

# **PEDIATRIC CENTRE FOR TEMA GENERAL HOSPITAL**

**By**

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## DECLARATION

I hereby declare that this submission is my own work towards the M.Arch. and that to the best of my knowledge it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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## DEDICATION

This design thesis is dedicated to my parents: Emmanuel and Faustina and my siblings; Michael, Wilson, Daniel and Jemima: may the almighty god continue to bless us and show us favour.



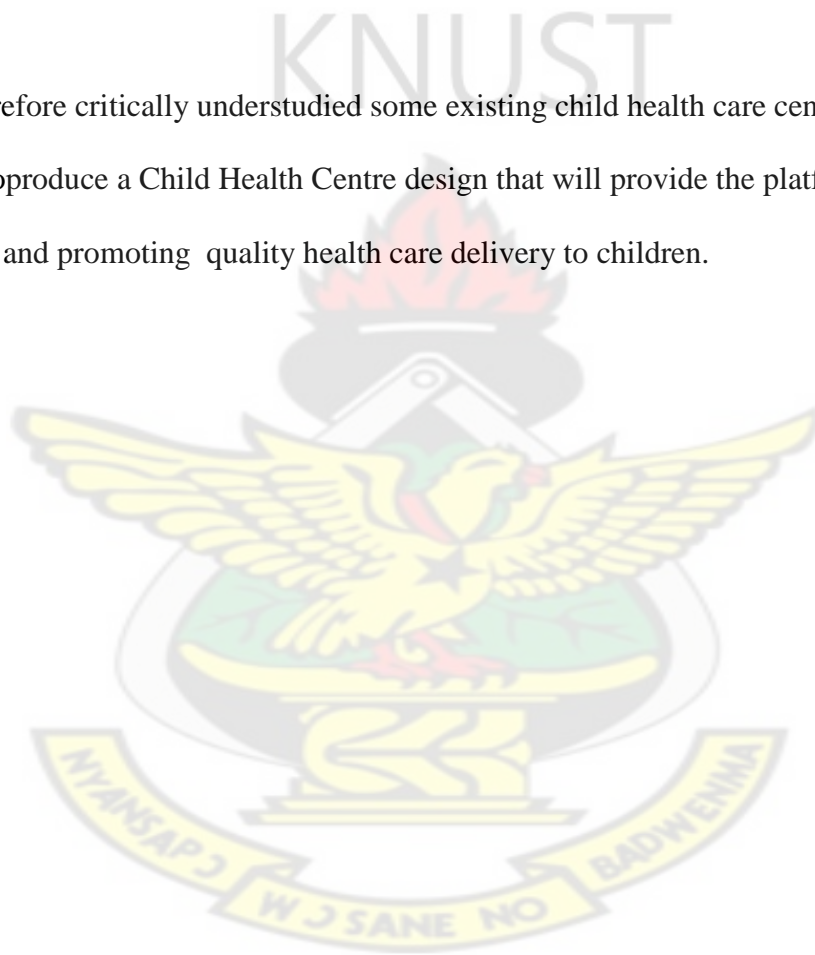
## ABSTRACT

Pediatrics is a branch of medicine that comprises the care and treatment of diseases of childhood and the study of normal growth. This specialty in medicine provides services for children from infancy to childhood (0-12) and also adolescence. This thesis, therefore, is aimed at producing a one stop health care facility that will provide these services for children. The facility has been designed not only to meet the medical needs of children but also create an environment that addresses physical, social, developmental and emotional needs of the child as he/she visits the place. As established, Pediatric needs are unique and the environment of care and healing needs to be redesigned or adapted to be effective. Moreover, it is also known that the physical environment of a treatment program affects patient outcome, but how and to what degree this is not known. Therefore, decisions about the design of the environment in areas such as; potential for growth, changes in health care delivery, cost and building-code constraints and widely varying patient characteristics and treatment models were carefully considered and resolved functionally and aesthetically.

In addition to these considerations, other equally important issues which have been identified to be lacking in most of the child health care centres visited in the country such as respect for values of children and family participation in the healing process have been successfully incorporated in the medical centre design. The design of this pediatric centre is therefore as a result of critical examination and analysis of existing child healthcare centres both within and outside the country so as to improve and promote quality child health care.

