.4 Objectives of the Study**

The objectives of this research work are to;

- i. Assess existing spaces provided for recreational in orthopaedic wards and hospitals.
- ii. Analyse how outdoor recreational spaces influences the recovery rate of its occupants
- iii. Assess behavioural responses to healing gardens amongst patient and employees of the hospital.
- iv. Propose a design that incorporates therapeutic outdoor facilities that are amenable to hospital protocols.

### **1.5 Research Question**

- i. What recreational spaces can be applied in orthopedic hospital to aid recovery of patients.
- ii. How have these recreational spaces been applied in existing orthopedic hospitals.

### **1.6 Scope of the Study**

Orthopaedic hospitals are specialize healthcare settings devoted to the care of diseases and injuries diseases connecting the bones and usually combines these three roles of providing health care delivery, research and education in this field. Orthopaedic cases can be categorised into: congenitals and traumatology. The research covers five (5) of the ten orthopaedic hospitals in northern Nigeria. Cases studies were carried out in these

hospitals with emphasis on recreational spaces, such as the general landscape, relaxation spots, liesure, water features and gardens, its impact on the recovery rate of of patients.

### **1.7 Justification of Study**

Most patients with severe cases of musculo-skeletal injuries or disorder that require therapeutic care during recovery are usually referred to gyms and other facilities (Dada, *et al.*, 2009). Hence, adopting recreational spaces in healthcare settings has proven to have a positive effect on the length of stay of patients during recovery. This however, remains relatively unharnessed due to the limited knowledge on the benefits that can be derived from in cooperating these features in design. The research thus will provide an insight on which recreational spaces has therapeutic values.

This thesis provides a good understanding on ways in which therapeutic recreational spaces can be incorporated in the design of orthopaedic hospitals. Furthermore, this study has contributed to existing knowledge by highlighting the vast impact of therapeutic spaces have on patient recovery and wellbeing. This will serve as a guide in future policy and planning decisions concerning the subsequent orthopaedic hospital designs.

### **1.9 Study Area of the Research**

The location of the study area for this research work is within Minna metropolis which serves as the capital city of Niger state, a state situated in the North central geo-polit ical region of Nigeria (Figure 1.1). Niger State is on latitude 80° to 11°30' North and Longitude 03° 30' to 07° 40' East.



Figure 1.1: Nigeria Showing Niger state.  
 (Source: [www.nationsonline.org](http://www.nationsonline.org))

Notably, Niger state has towards its East, the Federal Capital Territory and a border with the Republic of Benin in the direction of its West. Niger State has an total estimated land mass covering about 74,244km<sup>2</sup> ([www.nigerstate.gov.ng](http://www.nigerstate.gov.ng)). There is a distinct dry and wet season and annual rainfall between 1,200mm and 1,600mm from the north to the south of the state, the highest rate of rainfall is estimated at 150 days in the northern regions and approximately 120 days in the south of the state. The temperature of Minna is hottest between March and June, while the coolest periods are usually in December and January with a maximum and minimum temperature of 42°C and 22°C respectively ([www.nigerstate.gov.ng](http://www.nigerstate.gov.ng))

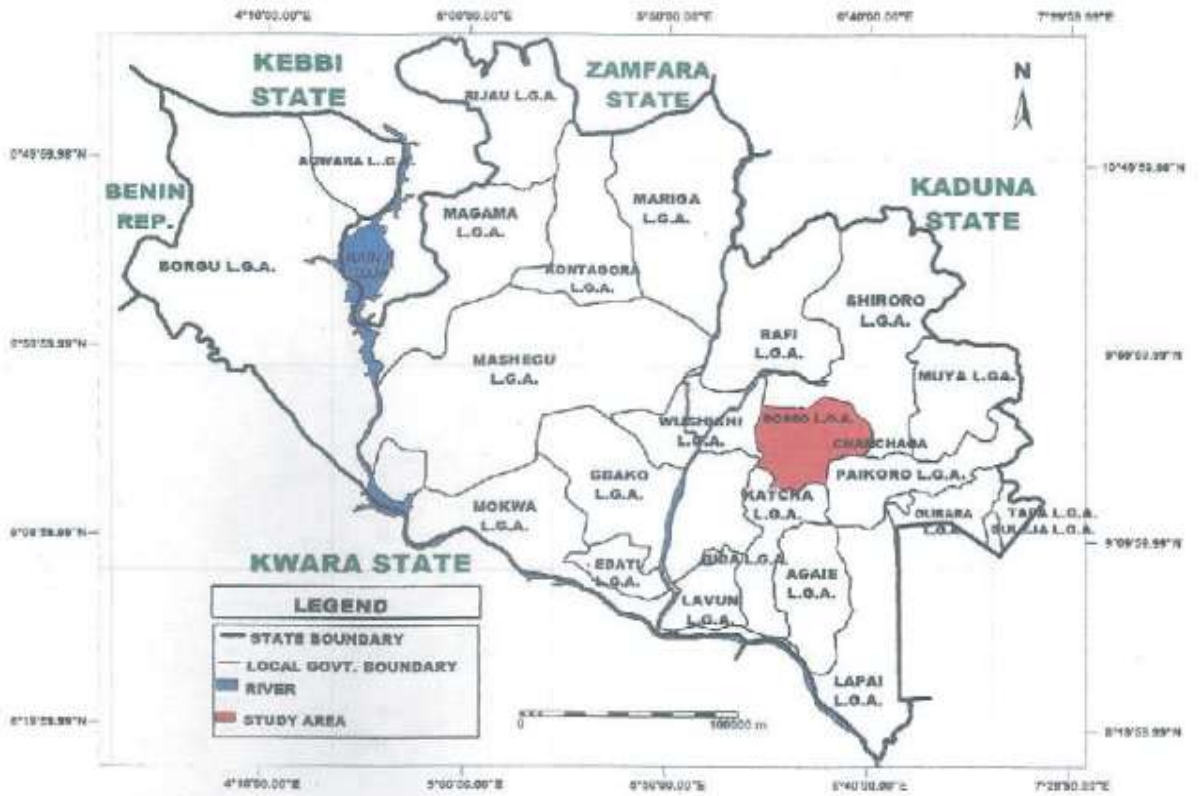


Figure 1.2: Niger State showing the Study Area  
 (Source: Ministry of Lands and Housing Minna)

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 The Concept of Hospitals and its Development Over Time

The word hospital is a Latin term derived from the word “*hospitalis*” which relates with guest and their treatment. Early use of the word highlights institutions as a place for both healing, the poor or weary travellers (Carter *et al.*, 2007). The Idea of healing spaces dates back to the ancient Greek era, when temples dedicated to gods served as places where people afflicted with infirmities go to, hopeful of having dreams that will reveal the cures of their ailment. The *Epidaurus* sanctuary built for the god *Asclepius* is one of such examples (Ananth, 2008). However, the notion of “therapeutic landscape” was introduced first by medical geographers, referring to places that possess noteworthy natural or artificial features capable of enhancing wellbeing and health (Velarde *et al.*, 2007). For centuries, ideas have evolved about the positive effects the natural surroundings, wild nature as well as enclosed gardens can have on man’s health and well-being by spending time in it. (Gerlach-Spriggs *et al.*, 1998; Marcus and Barnes, 1999).

Literature author such Jiang (2013), highlights how different cultures viewed nature as a “healer”. In Europe for example during the middle ages, gardens for sick and monastic hospitals were castellated with greenery in the earnest wish for the spiritual transformation of patients. In 820 AD, the Abbey hospital was built in Switzerland, subsequently followed by the Hotel Dieu of Paris built in 820 A.D (Ajayi, 1999). The first hospital to be established in the United States of America was sited in Philadelphia called the Pennsylvania Hospital in 1751. Although other U.S. hospitals were created in the 1700s, people with illnesses were treated in their place of abode by neighbours and family friends well into 1800s. Post-civil war witnessed a lot of changes in rate establishment of these centres. The high number of casualty from the war resulted

in the rapid increase in the amount of hospitals that were built. Towards the tail end of the war in 1865, more than 200 hospitals had been established (Mas'ud, 1983). The hospital planning based on scientific and functional correlation began in the 18<sup>th</sup> up until the early years of the 19<sup>th</sup> century notably with the introduction of the pavilion type of plan which segregates patients into smaller groups in order to enhance the reach of ventilation and daylight (Thomas, 2007).

The 20th century witnessed a lot of technological advancement both in the field of medicine and building construction. The realization of the tendencies of nature having a restorative benefit began to disappear due to the shift in prominence of green areas and creating therapeutic environments in hospital designs to increasing the efficiency of staffs and providing state of the art equipment. Thus, during the era of modern movement, hospitals erected had similar resemblance to high-rise office buildings, lots of parking spaces replacing the traditional gardens of the past (Neducin *et al.*, 2010).

Although many research works carried out long before now about the significance of the physical environment on health and well-being of people may possibly have been conducted in isolation by diverse research disciplines. Although, Florence Nightingale in Notes on Nursing in 1860 claims to have been the first to have concisely written the therapeutic effects of nature to improve patient's recovery, she opined that visual connections to nature, such as viewing natural scenes through window openings and having bedside flowers, aided patient's recovery (Nightingale, 1863). However, Ulrich argues that measurable effects of natural surrounding influence the health of occupants was first reported and subsequently published in 1984 (Ulrich, 1984). Some other scholars have attested to the benefit derived from direct contact with such an environment. Every garden is said to have a healing effect even if was not conceptualised in its initial design

intentions (Marcus and Barnes 1999; Dargan *et al.*, 2007; Ji, 2010). These studies were soon backed up by others, now constituting the bedrock for the theories of landscape architects. Today, the notion about of healing has connotes different meanings some are explicitly concrete, others are more spiritual and mental. The word springs up mind many immediate images, but these pictures have evolved since this writer began this research work. Initially the conceptions included thoughts, feelings of fears when the thought of the word hospital comes to mind (Ulrich *et al.*, 2004). Others perception implies good hygiene, medicine, consultation rooms, waiting for nurses, filling of menus, wheelchairs, diagnoses and tests. For others the allergy of hospital smell, the site of patients in pain, sound of hard shoes walking down the corridor with urgency, pacing, waiting, and praying.

## **2.2 Healthcare Institutions and their Functions**

According to World Health Organization (WHO), defined Hospitals as health care institutions with trained medical and supportive professional staff, most times consisting of inpatient facilities, that renders services 24 hours per day, 7 days per week Basis. They offer a varying range of acute, convalescent and terminal care using diagnostic and curative services. Usually it has a staff of doctors and nurses to aid in the treatment of patients. Other definitions include a building or facilities with a medical staff structure which is organized used, and operated with the aim of providing health care, diagnostic, therapeutic services, and continuous nursing care extensively to both out-patients and inpatients were such services are rendered under close monitoring and directives of physicians (Reiling, 2006).



### **2.2.1 The state of an individual's health, wellness, and disability**

The Medical Model has been what historically drove the primary view of health, wellness, and disability within recreation. This system, considers health to be the absence of disease, illness, or disability. The model defines disease as an organism's processes and mechanisms being unable to adapt to stimuli or stresses, whereas illness is defined as a state of being in which a person's ability to survive or maintain quality of life is decreased due to an imbalance of resources (Stumbo and Peterson, 2009). A disability is defined as a physical or mental impairment that may limit one's functioning in one or more major areas. The World Health Organization defines health as a state of complete well-being with regard to the physical, mental, and social domains (Carter and Vanandel, 2011).

### **2.2.2 Hospital and its landscape**

Plants and gardens have for quite some time been associated with the way toward recuperating. The earliest civilizations, from Alexandria and Ancient Egypt through to Renaissance Europe, recognize the remedial effects of plants. As indicated by the American Horticultural Therapy Affiliation (2007) Ancient Egyptian physicians endorsed strolls in gardens for patients who were experiencing mental unsettling influence, knowledge of the curative power of plants was the start of therapeutic intelligence and hence, the soonest physician were botanists (Farida, 2013). It is the believe of some horticulture historians that horticulture began in Egyptian temple gardens where the cultivation of fruit trees, palm, vines and grapes took place. Further to this, Silverman (2000), suggests that the first documented application of horticulture in a treatment context happened in ancient Egypt, when court physicians recommended strolls in palace gardens for royalty who were rationally disturbed. Likewise, in the 19<sup>th</sup> century, creating speculations on the spread of disease, for example, the green or miasma theories which fought that air expected to flow uninhibitedly inside healing centres with a specific

end goal to keep the spread of infections, enormously impacted hospital design. The nightingale ward, named after medical caretaker and general wellbeing reformer Florence Nightingale, developed as the favoured outline for healing facilities, where the patient beds were contained in one vast open region or pavilion, all around ventilated with windows which watched out finished the grounds outside. In the early twentieth century, good nursing practice, in keeping with this theory, directed that patients should have been moved to sun porches and rooftops or a treatment regimen of daylight and natural air. During the 19<sup>th</sup> century, emerging theories on the proliferation of diseases, such as theory like the green or miasma theory contends that it is necessary for air to move freely within hospitals, this is required to prevent the spread of infection, the idea is what has to a great extent influenced the design of hospital. The nightingale ward is referenced after renowned nurse Florence Nightingale, a public health reformer who suggested that the most ideal design for hospital wards should be having the beds of the patient are stationed in one large pavilion or open area, adequately ventilated with openings which provides visuals of the grounds outside (Nightingale, 1863).