The proposed facility, which is a brain child of the government of Ghana, has been designed to provide medical services for children between the ages of 0 – 12years. Its system of operation is organized under the following; a patient care area, a patient service area and supporting facilities. In addition, the facility has been designed as part of Tema General Hospital. This is due to the deplorable state of the existing children's unit and its inability to handle larger numbers of reported cases.

This project therefore critically understudied some existing child health care centres around the world in order to produce a Child Health Centre design that will provide the platform to improving upon and promoting quality health care delivery to children.



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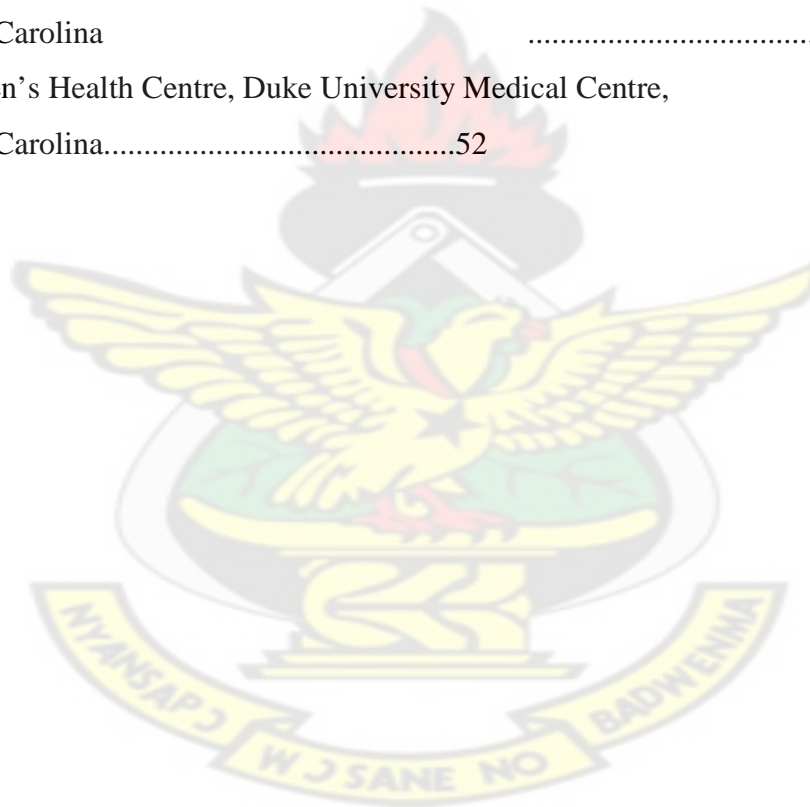
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# **CHAPTER ONE**

## **1.0. INTRODUCTION**

### **1.1. BACKGROUND**

Child health care presents a major challenge to African countries, especially those under the category of developing countries. Although in Ghana, there has been much improvement in health care service delivery, over the years not enough effort has been done in the sector of child health leading to the increase in infant and child mortality. Despite this devastating finding, the importance of improving child health to promote economic development and poverty reduction has not been fully appreciated in Ghana. Perhaps the reason may be that the impact of the burden of this challenge has not been demonstrated in quantitative terms to convince politicians, policy makers, program managers and development partners to devote the needed attention to this sector of health care.

In a quest to scale down this challenge, the government through the Ministry of Health and in conjunction with the World Health Organization has drawn out a program to tackle this challenge. This program which includes the building of child health centres is a tremendous opportunity for Ghana to prevent the needless deaths of her infants and young children.

Far more, since children in Ghana deserve to get the best start in life and their survival is dependent on the use of health facilities, it will then be a major commitment on the part of government to ensure that, such a facility when provided, takes into consideration all methods of health service delivery to children.

## 1.2. THE PROBLEM

Every year in Ghana, about 80,000 children do not live to celebrate their fifth birthday. Most of these children die from preventable causes. Malaria is hyper-endemic in Ghana and claims one-quarter of all under-five deaths every year – 20,000 young lives. Acute respiratory infection is responsible for 18 percent of under-five deaths, and diarrhea for another 18 percent. Malnutrition is the underlying cause of death in half of all under-five deaths (Ghana Statistics Board, 2007-2009).