In the early decades of the 20<sup>th</sup> century witnessed good nursing practices, in conforming with this philosophy, sun porches, courtyards and roofs gardens were dictated for patients to be moved to for treatment regimen of sunshine and fresh air. The present design of hospital landscapes is planned to reduce the stress of health medical personnel and the chances of them contaminating the overall system while as a whole trying to maximize the effectiveness of the system. The time required by medical personals and patients to move between the departments or units as well as within the hospital is facilitated and minimized. Landscapes are also designed to accommodate care-givers, patients and staff, while space for waste disposal and collection is provided for in the design. However, more often than not the reality is that, as hospitals begins to grow, the need for more

spaces emerges, new sections, department and utilitarian units are added to the existing structures depending on how the finances and needs dictates. Hence green spaces are converted for this use. More recently, hospitals are trying to re-establish designs which takes into cognisance the psychological needs of its patients by ensuring that the patients enjoy more natural ventilation, better visual connection, and a variety of colour schemes of plants. These concepts can be referenced back to the 19<sup>th</sup> century, when they were employed by architects to initiate hospital designs based on the idea of providing fresh air that improves the quality of service rendered within the building with regards to the believe that access to nature has some 'healing powers'. Another notable change is the significant shift from the ward-based system to one in which individual accommodation is provided for one or two patient depending on the set up. In terms of efficiency and effectiveness of supervision the ward system is considered to be better for medical staff, nevertheless it is more stressful for patients allowing for little or no privacy. The major factor affecting the idea of providing individual room for all the patient is the high cost of building and the maintenance of such hospitals. As a result of this, hospitals charge comparatively higher for private rooms which in no small way has caused an increase in medical bill for patients who intend to enjoy such privileges.



**Figure 1: Flow Diagram of Various Units in a Modern Healthcare Facility.**  
 (Source: Thomas, 2006).

### **2.3 Administrative and Functional Units of a Modern Healthcare Facilities**

Present-day Hospitals consists a wide scope of administrative and functional units that incorporates diagnostic and treatment capacities, such as; radiology or imaging, clinical laboratories, surgical wards, theatres, restaurants, laundry accident and emergency rooms. This variety is reflected in the broadness and explicitness of guidelines, codes, and protocols that governs the establishment and running of hospitals (Adams 2008). The wide- range and continually evolving functions of a hospital, includes the profoundly intertwined mechanical, electrical, and communications systems, which requires expertise for its operation. It is difficult for an individual to have complete knowledge, which is the reason why experienced professionals in the building industry are assembled and required to assume significant roles in hospital planning and design. Notwithstanding the wide scope of administrations that must be accommodated, the hospitals ought to serve and support other facility users. In an ideal situation, there is need for various stake holders to contribute immensely from the conceptual stage to the design and even the construction stage. The design process should entertain direct contribution from the owner be it the government or the private and also from key medical or clinical staffs simultaneously at opportune time (Ananth, 2008). The architect likewise must advocate for the patients, guests, auxiliary staffs, volunteers, and other service providers to contribute to the process as this is not usually the case. A good design and configuration incorporates the prerequisites spatial requirements of its various users.

### **2.4 Types of Healthcare Systems in Nigeria**

Health care delivery in Nigeria is categories two main groups comprising of the government and non-governmental organizations. The governments consist of the Federal, State and Local Governments while the non-governmental organisations (NGOs) includes voluntary agencies, private individuals, religious bodies, and civic communities

all these form part of health care delivery sector. The two major bodies execute health care delivery in Nigeria within three strata of levels which is the primary, secondary and tertiary levels (Ajayi, 1999).

#### **2.4.1 Primary level of healthcare delivery**

According to Osain (2011), the cadres of health institutions involved at this level are primary health centres, clinics, maternity homes and dispensaries. Basically, the local government are mainly involved and the centres are situated in remote and rural areas. At this level various programmes are initiated such as family planning, mal nutrition control. Health enlightenment and education, communicable disease control, environmental Sanitation, child immunization, maternal and health sensitization.

#### **2.4.2 Secondary level of healthcare delivery**

These level of facilities are mainly situated in the sub-urban areas to provide care for a larger population. It consists of general hospitals and comprehensive health care centres where services are rendered by health professionals alongside medical specialists such as neurologists, cardiologists, gynaecologists and dermatologists. The services include acute care and medical imaging.

#### **2.4.3 Tertiary level of healthcare delivery**

Health institutions classified under these level provides a trilogy of functions which includes education, research and healthcare delivery. These are specialized hospitals that handle cases that cannot be treated or referrals from both the primary and secondary health care centres. Teaching and specialist hospital fall under this third tier, specifically devoted to treating one or a group of related cases. In the Nigeria, the state and federal government are involved at the three levels in providing the infrastructure, equipping the hospital for day today running and even its maintenance when required (Musa, 2011).

**Table 2.4: Tertiary Healthcare and Specialist Hospitals in Northern Nigeria.**

<b>State</b>	<b>Hospital Name</b>	<b>Type of Treatment</b>
Abuja, F.C.T	(a) University of Abuja Teaching Hospital, Gwagwalada.	General and referred cases
	(b) National Hospital, Abuja	
Adamawa	(a) Federal Medical Centre, Yola	General
Bauchi	(a) Federal Medical Centre, Azare	General
	(b) Abubakar Tafawa Balewa University Teaching Hospital.	General
Benue	(a) Federal Medical Centre, Makurdi	General
Borno	(a) University of Maiduguri Teaching Hospital (UMTH)	General
	(b) Federal Neuro-Psychiatric Hospital (FNPH) Maiduguri	General
Jigawa	(a) Federal Medical Centre (FMC) Birnin Kudu	General and referred cases
Kaduna	(b) Barau Dikko Specialist Hospital, Kaduna	General,
	(c) National Eye Centre, Kaduna.	Orthopaedic cases
	(d) Ahmadu Bello University Teaching Hospital, Zaria	General
		Orthopaedic
Kano	(a) National Orthopaedic Hospital, Dala, Kano	Orthopaedic
	(b) Murtala Mohammed Specialist Hospital, Kano	General
	(c) Infectious Disease Hospital, Kano	Infectious Disease
Katsina	(a) Federal Medical Center, Katsina	General
Kogi	(a) Federal Medical Centre, Lokoja	General
Kwara	(a) University of Ilorin Teaching Hospital, Ilorin	General
Niger	(a) Federal Medical Centre, Bida	General
	(b) Ibrahim Badamasi Babangida Specialist Hospital	
Plateau	(a) Jos University Teaching Hospital, Jos	General and referred cases
Sokoto	(a) Federal Neuro-Psychiatric Centre, Kware	Brain Psychiatric
	(b) Usmanu Danfodio University Teaching Hospital, Sokoto	General

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**Source: Author, (2019)**

## **2.5 Typology of Hospital Outdoor Spaces**

There are several spaces that constitutes the hospital outdoor, these ranges in size, location, orientation, functions carried out within and the special configuration. Below are the major spaces that make up the hospital outdoor spaces.

### **2.5.1 General green areas and setbacks**

These consists of soft landscaped areas in-between hospital structures connecting various sections such as buildings and walkways are basically used to provide aesthetics to the layout, and serve as buffer zones between the street and the hospital building. Routine maintenance is required to keep them pleasing, hence it is cost intensive to maintain (Yucel, 2013).

### **2.5.2 Courtyards in hospitals**

Courtyards are the focal and regularly utilized spaces in a healing facilities on account of their vicinity to the dining zone; they have a tendency to be utilized more by guests and patients if they are easily visible, and ought to be adequately expansive to counteract stuffing. As emphasized by Velarde *et al.*, (2009) in sitting courtyards for therapeutic benefits that can be derived from them, key factors need to be considered such as; its size, user group age, sex, and sociocultural identity of the intended occupants, the spatial configuration, seating arrangement. The features of the courtyard include; landscaped green areas, water bodies, trees, shrubs, flowerbeds and moveable seats; due to consideration privacy, security, restrictions as well as aesthetics, it may be necessary to fence this area. These features enhance courtyards to be used as a place for recreation and meditation (Zhao *et al.*, 2009). Green zones between structures, principally utilized for pausing and eating in, interface the design with strolling ways; in any case, they might be costly to keep up.

### 2.5.3 Recuperating gardens in hospitals

Healing gardens which fill in as protected and thoughtful situated for mending and recovery dates back to the medieval period, and have customarily been highlights of healing centres, hospices, restoration focuses, and nursing homes (Gerlach-Spriggs, *et al.* 2014.) The extensive variety of exercises identified with mending greenery enclosures might be uninvolved or dynamic: taking a gander at the garden from a window, sitting, eating perusing, doing printed material or sleeping in the garden, petition and contemplation, strolling to a favoured spot, planting, exercise and games, and youngsters' play (Marcus, 2017). The patio nurseries are helpful for push alleviation, easing physical side effects, and upgrading the sentiment of prosperity of healing centre staffs and patients.



**Figure 2.5: Outdoor Garden with Different Verity of Plants**  
(Source: [www.gardenconservancy.org](http://www.gardenconservancy.org))

Furthermore, Franklin (2013), contends that stress levels among patients have been appeared to diminish when they are within the sight of plants, blossoms, and water includes and additionally when they are occupied with cultivating. In the Child and Adolescent Mental Health Unit at Great Ormond Street Hospital, developing vegetables has been believed to have helpful incentive for youngsters with dietary issues; and, as



specified prior, blossom and cutting greenery enclosures are being used for plant treatment at London's Bow Centre. Fruitful recuperating gardens make utilization of certain key outline standards (Mitrione and Larson, 2017).

#### **2.5.4 Main entrance porches and plazas**

These spaces consist of shades or covered porches, a zone where vehicles can get or drop off patients, sitting territories, signs with bearings, a letter box, pay phone, and emergency vehicle inlet. These open air zones, which are normally paved and finished, ought to permit easy access for wheelchairs users and walkers. The shades from blossoming trees or spreading evergreens should be incorporated around these entrance bearing in mind potential size of the tree (Zhao *et al.*, 2009). A plaza should have shaded seating zones designed with plants, shaded bushes and ground spread, and maybe a water highlight. Since these zones are to a great extent paved, finishing and cultivating expenses of maintain the green areas will be low.

#### **2.5.5 Rooftop garden and relaxation areas**

This garden is usually situated at the top of a hospital building as the name implies consisting of both soft and hard landscape elements. The components it is contained (plants and seating) and the surface complete are intended to limit perception from higher structures ignoring it. Rooftop porches are sometimes excessively left uncovered, making it vulnerable to wind, warmth or shade and therefore due consideration should be taken in choosing their location (Vapaa, 2012). Gardens situated on rooftops are outwardly appealing, allowing patients to watch out from their rooms and have a consoling perspective on grass, paved stones, seats and individuals, as opposed to roofing material or medical equipment. Rooftop gardens enables significant saving of energy that can over time more than redress, for the expenses of structure, structure, waterproofing, and

maintenance of the landscape. Additionally, they limit the ecological effect of emissions from the health care facility (Ulrich *et al.*, 2004).

#### **2.5.6. Parking lots in hospitals.**

These spaces cover a large percentage of the hospital outdoor space. Adequate provision should be made to cater for patients, staffs and visitors parking. Usually spaces are reserved for staffs at the rear of the hospitals to facilitated easy movement in and out of the premise. This is possible where there is no space restriction (Kunders, 2008). The location of parking areas ought to have vividly clear with directional signage for human and vehicular movements, placing restrictions as and where it is required for visitors and patients unfamiliar with the environment. More also, proper consideration should be given to wheelchair, crutches and prop users.



**Figure 2.5.1: Semi-Covered Patio within a Garden with Variety of Colored Plants. (Source: Hartig and Marcus, 2006).**

Patients' feeling of well-being is improved by delicate scenes, so plant material ought to be overwhelming and hardscaping diminished to a base: trees, bushes and blooms should make up a huge lump of the garden, with the walkways and squares making up the rest (Hartig and Marcus, 2006).

## **2.6 Hospital Indoor Spaces**

The interior designer assumes a noteworthy job in this push to create a therapeutic environment. The interior of an hospital should help support the main aim of the establishment and its patient profile. The varying demography of the patient's profile will decide how much the inside plan should address aging, loss of visual sharpness, other physical and mental disabilities (Musa, 2011).

### **2.6.1 Design Consideration for creating a therapeutic interior**

In creating a therapeutic interior in a healthcare setting there are several factors that needs to be put into consideration such should include choice of material, components of the building, accessibility, circulation control and restrictions all these combine to create a therapeutic interior for the occupants (Mitrione and Larson, 2017)

### **2.6.2 Material selection and specification**

- i. The use of recognizable and culturally important materials is usually adopted where ever it is consistent with sanitation and other functional needs.
- ii. Various cheerful colours and textures, can be used to create a more enabling environment however, comparatively there are inappropriate colours that patients, visitors, and staffs find unappealing. Such colours can be unwelcoming to the occupants of the facility (Marcus, 2010).
- iii. Allowing ample natural light where feasible and Providing perspective views of the outdoors from each patients bed, more also from anywhere else as much as possible. Nevertheless, where this is not provided photograph of natural scenes painting on the wall can be employed as they are helpful where outdoor views are not accessible (Marcus, 2010).

### **2.6.3 Finishing for cleanliness and sanitation**

Hospitals should be easy to clean and maintain. This is encouraged by:

- i. The use of appropriate and durable finishes for each functional space, special materials, finishes, and details are provided for spaces which are to be kept sterile, such as integral cove base.
- ii. The doorframes, casework and finish transition are carefully selected to avoid difficult to remove stains.
- iii. The provision and location housekeeping spaces ought to be duly considered.
- iv. Wastes management channels and routes should be differentiated from the access provide for restaurant and other sensitive areas such as the I.C.U sections keeping them away from the sight of patients (Kunders, 2008).

### **2.6.5 Accessibility in and around the hospital premise**

- i. In order to hence accessibility, there is need for an efficient "way-finding" process in the hospital. Patients and guests should it easy to identify their location, where they are, where they are heading, and how to arrive there and return back. Building elements, surface colour, texture, pattern and colour should all give clues, as well as artwork and signage (Gupta *et al.*, 2007).
- ii. The walkways, passages and corridors should be wide enough to allow for easy locomotion from and between the wards. Patients with slow rate of adaptation to darkness and brightness, hence the doors are made of glasses to make their presence easily visible (Kunders, 2008).

### **2.6.6 The need to provide controlled circulation**

A hospital usually consists of complex structures with interconnected systems that necessitates incessant traffic of individuals and goods. There should be control of the

movement. The general outpatient's areas such as the visiting, diagnostic and treatment areas are separated from the functional areas of the inpatient (Osain, 2011).

- i. The access routes for outpatient are clearly defined without any obstruction. The visitors should be provided with easy and direct access to the treatment area or wards of the patients without passing through other functional areas.
- ii. Furthermore, it is advisable to segregate visitors and patient from mechanical or electrical areas or floors.
- iv. Transfer of cadavers to and from the morgue should be out the eye-view of guests and patients. The service elevators are useful in supply food, medical items and maintenance services across the vertical length of the building as applicable (Reiling, 2006).

## **2.7 Overview of Physio Therapy**

Occupational therapy and physio-therapy, recreational music, recreational art, and nature therapy are subdivisions under recreational therapy. Therapeutic recreation is a process that uses a variety of strategies such as instruction, different forms of entertainment to physically, psychologically and intellectually empower people with such constraints to get or keep up with their natural knack to ensure they continue learning and practices that will enable them function independently, work autonomously with minimal measure of help and take an interest subsequently in the society. These services are rendered by trained professionals in clinical and community settings (Therapeutic Recreation Ontario, 2016). Physical Therapy is a \$29billion industry according to IBIS World Industry Report (2015), consisting of outpatient rehabilitative facilities (ORF) and inpatient rehabilitative facilities (IRF) offering physical, occupational and speech pathology services. ORFs constitute the lion's share of the rehabilitation market generating annual revenues of \$19billion and this sector is projected to grow at an annual rate of +5% over the next five

years (U.S. Physical Therapy industry overview). The sector concerned with the rehabilitation of the outpatient is mainly subdivided into three major players who control approximately 8,3% of the market share.

### **2.7.1 Exercise based therapy**

Exercise Therapy is an orderly arranged physical activities planned and suggested for specific healing targets. Its inspiration is to progress in the direction of the recovery of typical musculoskeletal limit or to reduce torment and underneath the site of harm brought about by disorders or wounds through neuro reconsidered guidance, step getting ready and helpful activities. It is exceedingly tedious and raised in nature, requiring time and responsibility regarding the client to empower neuroplasticity. The treatment is given by specialists with instructive foundation in exercise science, practice physiology, or other relative degree. Fortunately, enjoyable exercise activity has also been associated with emotional well-being (Buckworth and Dishman, 2002).

Psychosocially, isolation and unexpected changes in environment could be especially relevant to depressed mood. The opinion expressed by Michael *et al.* (2017) reveals that married couples often share recreational activity with each other. Loss of spouse would then discourage widows to continue recreational activities, which further limit the positive enjoyment for widows at old age. The loss of mobility further decreases self-esteem to carry out recreational activities (Michael *et al.*, 2017). A person may experience chronic stress when exposed frequently or continually to acute stressors (Smyth *et al.*, 2013).

## **2.8 Therapeutic Effects of Music**

One of the accent forms of healing familiar to humans is sound, it is believed to be able influence patients and hospital caregivers distinctively in different ways. Music therapy

(MT) amongst others is a branch of health profession, used to assist patient improve their functional outcomes and psychosocial needs in a rehabilitation setting (Levitin, 2013). The helpful impacts of music have been shown to incorporate inspiring a scope of emotional and physiological reactions including, however not restricted to, excitement, disposition, and motor response including respiratory examples. Studies have observed tuning in to persuasive music to be compelling as far as moderating the physical condition of patients with incapacities, including stroke, Parkinson's ailment, Tourette disorder, dementia and mental issues (Hochberg *et al.*, 2012). The remedial impacts of music have been exhibited to incorporate bringing out a scope of passionate and physiological reactions including, yet not constrained to, excitement, state of mind, and engine reaction including respiratory examples such as; the effect of music therapy as a tool for dementia care used for patients with Alzheimer's infection (AD) is particularly visible. Music modifies the distinctive segments of the illness through tactile, subjective, emotional, conduct and social impacts. In 2008, a post hoc analysis was carried out to determine to what extent can musical therapy influence the length of stay LOS of patients with orthopaedic conditions undergoing rehabilitation. The study investigation was slanted to check if any distinction existed in the length of stay between patients who received music therapy services versus those who did not (Heather, 2007). The result shows that the mean LOS for the control group was less although not significantly. Relaxing music gives extraordinary advantages to clinicians and patient alike, its application in clinical settings have the ability of basically decreasing apprehension, stress, heart pulses, circulatory strain and blood pressure in patients (Daniel, 2016). The benefits of making a supportive outdoor condition are interchangeable, yet they for most part alluded to the proportions of patients' ailments or indicators of providing quality health.

They are as follow; discernible medical indications of progress, emotional measures, such as reported, detailed fulfilment of patients, guests and staff as well as monetary advantages.

## **2.9 Chromo-therapy and the use of colour for healing**

Chromo-therapy is a strategy that adopts a range spectrum to cure diseases. It has been in use for decades now, over the years it has been used to cure diseases. Over time, scientists have attempted to find the basic logical it (Samina *et al.*, 2005).



**Figure 2.9: Variety of Bright Flowers against a Brick Building Background.**  
(Source: [www.gardenconservancy.org](http://www.gardenconservancy.org))

Researchers have basically investigated the use of chromo-therapy, this has led to a considerable progress being achieved in this area. However, without adequate quantitative examination, the no logical conclusion has not been reached has to how colours impact recovery and wellbeing (Ebbesen, 2003).

### **2.9.2 The perception of colours**

There colours that are regarded as warm other are cool. Certain colours like orange, yellow and red are warm colours that draws attention and evokes excitement they represent the sun fire and heat. Blue, and Blue are called cool colours, they depict the sky



forest and water. Colours have effect of people that is why psychologist have long examined (Matthew *et al.*, 2014). In designing restaurant warm colours are used evoke excitement among costumers while cool colours are used in hospital to create an atmosphere that relaxing and calm (Coclivo, 1999).

## **CHAPTER THREE**

### **3.0 METHODOLOGY**

Research method is a systematically approach that is adopted in solving a research problem by intelligently embracing various procedures and system. It is additionally the manner by in which information is gathered in a research work. The choice of data collection in research is of is critical in order to assemble relevant information. Consequently, this chapter discusses the research design, development of measurements, sampling and data collection procedure which were employed in the study. The researcher's ultimate objective is to develop prototypical hospital design that in-cooperates healing gardens, leisure and sports related facilities that are amenable to hospital protocols for orthopaedic patients.

#### **3.1 Research Method**

Since it is imperative that the type and mode of data collected affect and to a large extent determine the outcome of a research. Hence in carrying out this work both quantitative and qualitative tools were adopted in data collection and presentation. This research was carried out in five out of the total number of ten tertiary hospitals in Northern Nigeria namely; The National Hospital, Abuja (NHA), The Barau Dikko Specialist Hospital Kaduna (BDSH), Gen. Amadi Rimi Orthopaedic and Specialist Hospital Katsina (GAROS), The National Orthopaedic Hospital Dala Kano. (NOHDK), The Ahmadu Bello Teaching Hospital Zaria (ABUTH). The stratified random sampling was used for selection. The aforementioned hospitals from this region were categorized into three according to the classification of Nigeria healthcare system which is the primary, secondary and tertiary healthcare delivery system.

## **3.2 Sources of Data**

There are two noteworthy sources from which data can be gathered about a circumstance, issue or phenomenon when undertaking a project work. On this note, the sources from which the needed have to be gathered from is as paramount as the data to be gathered itself. Nonetheless, in some cases the data required is already available and needs only to be accessed. It is in view of these two approaches, data sources can be ordered into these two groups namely; Primary and Secondary Sources.

### **3.2.1 Primary data**

In carrying out this research Information was gathered first hand from primary sources using observation schedules, interviews and questionnaire from employees/staff and patients by the researcher. Data gathered include the behaviour of patients in recreational space, their preferences between indoor and outdoor spaces in an orthopaedic hospital. One amongst other merit of obtaining primary data is that only relevant information is obtained from the source. More also terms were vividly defined as much as possible, hence eliminating ambiguity. The reason being that these data was collected from actual people on whom have experienced the phenomenon under study. Therefore, it is an advantage for the study because exact information will be obtained. Other factors that necessitated the use of primary source of data are:

- i- The nature of the data: Very important issues such as the means of obtaining the data, source of data, the contacting source unit and gravity of the data, were given much consideration for the purpose of this study.
- ii- Nature of the problem under consideration seek for the collection of facts and figures relating to the variables under the study. Therefore, the primary data collected are from the observation schedule, questionnaires and interview conducted on the patients and staffs consequently.

### **3.2.2 Secondary data**

On the other hand, any data gathered from sources such as journals, articles, magazines, the internet, books and periodicals are all classified to be from secondary sources. For example, the use of census data to obtain information on the age–sex structure of patient population, the use of hospital records to find out the nature of injuries predominate amongst patients, and use of organization’s records to deduced average duration of stay are all secondary data. In summary, primary sources were used to obtain first-hand information while secondary sources provided second-hand data.

### **3.3 Method of Data Collection**

In the course of conducting out this research work a number of data collection tools where employed such as personal observation, questionnaire, and structured interview with preference given to sources such as patients and medical staffs from whom direct information were acquired. Their responses were subsequently noted down for further analysis which was used in accomplishing the aim of this study.

#### **3.3.1 Case study**

This more or less involves visiting existing hospitals consisting a total of five (5) tertiary hospital. Two (2) foreign hospitals were also assessed as case studies for this study. Taking of pictures, notes and sometimes drawing sketches were the activities undertaken during case studies to show existing features of facilities provided in the orthopaedic hospitals.

#### **3.3.2 Observation schedule**

Observation is a decisive, efficient and peculiar method of engaging in visual and aural examination of an interaction or phenomenon as it takes place. There are numerous circumstances which necessitated the use of visual examination as a tool for data

collection in this research. The items that were assessed includes; Existing recreational spaces provided in the hospitals, the behavioural trait of patients along walkways, courtyards, and relaxation spots, the number of indoor plants, openings with landscape view. Observation schedule was considered suitable because in these instances where exact data can't be collated by questioning, due to respondents either not been cooperative or are unaware of the answers Hence, it is sometimes hard for target respondent to disconnect themselves from the interaction. In summary, when subjects are involved also in the interaction and objective information cannot be provided about it, the best tool for gathering this kind of data is the use of observation schedule (Chosco, *et al.* 2010).

### **3.3.3 The questionnaire**

These comprises of a list of noted questions, of which the answers are written down by respondents. The questions are read and interpreted by the respondents, the answers are then written down. In a sequence to assess the impacts of recreational spaces on patient's recovery a total of 150 questionnaires were administered to patients in the five selected hospitals in Northern Nigeria. The group of the respondents were stratified on the basis of gender, age and educational level. A total of 128 questionnaires were answered properly and returned. The main contrast between an interview schedule and a questionnaire is that, the person conducting the interview through asking of questions (if and when necessary, explains them) is also the one recording the responses on an interview schedule while in the latter, the responses are recorded by the interviewees themselves. This difference is crucial and relevant in relaying the respective merits and demerits of these methods. Nevertheless, due to existing hospital protocols and restrictions, questionnaires are considered best in gathering data about their perception on recreational spaces provided.