Moreover, over the last five years, national infant and child mortality rates in Ghana have not improved – startling evidence that children continue to die needlessly. Statistics further shows that the rate of infant mortality increased by 12.3% between 1998 and 2003 whilst child mortality also increased by 2.8 % (Ghana Statistics Board, 2007-2009). The decline has been attributed to three major problems which are; availability and accessibility of health infrastructure; availability and productivity of human resource for health delivery; and ensuring adequate and predictable financing of programs.

In addition, the existing health facilities are far overstretched in terms of use and also in deplorable states. This is evidently clear when one visits a health care centre in his or her neighbourhood. Because these health centres are inadequate, mothers, fathers and children compete for medical attention as a result patients do not get the maximum medical attention. It is also an established fact that the immune system of children under the age of 16 is not well developed therefore the least infection, if not well treated can lead to their demise.



### 1.3. JUSTIFICATION

For a population of 23.5 million, there are only 1,439 care facilities (IRIN, 5 August 2008). Estimates show that 50% of the population falls below 15 years and that infant mortality rate worsened from 64 per 1000 live birth in 2003 to 71 in 2006 (US Census Bureau, 2008). In Ghana, the major causes of infant mortality are due to unavailability and inaccessibility of health facilities. A study by Van Den Boom et al. compiled in 2004 noted that access to these health facilities remain a major challenge to child health in Ghana. Although the government of Ghana embarked on a health sector reform in the early 1990s to improve the accessibility and quality of services, however, “the health situation is still far from satisfactory”. Many people in the country still rely on self-medication vis-a-vis their children (Van Den Boom et al., October 2004). It has however been established that the health and medical needs of children require special attention since their immune systems are not well developed compared to that of adults (Karla, 2007). In a move to curtail this problem, developed and some developing countries have set up child health care centres also known as Pediatric centres to solely provide health care for children. The introduction of these centres has drastically improved child health care in these countries and therefore can be means to tackling this pending canker in our beloved country.

The pediatric centre will aim at responding to the challenges of unavailability and inaccessibility of health infrastructure. The centre will go beyond meeting the medical needs of children and also create an environment that will address physical, social, developmental and emotional needs. It will also aim at providing the requisite

infrastructure that will greatly improve upon the delivery of medical services with special attention given to the varying patient characteristics and treatment models.

Moreover, most of these facilities outside have been designed to erase the fear factor among children when they visit hospitals thus improving health care service delivery. In addition the design of such health care facilities brings into play respect for values of children and also involves the family in the healing process. By this all stake holders especially children feel comfortable when visiting for medical attention.

From the aforementioned discussion it can be justified that the provision of such a centre will improve on child health care delivery. It will erase the fear factor among children, address physical, social, developmental and emotional needs, introduce and also accommodate new treatment models.

#### **1.4. RESEARCH QUESTION**

What can be done architecturally to improve upon the quality of care offered to children at Tema General Hospital?

#### **1.5. OBJECTIVES**

The objective of this design thesis is to

- Ascertain the factors relevant to promote preventive and curative ways mainly for children.
- To identify building design approaches employed to house effectively very advanced care and medical research.
- To determine the conditions that creates a healing environment for children.



## **1.6. SCOPE**

The major areas considered were concerns raised by users, medical practitioners and other professionals in relation to this field. Here proposals made by experts and users in terms of architectural designs for the care of children and built prototypes of pediatric centres, which are working effectively will be carefully looked at. In addition, documents and other published materials in respect of child health care were also been considered.

## **1.7. METHODOLOGY**

The various methods employed in data collection for this research includes; interviews, photography, published materials, personal observations and internet search.

## **1.8. ORGANIZATION OF RESEARCH**

The first chapter of this research gives background information on child health care and its challenges in Ghana. It identifies the cause of these problems and justifies the provision of a pediatric centre as the best intervention to resolve these problems. In addition, the major areas of concern from which this intervention has been made are clearly outlined. The second chapter also looks at the history of pediatrics and takes into consideration all published materials either electronic or hard copies that are related to child health care and development. It gives an appraisal of some existing pediatric centre both within and outside the country.