### **3.3.4 Interviews**

Interviews are orally administered questionnaire with a set of predetermined questions having little or no variation and mostly void of follow-up inquiries that need further expatiation. Research interviews can be classified into three main types namely; unstructured, semi-structured and structured. Relatively, they are faster and easier to administer at the point when explanation of specific inquiries are required or if it has being anticipated that there will educational or numeracy issues with the respondents (Silverman, 2000). Their utilization was consequently, for most part considered where significant 'depth' is required, or where virtually nothing is known about the subject area. Semi-structured interview format was being adopted for this research because of the qualitative in-depth responses required from staffs (doctors and nurses). This method gives the researcher some direction on what to discuss, which will be useful. The adaptability of this approach, especially when contrasted with structured interview is that, it takes into account the discovery or elaboration of further information that is of importance to the researcher but may not have been previously considered or was overlooked initially by the researcher.

### **3.4 Population of the Study**

The study population consist of patients and staff of purposively selected tertiary health care centres within the northern geopolitical zone of Nigeria. The five (5) hospitals are namely: The Hospital of the University of Abuja, Gwagwalada, A.B.U. Teaching Hospital Kaduna, National Orthopaedic Hospital, Kano, General Amadi Rimi Orthopaedic and Specialist Hospital Katsina.

### **3.5 Sample Size**

Sampling is defined as the process of segmentation of population chosen for examination. It also includes a subset of the population. In line with Frankfort and Nachimias (1992), who recommended that so as to secure representative responses, the size of the patients sample as for this situation, it ought not fall beneath the delegate size decided from statistical estimation theory, which depends on the level of certainty that the scientist wishes to utilize. For the purpose of this study, how large sample of patients would be was determined by assuming the confidence to be 95% percent such that although the whole population does was not survey yet the probable error does not go above 0.05. According to the suggestion of Frankfort-Nachimias and Nachimias the mode of determination.

### **3.6 Variables of the Study**

A concept or perception that can be estimated and will subsequently take on different values is called a variable. The process of developing variables includes highlighting and assessing recreational spaces with therapeutic values in orthopaedic hospitals. As opined by Mogbo (2003) variable should conform with the character of the scale of their measurement and purpose in the studies that they are enlisted. As with this study the impact of recreational spaces on patient's recovery. For this work, the two form of variables used are;

#### **3.6.1 Independent variables**

In a phenomenon or circumstance the elements of the data that are expected to be in charge of influencing changes is called an independent variable. These elements are occurring, hence cannot be manipulated nor controlled but are essential for classification of data gathered. These are the building typology, location of the hospital and it climate, vegetation cover, gender and Age classification of patients.

### **3.6.2 Dependent variables**

The result or changes initiated by the introduction of an independent variable. These variables change with their integration. These variables include the location of recreational spaces, the size and proximity to the wards, the seating configuration, nature and type of recreational spaces provided, notable landscape features and the general spatial configuration of outdoor spaces.

## **3.7 Method of Data Analysis and Presentation**

The information gathered from different sources was analysed descriptively for the better assimilation and a proper elucidation. In order to carry out an in-depth finding about a subject matter under study, a descriptive analysis is used for a detail description.

### **3.7.1 Data presentation**

The presentation of data was done through the use of descriptive statistics that consists of charts and graph that was adopted for this project and furthermore enumerated in tabular form, plates of photograph and graphs in order to have clarity in presentation.



## CHAPTER FOUR

### 4.0 DATA PRESENTATION AND DISCUSSION

The data obtained from the field survey from the various hospitals visited were analysed with the use of statistical package (Excel). A total number of five out of the ten number tertiary hospitals in Northern Nigeria was selected. Stratified random sampling was used for selection namely; The National Hospital, Abuja (NHA), The Barau Dikko Specialist Hospital Kaduna (BDSH), Gen. Amadi Rimi Orthopaedic and Specialist Hospital Katsina (GAROS), The National Orthopaedic Hospital Dala Kano. (NOHDK), The Ahmadu Bello Teaching Hospital Zaria (ABUTH). Stratified random sampling was used for selection. The hospitals from this region were categorized according to the three levels of healthcare delivery system which are the primary, secondary and tertiary healthcare delivery system. The results were analysed based on the following project objectives;

#### 4.1 Existing Spaces provided for Recreational in Orthopaedic Hospitals.

Personal observation schedule was used as a data collection tool to assess the existing spaces used for recreation in hospitals. This involves direct observation of spaces provided, systematically recording people's activities and behavior at a particular time within these spaces. This non-intrusive, direct observational method is suitable in understanding the behavioral dynamics of a built environment, revealing significant information on patients' spatial interactions and preferences that are essential in architectural design. The physical visits were carried out in the five tertiary hospitals located in Northern Nigeria. Each site was visited for the features to be carefully observed and a guided tour around the landscape and its facilities. The information gathered was used to assess the outlined variables for the comparative study of the area. As seen from table 4.1.1 the result shows the percentages from for types of recreational spaces in the hospital buildings studied. In the buildings the open space with highest frequency is the

courtyard. It is the constitute the open with the highest percentage used by patients for relaxation, followed by the common room with 26%, gardens and open porches are closely tied with 18% and 17% respectively. Gazebos fall the least in terms of frequency. In addition, other open spaces, the researcher identified during literature such as atriums, orchards, reading gardens were not seen in any of the hospitals studied. These highlighted types of open spaces provided in the hospital.

**Table 4.1.1: The Various Recreational Spaces available in Hospitals**

S/NO	NAMES OF HOSPITALS	RECREATIONAL SPACES AVAILABE				
		Common Room	Courtyards	Gardens	Gazebos	Open/covered Porches
1.	The National Hospital, Abuja (Nha)	6	11	5	2	4
2.	The Barau Dikko Specialist Hospital Kaduna (Bdsh)	2	7	3	1	-
3.	Gen. Amadi Rimi Orthopedic And Specialist Hospital Katsina	8	13	5	3	7
4.	The National Orthopaedic Hospital Dala Kano. (Nohdk)	4	6	5	1	3
5.	The Ahmadu Bello Teaching Hospital Zaria (Abuth).	7	6	4	-	7
	<b>TOTAL</b>	<b>27</b>	<b>43</b>	<b>22</b>	<b>7</b>	<b>21</b>
	<b>PERCENTAGES</b>	<b>23%</b>	<b>36%</b>	<b>18%</b>	<b>6%</b>	<b>17%</b>

**(Source: Author, 2019)**

From the observation carried out results from table 4.1.2 reveals that seating areas has the highest percentage 32% as attractors followed 27% shade and plants 25%. Other features such as water bodies and sculptures have lesser effect on users of these spaces due to their

location and the limited numbers. These features will be incorporated in the proposed design with consideration for location, size and accessibility.

**Table 4.1.2: Attractors in Recreational Spaces in the Hospitals Visited**

S/NO	NAMES OF HOSPITALS	ATTRACTORS TO RECREATIONAL SPACES				
		Seating Areas	Shade	Sculptures	Plants (Trees & Shrubs)	Water Bodies
1.	The National Hospital, Abuja (Nha)	8	6	3	6	2
2.	The Barau Dikko Specialist Hospital Kaduna (Bdsh)	6	3	-	5	-
3.	Gen. Amadi Rimi Orthopedic And Specialist Hospital Katsina	7	9	1	9	6
4.	The National Orthopaedic Hospital Dala Kano. (Nohdk)	4	6	2	7	2
5.	The Ahmadu Bello Teaching Hospital Zaria (Abuth).	9	6	3	5	2
	<b>Total</b>	<b>34</b>	<b>30</b>	<b>9</b>	<b>32</b>	<b>12</b>
	<b>Percentages</b>	<b>29%</b>	<b>25%</b>	<b>7%</b>	<b>27%</b>	<b>10%</b>

(Source: Author, 2019)

#### 4.2 How Outdoor Recreational Spaces Influences the Recovery Rate of its Occupants.

This was assessed by the use of semi-structured questionnaires that were administered to patients in each of the selected hospital to ascertain how these recreational spaces influences the recovery rate of occupants. The Socio-demographic data of respondents (orthopaedic patients) (n=128) within the five hospital selected is shown in the table 4.2 above, reveals that majority of the respondents are male 56.3 % (n=72), within the age range of 19-34, 35-49 having the most with 32.8% (n=42) and 28.1% (n=36) respectively.

**Table 4.2: Socio-Demographic Data of Respondents n= 128**

Items	Categories	Frequency	Percentage (%)	
1	<b>Sex:</b>	Male	72	56.3
		Female	56	43.7
2.	<b>Age:</b>	< 18 (less than)	13	10.2
		19 - 34	42	32.8
		35 - 49	36	28.1
		50 - 64	22	17.2
		65 and Above	15	11.7
3.	<b>Nationality:</b>	Nigerian	122	95.3
		Foreigner	6	4.7
4.	<b>Religion:</b>	Christianity	48	37.5
		Islam	74	57.8
		Others	6	4.7
5	<b>Occupation:</b>	Farmer	43	33.6
		Civil Servant	56	43.8
		Trader	21	16.4
		Student	8	6.2
6.	<b>Educational Qualification:</b>	Primary	14	11
		Secondary	68	53.1
		Tertiary	46	35.9

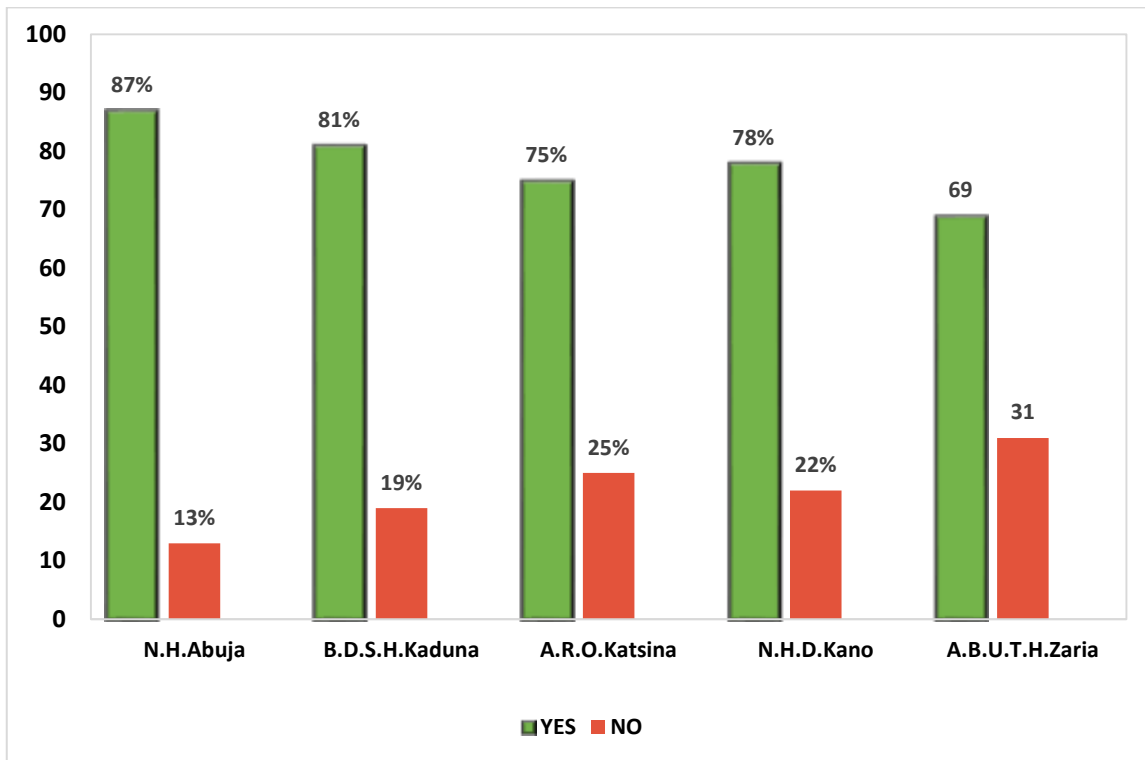
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(Source: Author, 2019)

Only a few are foreigners 4.7% (n=6), Islam dominates with 57.8% (n=74). The respondents are majorly civil servants 43.8% (n=56) and farmers 33.6% (n= 43) with most having acquired a minimum of secondary school qualification 53.1% (n=68).

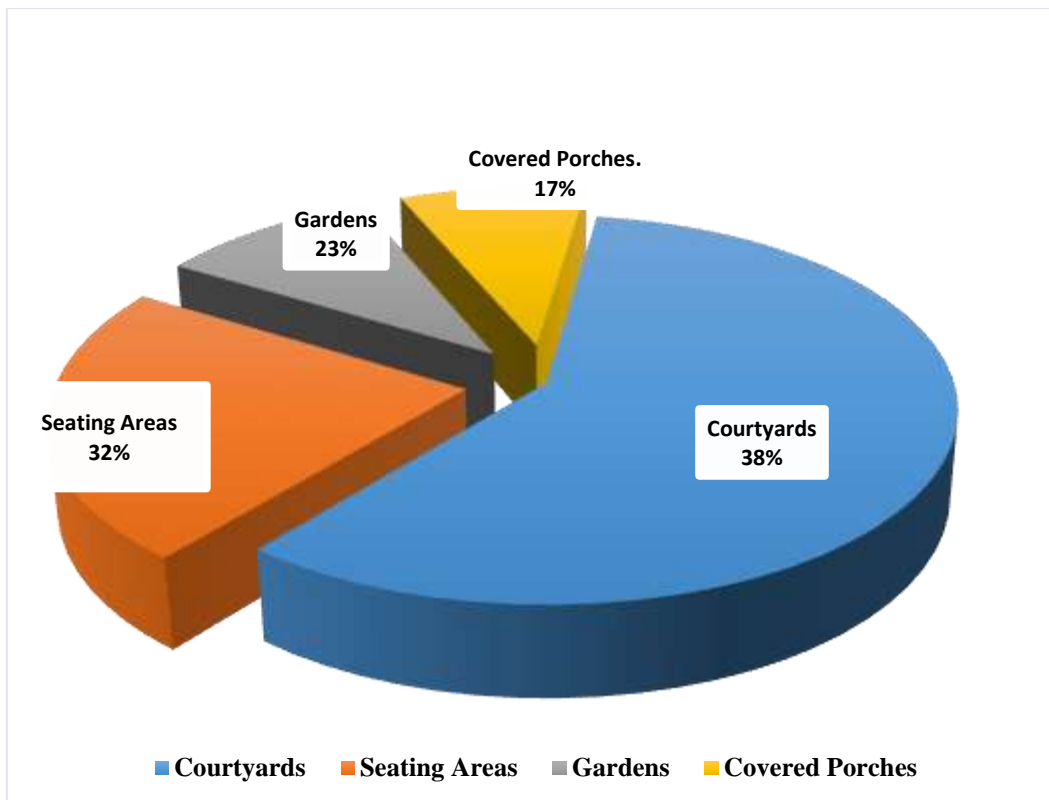
The responses from the inquiry conducted on patients to know their opinion on if they will prefer to have more recreational spaces within the hospital premises. As shown in figure 4.2.1. results show that 87% of patients in The National Hospital, Abuja, 81% in The Barau Dikko Hospital Kaduna, 75% Gen. Amadi Rimi Orthopaedic Katsina, 78% The National Orthopaedic Hospital Kano and Ahmadu Bello Teaching Hospital Zaria

78%. The results highlight that patients are possibly aware of the importance to their recovery and wellbeing.



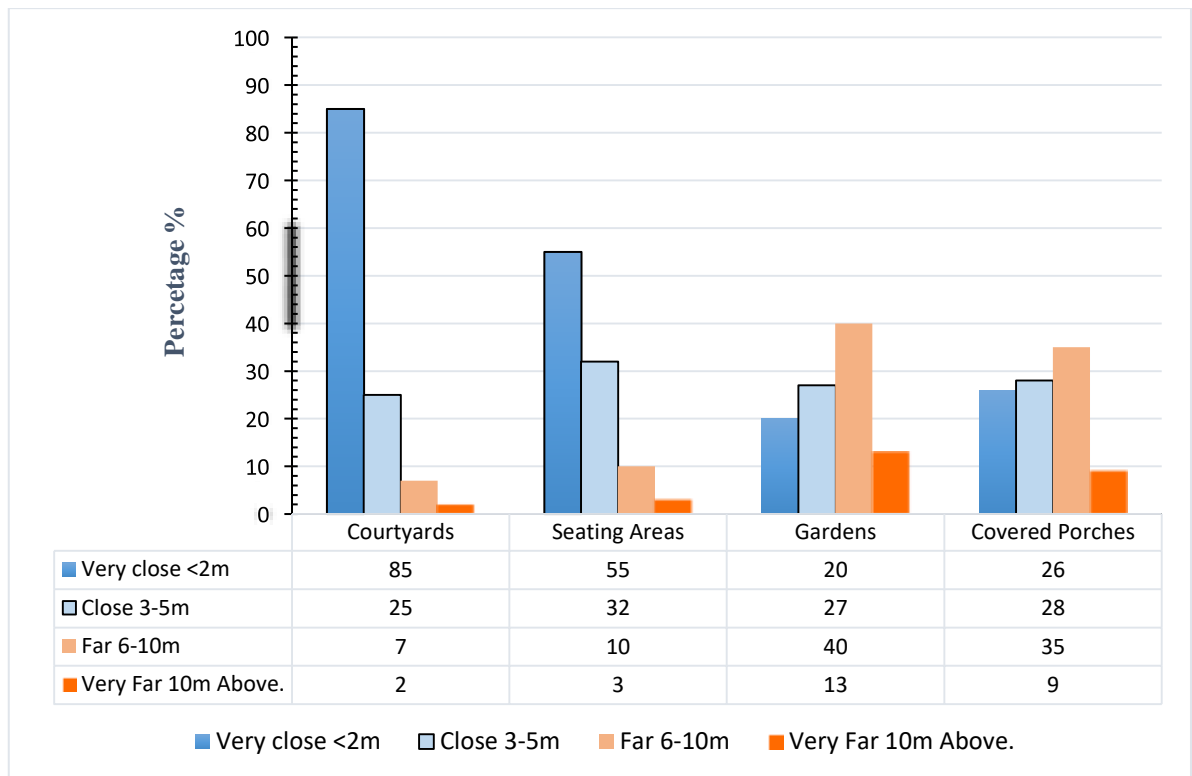
**Figure 4.2.1: Survey Regarding Recreational Spaces Around the Hospital.**  
(Source: Author, 2019)

The spaces designed within a health care setting can either have a positive or negative impact on patients, it should be shaped to serve as conducive healing spaces for patients rather than warehouses for the sick. It is on this note that patients were asked about which recreational spaces has a positive impact on them. From the respondents attested to courtyards 38% (n=49) having the most, followed by seating areas 32% (n=41), this shows that patients prefer to seat and interact with family, friends and others rather than isolate the self and alone.



**Figure 4.2.2: Outdoor Spaces that Impacts Positively on the Patients' Wellbeing. (Source: Author, 2019).**

The distance between patient ward and recreational spaces is of great importance that needs to be put into consideration in order to have the desired impact on patients and visitors. Across the five hospitals visited, patients were asked about their perception on the proximity of these spaces to their wards. Figure 4.2.3 show the result from the inquiry 85% agreed that courtyards are very close, followed by 55% for seating areas.



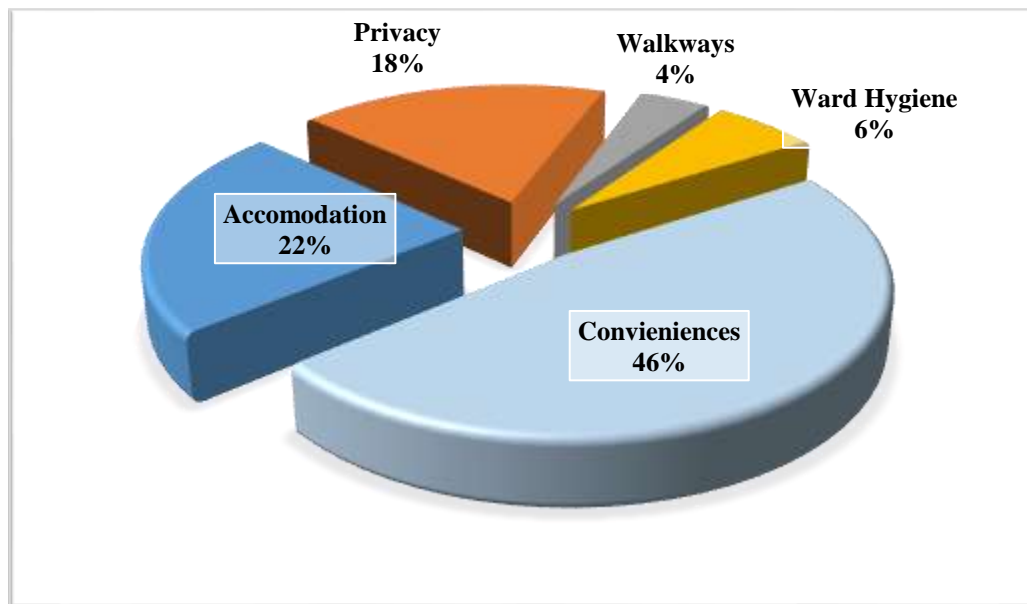
**Figure 4.2.3: Proximity of Recreational Spaces from Patient’s Domain.**  
 (Source: Author’s field Work, 2019)

However, the charts indicate that gardens 40% and covered porches 35% were located far from their domain. The implication is that locating recreational spaces far from patient domain may influence how frequently it will be used and the number of user that will use it at a particular time. The proposed design will ensure that courtyards, covered porches and gardens are located within close proximity to the patient’s domain.

**4.3. Behavioural responses to healing gardens amongst patient and employees of the hospital.**

The patients were asked what they found unfulfilling about their environment in which there are admitted. The variables were then categorized into internal and external factors. The perception of patients about the least appealing spaces within the hospital environment was carried out to ascertain areas that possibly have negative impact on occupants. The result shows that 46% (n=59) of patients find the conveniences to be

unappealing while accommodation 22% (n=28) and privacy 18% (n=23) are the least appealing.



**Figure 4.3: Patients Perception on what they find least Satisfactory.**  
(Source: Author, 2019)

From the figure 4.3. it shows that conveniences, accommodation and privacy are the main stressor to patients. These areas will be given proper consideration in the proposed design by putting into cognisance's their location, orientation and the specific needs of the user groups.

#### **4.4 Proposed Design that Incorporates Therapeutic Outdoor Facilities that are Amenable to Hospital Protocols.**

In the course of carrying out this work, the researcher used case study which is an observation based tool to assess five (5) hospitals within Nigeria and two foreign hospitals, to give an insight into what is obtainable home and abroad. The significance of this piece of the examination can't be over underscored in view of the diverse existing sorts of the tertiary health care centres in the area of study which is Northern Nigeria. Case studies were carried out for the sole purpose of gathering information and research.



The point of doing contextual investigations is to recognize the issues and difficulties experienced in existing hospitals so as to proffer an appropriate solution through exploration, and furthermore to pick up knowledge that will constitute the fundamental prerequisites for a patient centred design.

#### **4.4.1 National hospital, federal capital territory, Abuja.**

The national hospital, Abuja was established by Gen. Abdusalam Abubakar and commissioned on 22<sup>nd</sup> may 1999. It was originally national hospital for women and children, the hospital opened to the public on 1<sup>st</sup> September, 1999. Geographical located in the central area of Abuja which falls within the Guinea forest savannah vegetation zone. The building was constructed by Arab Contractors/ M-S Julius Berger Nigeria. Boasting of a capacity of over 200 bed spaces.



**Figure 4.4.1: Google Image Showing Landscape Layout of the Hospital  
(Source: [Www.googleearth.com](http://www.googleearth.com))**

**i. Deduction from case study one**

The hospital is well landscape, good soft landscape layout with mostly green, yellow and red colour lawns and shrubs. There is adequate on-site drainage, solar light luminance, efficient irrigation technique these are the other attributes the site possesses. The walls have painting and drawings displayed on them which blends well with the interior of the hospital.



**Plate I: Entrance Gate of the National Hospital Abuja**  
(Source: Author's Field Work, 2019)

**ii. Site planning and arrangement**

There is adequate no provision for seating within the outdoor such that patients can a close interaction with their natural surroundings. Although the lawns and shrubs has good variety of plant species, however, most of the deciduous trees that dominate the scape easily shed its leaves during the dry season, hence leaving the few seat outs devoid of green cover.



**Plate II: Showing the Sculpture of a Women Holding a Baby (Source: Author's Field Work, 2019).**

Sculptures are aesthetically pleasing and provides positive distraction emotional and psychologically for patients (Marcus, 2010). The national hospital has sculptures located in open areas as shown in plate II. These edifices are not visible for patients in the wards showing that minimal consideration was made for the value it can add to patients.



**Plate III: Showing Vegetation Cover of the Hospital with decorative shrubs. (Source: Author's Field Work 2019)**



The change level in design of the hospital's landscape that was created using kerbs is detrimental to the physically challenge as it limits accessibility to garden areas, limiting the therapeutic value patients confined to wheel chairs can could derive from spending time there. lack of adequate water bodies and water features for physio therapy activities. The arrangement and courtyard configuration allows for visual contact with various of the landscape.