The third chapter on the other hand explains the methods employed to gather information on child health care and development and further goes on to analyse these information gathered from these methods employed. Equally important is the fourth chapter which discusses deductions made from the data analysed in the third chapter. Here key issues

pertaining to pediatric centre designs are discussed into detail to reflect the set objectives.

The last chapter gives a summary of findings made and proposes recommendations that should be considered in order to achieve the set objectives of the proposed facility.

# KNUST



## **CHAPTER TWO**

### **2.0. LITERATURE REVIEW**

#### **2.1. INTRODUCTION**

##### **2.1.1. WHAT IS PEDIATRICS AND WHAT EFFECT DOES ARCHITECTURE HAS ON CHILD HEALTH CARE?**

Before answering this question, the principles behind hospital planning and design will have to be explained thoroughly since a pediatric centre can otherwise be described as a hospital. An in-depth evaluation of the effects of child health care on architecture will also be conducted.

#### **2.2. HOSPITAL DESIGN**

Hospitals are the most complex of building types. Each hospital is comprised of a wide range of services and functional units. These include diagnostic and treatment functions, such as clinical laboratories, imaging, emergency rooms, and surgery; hospitality functions, such as food service and housekeeping; and the fundamental inpatient care or bed-related function. This diversity is reflected in the breadth and specificity of regulations, codes, and oversight that govern hospital construction and operations. Each of the wide-ranging and constantly evolving functions of a hospital, including highly complicated mechanical, electrical, and telecommunications systems, requires specialized knowledge and expertise. No one person can reasonably have complete knowledge, which is why specialized consultants play an important role in hospital planning and design. The functional units within the hospital can have competing needs and priorities. Idealized scenarios and strongly-held individual preferences must be balanced against

mandatory requirements, actual functional needs (internal traffic and relationship to other departments), and the financial status of the organization.

In addition to the wide range of services that must be accommodated, hospitals must serve and support many different users and stakeholders. Ideally, the design process incorporates direct input from the owner and from key hospital staff early on in the process. The designer also has to be an advocate for the patients, visitors, support staff, volunteers, and suppliers who do not generally have direct input into the design. Good hospital design integrates functional requirements with the human needs of its varied users.

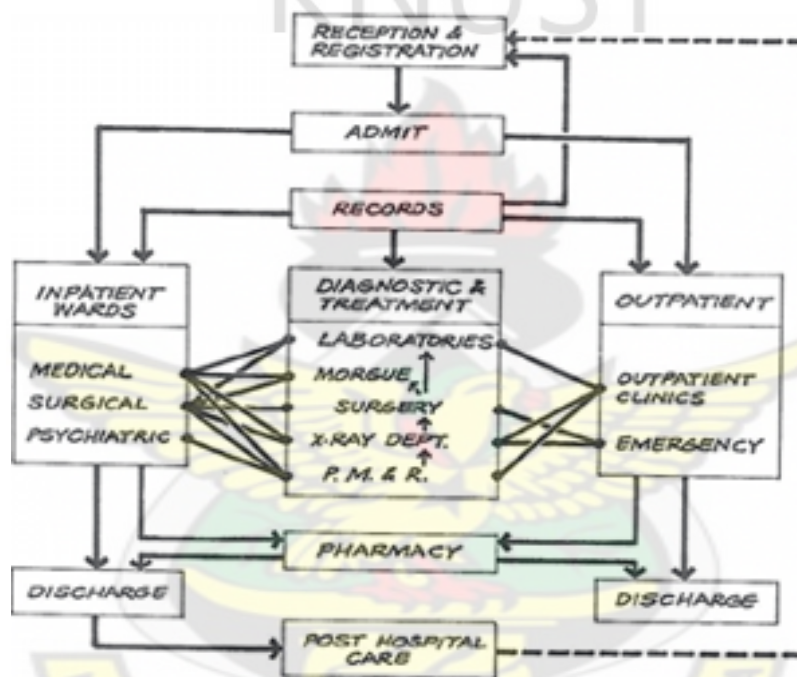
The basic form of a hospital is, ideally, based on its functions:

- bed-related inpatient functions
- outpatient-related functions
- diagnostic and treatment functions
- administrative functions
- service functions (food, supply)
- research and teaching functions

Physical relationships between these functions determine the configuration of the hospital. Certain relationships between the various functions are required as in the following flow diagrams.