#### **4.4.2 Ahmadu Bello University Teaching Hospital (ABUTH) Zaria, Kaduna, Nigeria.**

The Ahmadu Bello Teaching Hospital Zaria, is situated in Zaria town, Kaduna State, Nigeria. It was established in October 1962 to serve the people of the region with a capacity of 350 beds spaces. The state falls under the guinea savannah zone



**Figure 4.4.2 Google Image Layout of the ABUTH Hospital**  
(Source: [www.googleearth.com](http://www.googleearth.com))



**Plate IV: Showing a Courtyard with Trees and Spline Shape Walkway  
(Source: Author's Field Work, 2019).**

**i. Deductions from hospital visit**

From the street, the hospital is aesthetically pleasing; its appearance is in sharp contrast to the more typically landscaped hospitals within Zaria metropolis, with courtyards well thought of connecting rectangular shaped building that are mostly enclosed. The hospital is landscaped with a variety of plants, shrubs and trees. The courtyards are accessible and well landscaped however no provision for social interaction between patients and the nature habitat. The hospital boast of a physio therapy and hydro therapy units, however due to poor maintenance the hydro-therapy facility provided, it is not functional due to non-availability of water, and a lack of regular maintenance. The space has hence been converted for other use thereby neglect the services and functions it was original designed to provide to patients.



**Plate V: Showing Vegetation Cover of the Hospital  
(Source: Author's Field Work, 2019)**

The orthopaedic department is located on the second floor of the hospital complex with staircases at both ends and a central ramp for vertical movement between the floors. The slope of the ramp makes it difficult for individuals to move upward or downward. with well-planned landscape layout with variety of shrubs, trees with different colours that can be seen through its windows. The hard landscape is another area of attraction with paved walkways having good drainage systems that efficiently irrigation water. However, the runoff water was no utilized to offset the water demand for software landscape. This is an area the researcher has consider for implementation in the proposed orthopaedic hospital



**Plate VI: Showing Linear Bed Spaces Arrangement  
(Source: Author's Field Work, 2019).**

#### **4.4.3 General. Amadi Rimi Orthopaedic and Specialist Hospital, Katsina.**

Gen. Amadi Rimi orthopedic and specialist hospital Katsina, was established in May, 2015 by Former President Goodluck Ebele Jonathan. It was created to cater for orthopaedic and other referred cases. It consists of Accident & Emergency unit, Outpatient department, Pediatric, Intensive Care Unit, Male and Female medical and Surgical wards. Among all the case studies visited, this hospital is the most recently built, hence the facilities and the general landscape has a more appalling out than the older hospitals. The hospital is located at the outskirts of the city on one of the major access roads leading out of the main Katsina town.





**Figure 4.4.3 Google Layout of the Gen. Amadi Rimi Hospital Katsina.**  
(Source: [www.googleearth.com](http://www.googleearth.com))

The overall building layout on the site consist of a hexagonal shaped outlook with a centralized main entrance and several other smaller entrances and exists. The main entrance is flanked by two motor-able ramps connecting the natural ground with the first floor. Similarly, there is a central courtyard that is connected by walkways and passages that leads to a gazebo used mostly by patient during the hot seasons and periods of the day. The parking spaces are dispersed to the left and right of the building depending on the ward or department a patient, visitor or staff wants to access. Furthermore, the parking spaces are then linked to the main hospital building by open walkways.





**Plate VII: Entrance Gate of the Gen. Amadi Rimi Hospital Katsina.  
(Source: Author's Field Work, 2019)**



**Plate VIII: Showing the Pediatric Unit of Orthopedic Hospital Katsina  
(Source: Author's Field Work, 2019).**

**i. Recreational spaces within the hospital**

The indoor physio-therapy department has active sport and gym facility that is used for patient to enhance body mobility during recovery. The large window openings provide good views of the landscape. The Hydro therapy facility which was part of the initial conceived idea of the hospital was latter converted to paediatric therapy due to seasonal water scarcity.



**Plate IX: Showing the Physio Therapy Unit of Orthopaedic Hospital Katsina. (Source: Author's Field Work, 2019)**

**ii. Deduction from visit to the hospital**

The open courtyards allow light and air inflow into the building hexagonal shaped gazebos are located within the court yards to provide seating and space for social interaction. Floor tile finish along the walkway becomes slippery when water from rainstorm pours on it.



**Plate X: Showing the Walkways and Landscape within Courtyard**  
**Source: Author's Field Work 2019.**

#### **4.4.3 National Orthopaedic Hospital Dala, Kano.**

The National Orthopaedic Hospital is situated in Dala Kano state Nigeria. It was established in December, 1959 serving Nigerians ever since in the field of trauma and orthopaedic surgery. It also serves as a training institutes for trauma and plaster technique. The hospital has 190 beds capacity within the different units and departments.



**Plate XI: The Main Gate of the National Orthopaedic Hospital Dala, Kano.**  
**(Source: Author's Field Work, 2019)**





**Plate XII: The Main Gate of the National Orthopaedic Hospital Dala, Kano.**

**(Source: Author's Field Work, 2019)**



**Plate XIII: Showing Water Fountain Located within the Garden of the Hospital.**

**(Source: Author's Field Work, 2019)**



**Plate XIV: Soft Landscape Features around the Courtyard of the Hospital.**  
(Source: Author's Field Work, 2019)

**i. Deduction from visit to the hospital**

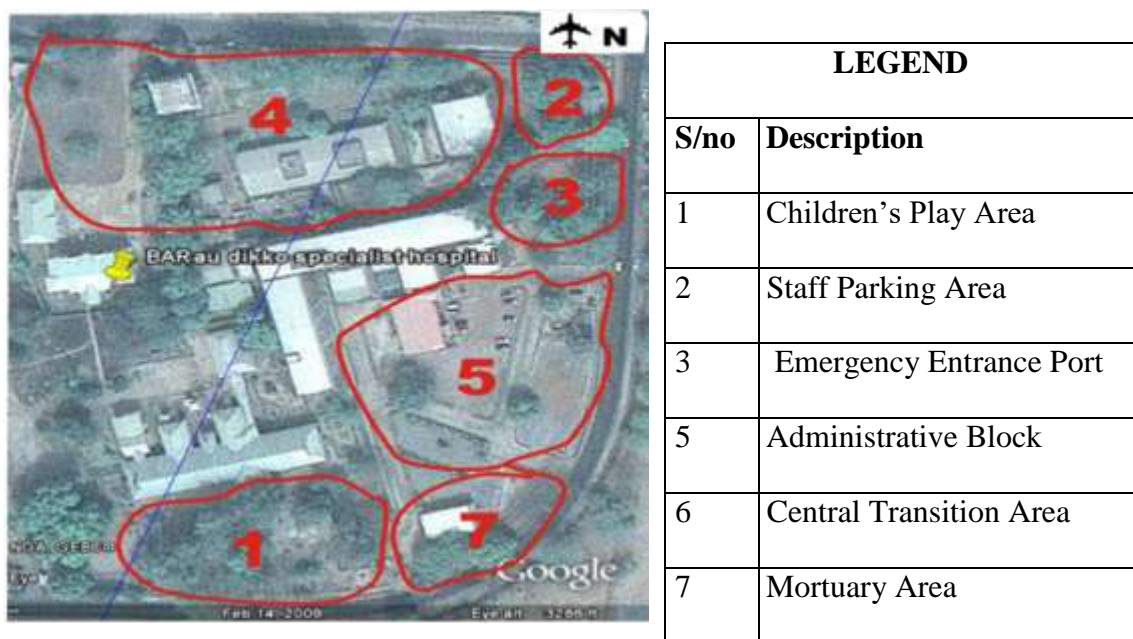
The general landscape and layout looks old, although it has variety of lawns, shrubs, and trees with different colours. There is a glaring need for refurbishment so as to add more to its overall outlook and benefit. Furthermore, due to the harsh climatic conditions of Kano, the fountain has dried up due to inadequate water supply. The wall and floor finish has undergone severe wear and tear due to the length of duration these finishes have served, overtime the hospital has seen some modification in its spaces as courtyard plans have been altered from the initial design.

**ii. General Landscape**

Sparse vegetation covers due to seasonal rainfall & lack of mechanical alternative to water and keep these soft landscapes ever green. The existing asphalt and terrazzo floor finish are not the best for orthopaedic patients due to their surface hardness.

#### 4.4.5 The Barau Dikko Specialist Hospital Kaduna.

The Barau Dikko Specialist Hospital Kaduna, (BDSH) is a 240-Bed tertiary health facility situated in Kaduna city, In 1999, the Barau Dikko Specialist Hospital was renamed after Dr Russel A. Barau Dikko. From Nigeria’s northern region he was the first medical doctor. It is has two noteworthy segments; The Adult Section and the Paediatric Section. The grown-up segment has a physio treatment unit located at the right side of the emergency clinic while on the leftside is the pediatric segment.



**Figure 4.5: Outline of different sections in (BDSH) Kaduna.**  
(Source: Www.Google earth.com 2010)

Since the opening of Barau Dikko Specialist Hospital, Kaduna medical care has enjoyed national attention on an unprecedented scale. Due to the human traffic, other environmental and physical factors the hospital landscape will be re-designed using the appropriate planting and landscape. Subsequently, these feature can enhance the process of healing by integrating therapeutic effects.





**Plate XV: Showing Vegetation Cover with Lawns and Shrubs  
(Source: Author's Field Work 2019).**

**i. Deduction from Site Visit**

Outdoor seating areas with flower planted around it, consisting of three main species of plants. The courtyards are enclosed with accessible corridors along the perimeters linking the opening. Adequate provisions were made for ramps to provide access between change level.



**Plate XVI: Showing Indoor Physio-Therapy Equipment.  
(Source: Author's Field Work, 2019)**

## **ii. Existing spatial challenges and their negative impact on patients**

There is no adequate provision for person on wheel chair users this resulted into visible foot paths through the garden making it difficult for wheelchair users to moving around within the garden. The site of stagnate drainages and refused dumps sight around the courtyard has a negative impact on the use of the space for recreational activities due to the offensive smell that emanates from them, as this may have affect the wellbeing of the patients. Furthermore, there is no provision for seating, sculptures or fountains within the gardens. Due to the remodelling and persistent change in function of the hospital some initial recreational spaces have been converted for other used.

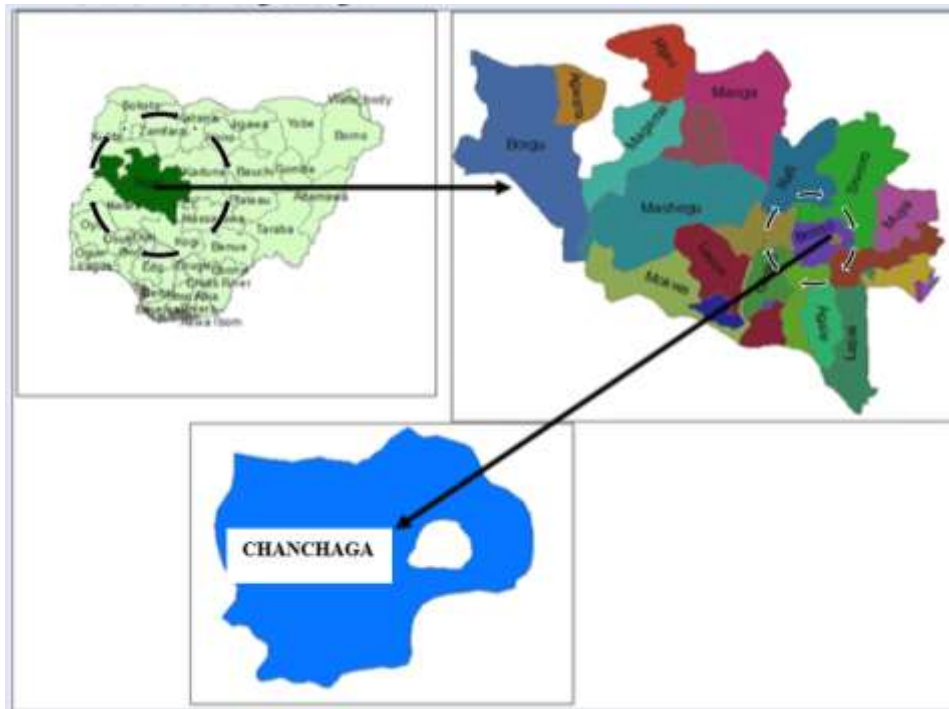


**Plate XVII: Covered Outdoor Seating Area with Flowers around it.**  
(Source: Author's Field Work, 2019).

### **4.5 The Location of the Proposed Site**

The site is located within Minna metropolis a city in middle belt of Nigeria with an estimated population of 304,113 according to census carried out in year 2006 by Nigeria Population Commission (NPC). The Gbagyi's and the Nupes' are two major ethnic groups in the state. The evidences of settlement in the area according archaeologist dates back to about 47,000-37,000 years ago. Through the accent Saharan trade and commerce routes, Islamic culture filtered into the city of Minna.