GENERAL HOSPITAL RELATIONSHIPS



MAJOR CLINICAL RELATIONSHIPS

Fig.2.1 General Hospital Relationship Diagram (Source: Hospital-2008, R. F. Carr)

These flow diagrams show the movement and communication of people, materials, and waste. Thus the physical configuration of a hospital and its transportation and logistics systems are inextricably intertwined. The transportation systems are influenced by the building configuration, and the configuration is heavily dependent on the transportation

systems. It is therefore the responsibility of the designer to handle these routes carefully to promote comfort, cost saving and efficiency.

### **2.3. CRITICAL AREAS IN HOSPITAL DESIGN TODAY**

#### **2.3.1. CIRCULATION**

According to Dr, Hussein Varawalla, hospitals like small cities consist of different departments which work together as a whole. The way in which the different parts are assembled but with the parts differentiated make for analogies with urban design; the way in which traffic moves, and the routes that are taken by mechanical and electrical services are fundamental generators of the plan. It is important that these fundamental generators are well planned and designed to promote efficient use of the facility by staff, patients and visitors. According to him, the importance of circulation spaces in hospital design is numerous but the major ones are as follows:

#### **2.3.2. PROTECTION OF PATIENTS**

The primary principle underlying the circulation theory is the protection of patients (Varawalla, H 2004). The nursing unit corridor is a virtual traffic highway; in some cases a thoroughfare. Too much traffic disturbs patients and impedes smooth and efficient care. Of more serious consequence is the risk of contamination – hospital acquired infection. Assured protection against infection is the very heart of good patient care. For the architect it forms the basis of good hospital planning.



### **2.3.3. SHORTEST TRAFFIC ROUTES**

The second principle is the establishment of the shortest possible traffic routes.

Unnecessary steps cost money, time and fatigue and increase the chances of infection (Varawalla, H 2004). This is not a one-time cost but a continuous one because the steps taken by the nurse and others on the routes of the nursing floor are repeated endlessly day and night, every day of the year. On the other hand, short routes save steps to every one – patients as well as those who are concerned with patient care – doctors, nurses and personnel. Moreover, the hospital is a place where doctors and nurses are dealing with emergencies and life and death situations. In these situations, every minute is precious. Even otherwise, there is no room for tardiness in a hospital set-up; everything should be done fast. Shorter routes and fewer steps save lives.

In a study in Yale University, USA on the nursing floor, it was found that the distance travelled taken by nursing personnel during duty hours was 65.8% of duty hours. This was done to find the effectiveness of variety of planning of nursing units (Progressive Architecture, 1966). The increase in nurses' travel raised an important design question. This was an early call to architects to rethink planning long corridors in the nursing units of hospitals in Ghana.

### **2.3.4. SEPARATION OF DISSIMILAR ACTIVITIES**

Separation of different types of activities and different kinds of traffic is the third principle that should be followed. Such an arrangement helps to minimize chances of infection, for example, when clean and dirty operations, or clean and dirty utilities, or clean and infectious linen are separated. Similarly, seriously ill patients are separated

from convalescent or ambulatory patients. Separation of dissimilar activities also helps towards better organisation, a more efficient working arrangement, saving time and steps, and reducing confusion (Varawalla, H 2004).

Quiet and noisy activities are likewise separated. For example, there is much noisy bustle in the departments such as the kitchen and the engineering department; they are isolated so as not to disturb the critical patient care areas. And finally, different types of traffic outside as well as inside the hospital are (and should) be separated.