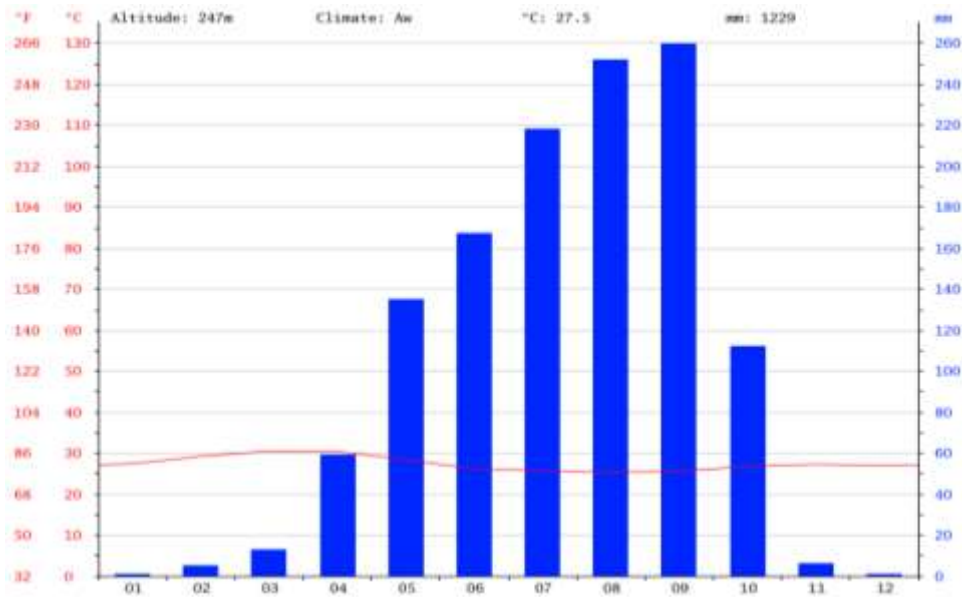


**Figure 4.5: Showing the Maps of the Proposed Site.**  
 (Source: [Www.Googleearth.com](http://www.Googleearth.com))

There are a number of mosques and Islamic association within the metropolis. Christianity has considerable population too in Niger State. Amongst dominate denominations are the Living Faith Church, The Baptist Church, The Anglican communion Churches, The Apostolic Church and many others too numerous to mention. There are two former military presidents from Minna. The immediate past governor of the state Dr. Mu`azu Aliyu Babangida served two terms of four years between 2007-2015 under the latform of the People's Democratic Party. The incumbent governor of Niger state is Abubakar Sani Bello.

#### **4.6 Climate of Minna Across the Year**

This city has a tropical climate. The summers here have a good deal of rainfall, while the winters have very little. The town experiences two distinct seasons the dry and wet seasons.



**Figure 4.6: Showing the Average Annual Rainfall in Minna, Niger State. (Source: Nigeria Metrological Agency, 2018)**

The total amount of rainfall experience across the state annually varies as one move from south (1600mm) to the north (1200mm). According to Köppen and Geiger, this climate is classified as Aw. The average temperature annually is around 27.5 °C in Minna. The rainfall here averages 1229 mm. During the month of January the least amount of rainfall occurs. The variation in the precipitation between The driest and wettest months as shown in figure 4.6 is 259 mm. The majority of the rainfall here falls in September, averaging 260 mm. In the month of March and June annually, the mean maximum temperature remains high throughout drifting about 32F.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	27.4	29.2	30.5	30.4	28.4	26.1	25.7	25.3	25.8	26.7	27.3	26.9
Min. Temperature (°C)	19.8	21.5	23.3	24.1	23.4	21.7	21.8	21.7	21.2	21.2	20	18.7
Max. Temperature (°C)	35.1	36.9	37.8	38.7	33.4	30.6	28.6	29	30.1	32.3	34.6	35.2
Avg. Temperature (°F)	81.3	84.6	86.9	86.7	83.1	79.0	78.3	77.5	78.1	80.1	81.1	80.4
Min. Temperature (°F)	67.6	70.7	73.9	75.4	74.1	71.1	71.2	71.1	70.2	70.2	68.0	65.7
Max. Temperature (°F)	95.2	98.4	100.0	98.1	92.1	87.1	85.3	84.2	86.2	90.1	94.3	95.4
Precipitation / Rainfall (mm)	1	5	13	59	135	167	218	252	280	112	6	1

**Figure 4.6.1: Showing the Monthly Average Temperature of Minna. (Source: Nigeria Metrological Agency, 2018)**

Although throughout the year, temperatures vary by 5.2°C. Nonetheless, the least temperatures occur from December to January when most regions of the state experience the infiltration of the tropical continental air mass blowing from then northern region of the country. In Niger State the dry season begins in October.

#### **4.7 Description of the Proposed Site and its Adjoining Properties**

The site is situated along David Mark road Al-amin universal school. The entrance to the site is tarred and very much characterized, arrangement for and available road route is important. The major factors that characterised the site includes water bodies, vegetation, geology, see, physiographic orientation, atmosphere that are classified to be natural elements. Likewise, there are man-made factors such as, social attraction, administrative zoning, roads, services utilities.



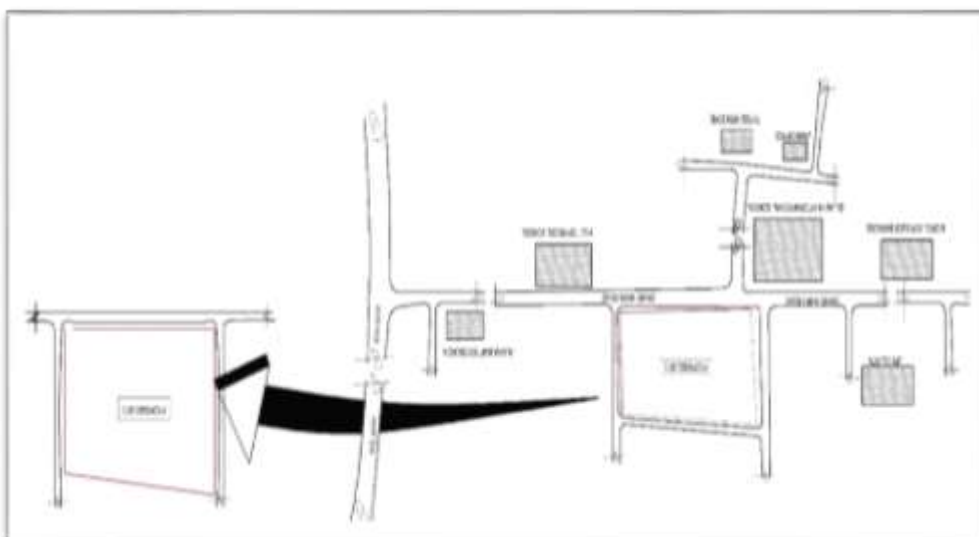
**Figure 4.7: Showing the Maps of the Proposed Site.**  
(Source: Www.Googleearth.com)

#### 4.7.1 Site selection criteria

The site has been picked on account of its aesthetically pleasing natural features. This site is ideal for a hospital as a result of the size and function being proposed as it offering a quietness and serene environment. A moderately large land parcel was required with sufficient natural vegetation because of the outdoor function intended to consolidated or supplement the purposes the facility will serve. Besides that, the general landscape of the site and topography is near to nature as conceivable to the fundamental of the structure being proposed. Movement for both vehicle and humans are properly segregated. Thirdly, the site is accessible easily because of the By-pass access road which comprises one of the great roads around the entire city of Minna. Lastly, utilities are available, for example, water, steady power supply and telecommunication services.

#### 4.7.2 Existing feature on the site

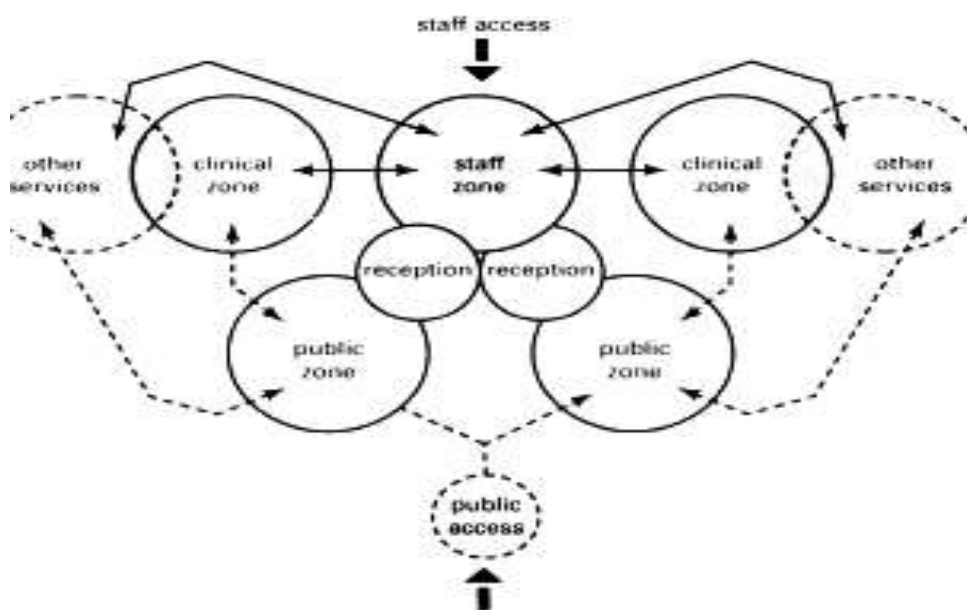
There are adjoining properties to the proposed site, to the north is an empty plot, to the east is a residential property and the western end has an animal farm, to the south is El-amin International school. Predominantly, the land use around is site is majorly for residential and civil purposes. These features are typified in diagram on figure 4.7.2.



**Figure 4.7.2: Directional Map of the Proposed Site Showing the Existing Features.**  
(Source: Author, 2019)

### 4.7.3 The brief and scope of the proposed design

As part of the Federal Government of Nigeria under President Muhammadu Buhari led administration cardinal target of improving the health care service delivery and social welfare of Nigerians with increase of 8% percent in budgetary expenditure from year 2018. The federal government has decided to embark on a project of establishing an orthopaedic hospital and treatment centre where medical practitioner can have a conducive environment to render their services effectively and sufficiently.



**Figure 4.7.3: Bubble Diagram Showing the Zoning of Medical Practice Premises (Source: Architect Data 3rd Edition)**

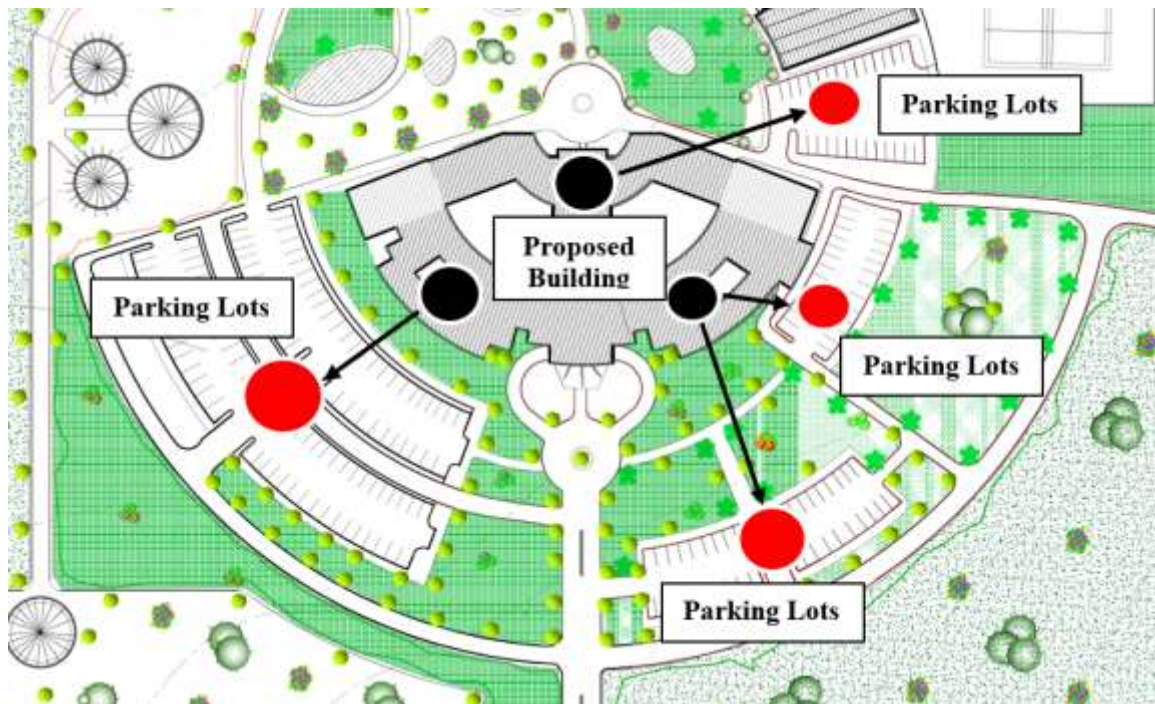
### 4.8 Planning Principles and Considerations

To promote aptitude, economy, convenience and solace, there is need for a functional design on other side a structures that are can hinder different exercises, degrade care and raise expenses to unbearable extents. Over course of the design, the following elements were duly considered.



#### 4.8.1 Zoning and circulation in hospital planning.

The design was zoned according to the requirements of health standard. The parking spots were positioned far from circulation area for pedestrians as shown in figure, furthermore the sensory gardens, provision of open space for carrying out indoor and outdoor activities without facing the challenges of moving around.



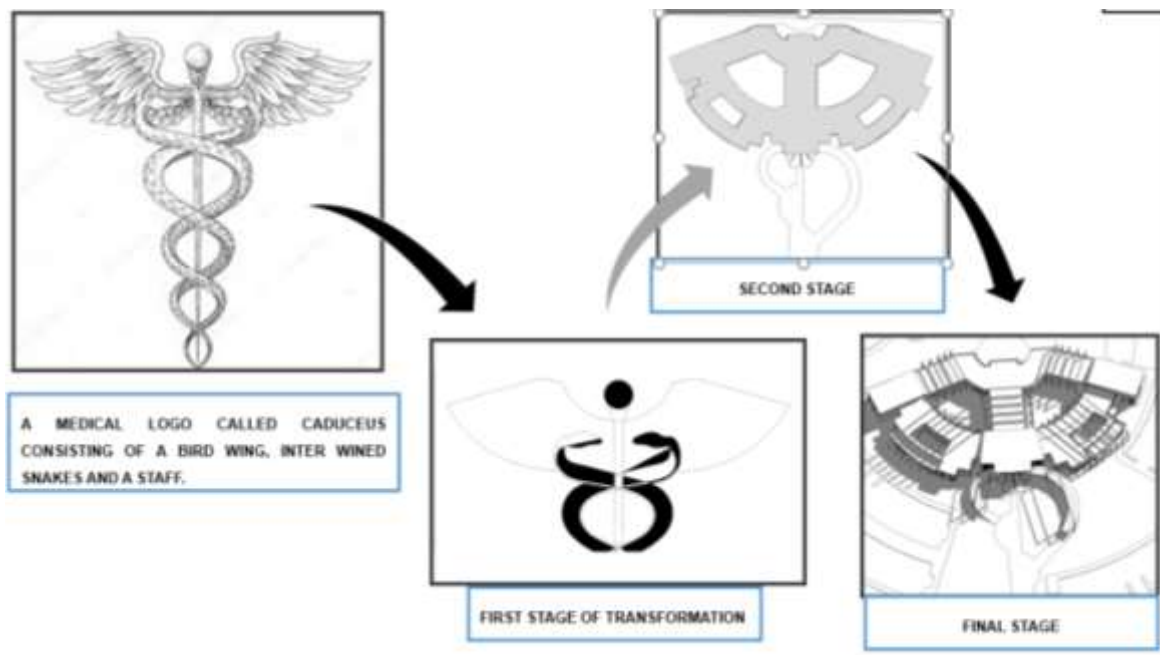
**Figure 4.8: Showing the Zoning of Parking Spaces and Pedestrian Circulation.**  
(Source: Author's Work, 2019)

#### 4.8.2 Provision of facilities for services and fire safety.

Facilities such as alternative power plant, water reservoirs, waste collection and drainages, canteen, restaurants and firefighting units were provided and appropriately sited within the orthopaedic hospital. Other areas like active sport fields, sensory gardens, and pools were given considerable locations within the setting.

#### 4.9 The Concept Transformation of the Proposed Design

The proposed orthopaedic hospital design adopted an iconic concept which is a design idea where the form is model in resemblance or having a similar relating character to an icon. These icons can range from a logo, to a symbol or graphical diagram relating to the theme of the design. Hence, in order to create a structure that depicts the emphasis of the design which is therapeutic recreation, a medical logo was used.



**Figure 4.9: Showing the Conceptual Transformation.**  
(Source: Author's Work, 2019).

This medical logo called “*Caduceus*” consisting of a bird wing, two interwined snakes and a staff. This logo systematically creates the desired iconic form without distorting functionality. In terms of the floor plan and elevation it is symmetrically balance, hence offer good visual rhythm on both sides of the proposed building. This was conceived and achieved with different the stages of transformation graphically shown in figure 4.9 above.

#### **4.9.1 Materials and construction method**

The buildings substructure constitutes its foundation that anchors the building to the ground on which it is built and also transfers vertical load from the super-structure to the ground. After a close observation of the soil type and due consideration of its bearing capacity and the intended number of floors to be erected this influenced the choice of a deep strip foundation. Due to the soil nature, excess run off water during the wet rainy season and the anticipated vehicular and pedestrian movement, with the muddy site soil and mixing of sharp sand the upper layer of the site will be stabilized. The flooring system is reinforced concrete cast in situ, finished with easy to clean floor finishes and hard wearing floor finishes. Long span aluminium roofing sheets was used for areas with roof covering laid on galvanised steel trusses while there are areas with roof garden used as external roof covering in the proposed project. Aluminium roofing sheets are in different sizes and thickness. For this design a 0.75mm gauge roofing sheet is deemed adequate for use. They possess moderate mechanical strength and are not brittle in nature. Hence they can be bent to different shapes without being ruffled. Suspended acoustic ceiling will be used for its imperviousness to fire and sound assimilation. The ceiling tiles are to be fastened either a covered network or uncovered matrix framework on lightweight tempered steel railings. Internal walls of the interior space serve as in-fillers. Partitioning non load bearing walls were utilized for theatre and examination rooms where privacy is required. The demountable walls are made of gypsum board panels finished with plaster of Paris, and glass. However, sand screed blocks were used as partitions for some offices laboratories and convenience areas, because of the fixed location, this is necessary for plumbing services. Structural columns are made up of reinforced cast in situ concrete columns that are placed for support at intervals within the building to bear the total dead and live load of the building.



#### **4.9.2 Elements used in the design of landscape and external works**

The hard and soft landscape elements was utilized in a way that blend the building and its surrounding. Green plants (grasses, trees and bushes) any place conceivable is important to avert heat-gain into the structures and remedy heat loss such that the whole environment will be moderately cooled. For privacy reasons the vegetation additionally fills in separating areas and to buffer noise from public area.

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATIONS

#### 5.1 Conclusion

This research work began by identifying the problems of recreational spaces in Nigerian hospital and establishing the phenomenon of ‘healing’ gardens and highlighting its relevance in landscape architecture, further discussing how this concept evolved over the years. Review of relevant literature shows the significance of contemporary healing gardens in enhancing general human wellbeing and further discussing typologies of gardens, functions and design considerations.

The case studies in Nigeria and other countries were reviewed, the survey being biased towards the degree of application of therapeutic landscape for in its indoor and outdoor spaces. Case studies were analysed using general variables and specific variables (directly related to the subject of therapeutic landscape). Findings from the case studies and literature review were thus used in generating design and planning concepts for the of the proposed design. Furthermore, a design proposal was conceptualized, with attention paid to implementing therapeutic features in the form and function of the hospital buildings. This thesis has demonstrated through empirical evidence the role of therapeutic landscape in transforming a hospital environment beyond an outdoor extension that is not just attainable but can also be a sustainable means that enhances patient’s recovery. It is anticipated that the creation of a therapeutic landscape will create a trickle-down effect to that will serve as a model for designers of similar health care centres across the region and even the country at large. The integration of therapeutic recreational spaces in the design of an orthopaedic hospital will highlight the potential benefits that are derived from recreational therapy and proffer a sustainable pathway on how to adapt recreation in a hospital environment. The main focus of this thesis is to

create a therapeutic environment in hospital landscape through the introducing therapeutic recreational spaces in the design by adopting the its techniques and principles. This is achieved by taking into account climate, environmental conditions and space functions. By so doing, the environmental problems associated with the hospital landscape, unorganized and undefined user spaces were identified and improved upon. This work will serve a stepping stone alongside other existing body knowledge for future studies that will be carried within subject matter under consideration.

### **5.1.2 Area of further research**

The challenges of this thesis, has been to provide therapeutic landscapes through landscape design means. For tropical regions, where the air temperature and relative humidity are generally high and also with the mass influx of patients to hospitals; the comfort of the outdoor hospital environment is questionable. Therefore, more of similar research is required to shed more light on sustainable means in which outdoor recreational spaces can be adopted in hospitals (paediatric, psychiatric, orthopaedic) within the hot-humid climates and be efficiently managed. This will provide significant guidance in subsequent hospital landscape design proposals.

## **5.2 Recommendations**

Upon seeing the potentials inherent in therapeutic landscape architecture, the following recommendations are posited:

- i.) Schools of architecture should encourage more research into therapeutic landscape architecture, and related areas. Conceptual design for buildings should go beyond building of forms. There should be a sense of deeper meaning to architectural expression; landscape architecture remains a viable tool in this regard.

ii.) Hospitals in the country should integrate outdoor spaces for a much wider spectrum of users (patients). Hospital structures should not only serve as facilities for curing the sick but should serve as recreational places for physical and psychological healing.

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**APPENDIX A**

**The Questionnaire Sample**

**ASSESSMENT OF THERAPEUTIC RECREATIONAL SPACES IN  
HOSPITALS  
IN MINNA NIGER STATE**

**Research Assistants' Name:**.....

**FEDERAL UNIVERSITY OF TECHNOLOGY MINNA  
SCHOOL OF POSTGRADUATE STUDIES,  
DEPARTMENT OF ARCHITECTURE,  
MARCH, 2019**

Dear respondent,

The responses from you will be valuable in “**Assessment of Therapeutic Recreational Spaces in Orthopaedic Hospitals in Minna, Niger State**”. I will appreciate your effort in responding to the questions below. Thank you.

**Questionnaire for In-Patients**

**Name of Patient:** \_\_\_\_\_

**Occupation (Institution):** \_\_\_\_\_

**Age:** \_\_\_\_\_ **Sex:** \_\_\_\_\_

1. Please describe the nature of your orthopaedic problem and all symptoms:  
a. broken bones      b. neck, back    c. arm, shoulder      d. knee, ankle    e. leg, foot
2. How long have you been admitted?  
a. < 2weeks    b. 3 - 5weeks    c. 6 - 8weeks    d. 9 – 11weeks      e. Above 12weeks
3. Do you prefer to see more recreational spaces in the hospital?  
a. Yes      b. No
4. What do you find to be unfulfilling about the environment in which you are admitted?

a. accommodation   b. privacy   c. the walkways   d. hygiene   e.  
conveniences

5. What do you find appealing about the environment in which you are admitted?

a. courtyards   b. gardens   c. colourful plants   d. relaxation areas   d.  
common rooms

6. Do you hope to continue your recovery in your current environment?

a. Yes   b. No

7. Does moving between your ward and other units or wards help you to socialize  
with other patients?   A. Yes   b. No

8. What kind of features would you prefer to see in the garden?

a. Man-made   b. Natural

9. Do you like working with plants?

a. Yes   b. No

10. What time of the day do you prefer to visit the garden? Why?

Morning   b. afternoon   c. evening   d. night

.....

11. What would you prefer to change about your environment?

a. Landscape   b. Wall finishes   c. location of beds   d. relaxation areas  
d. Conveniences

## APPENDIX B:

### Observation Schedule

1. Presence of Garden and other green landscapes.
  - a. None
  - b. 1
  - c. 2
  - d. 3
  - e. 4 & Above.
2. Type of Vegetation cover in the Garden
  - a. Trees (species)
  - b. Shrubs (species)
  - c. Lawns
  - d. flowers
3. Number wards with indoor plants present in (e.g flowers and shrubs)
  - a. None
  - b. 1.
  - c. 2.
  - d. 3.
  - e. 4 & Above.
4. Distance of vegetation from the closest building.
  - a. Less than 1meter
  - b. 1-2 meters
  - c. 3 meters or more
5. Number of water bodies present (e.g Fountain)
  - a. None
  - b. 1.
  - c. 2.
  - d. 3.
  - e. 4 & Above.
6. Color of interior wall paint and finishes
  - a. Bright colours (e.g white, beige, yellow, green).
  - b. Dark Colors (purple, black, brown, blue.
7. Windows with landscape views
  - a. None
  - b. Less than 5.
  - C. 6-10.
  - d. 11-15.
  - e. 16 & Above.
8. Presence of Active play grounds
  - a. None
  - b. 1.
  - c. 2.
  - d. 3.
  - e. 4 and Above
9. Type of recreational indoor and outdoor water sports
  - a. Water volley
  - b. Swimming Pool
  - c. Water Choreography
  - e. Others
10. Hospital buildings with courtyards provisions.
  - a. None (B.) 1.
  - (C.) 2.
  - (D.) 3.
  - (E.) 4 and Above

**APPENDIX C**

**INTERVIEW FOR HEALTHCARE STAFF**

**Name of Respondent:** \_\_\_\_\_

**Occupation (Institution):** \_\_\_\_\_

**Age:** \_\_\_\_\_ **Sex:** \_\_\_\_\_

1. How long have you been in your current employment? .....

2. How many patients do you attend to daily? .....

3. What are the major and minor injuries? .....

4. What are the major challenges do you have in handling patients?  
.....

5. What environmental features can be improved to help patient's recovery?  
.....

6. Where do patients prefer to relax during intervals of medication?  
.....

7. Do patients appear happier when spending time outdoor with family and friends?  
.....

8. What exercises do you recommend for patients in outdoor spaces?  
.....

9. How does moving between workspace and other units or wards affect patients  
wellbeing?.....

10. what active sports facilities would you recommend to be added to the hospital  
environment?.....