#### **2.3.5. CONTROL IS VITALLY IMPORTANT**

Control is the fourth principle that is of vital importance to planning. A certain amount of control comes with the separation of dissimilar activities. But that is not enough. In certain areas of the hospital, greater control is called for. For example, the nurse must exercise control and supervision over patient corridors and the coming in and going out of visitors. Infants must be physically protected. They must also be protected from the germs brought in by visitors and staff. Babies are vulnerable to epidemics especially to the dreaded infant diarrhoea. This is the primary reason why in a good system only the nurse – not even the doctor – enters the nursery, that too masked and gowned and through an anteroom (Varawalla, H 2004).

#### **2.3.6. EXTERIOR TRAFFIC**

It is necessary to separate the different types of traffic that traverse, sometimes crisscross, the hospital in all directions. The most effective way of doing this is by separating the traffic coming from outside before it even gets within the building. In actual fact, it is essential to separate the traffic outside in order that it is regulated inside.



In principle, there should be four separate entrances to a hospital for four important exterior traffic lines. These entrances are determined by the adjacencies and traffic flow inside the facility. The four major entrances are (a) main hospital entrance for dropping and picking up inpatients and visitors (b) outpatient entrance for outpatients (c) emergency entrance for emergency patients and ambulance cases and (d) service entrance for delivery of supplies and for pick up or removal of trash and garbage from the facility. In some hospitals removal of dead bodies takes this route (Varawalla, H 2004).

### **2.3.7. MAIN ENTRANCE**

In most of our hospitals there is one main entrance that is used by every one – outpatients, inpatients, visitors, medical staff and personnel. One can imagine the confusion caused by the merging of the outpatient crowd with the other traffic at the main hospital entrance. The problem is compounded by a perennial stream of suppliers, vendors and job seekers. At no time should this traffic be allowed to mingle with other hospital traffic lines or to go through the main lobby and administrative corridors. In two ways this can pose a serious problem. One is from outpatients and other exterior traffic straying into inpatient and other sensitive areas of the hospital. The other is the security risk. The author recommends that the outpatient block is kept locked after outpatient hours. For this, it should be contiguous but semi-detached from the inpatient block.

Larger hospitals provide a separate entrance for staff. Some provide reserved parking area for doctors, usually at the rear. They should not be expected to fight a traffic jam every time they come to the hospital. Where parking is so reserved, a special entrance for them may be arranged. Doctors as a rule prefer to use less crowded corridors to avoid

anxious patients or garrulous relatives trying to buttonhole them when they are in a hurry to reach the operating rooms or patient floors. Reserved parking space for the doctors is necessary in front of the emergency department too.

#### **2.3.8. EMERGENCY ENTRANCE**

There should be a separate entrance to the emergency department – also called ambulance entrance – for cases brought in by ambulance or private vehicles. There should be adequate reserved parking space for ambulances and cars of patients and medical staff. The access should be large enough to admit one or more ambulances negotiating with stretchers.

In many hospitals, especially where there is no separate entrance to the main hospital, or where the main entrance remains closed, emergency entrance becomes the main entrance for the hospital during the night. In some others, it becomes an unobtrusive route for removing the dead.

#### **2.3.9. SERVICE ENTRANCE**

This should preferably be in the rear because deliveries (especially of bulky items) are a noisy and unpleasant operation that should be screened from view from the patient care areas as much as possible. More importantly, it should be near the unloading dock close to the kitchen and the storage areas that receive much of the supplies. The unloading dock should have a covered area big enough for a truck to turn around. There should be no pedestrian traffic around this area. Garbage and other solid wastes are removed from this point, so also the dead bodies in some hospitals.

### **2.3.10. INTERIOR TRAFFIC**

As part of the written operational programme, flow charts for patients, personnel and visitors within and between departments should be developed and given to the architect. They form the basis for architectural plans. A design that has taken flow charts into account will expedite traffic, eliminate congestion and promote efficiency of operation. It will also ensure placement of departments and layout of equipment in proper relationship. The golden rule to remember is: “Separate departments, yet keep horizontal travel to the minimum.”

### **2.3.11. FACILITATE HEALING**

According to architect Herb .K. Griffin, in his article “Technology, Demographics alter Hospital Architecture” (assessed 2008), research and experiences are continuing to confirm the effectiveness of “healing environments”. Modern hospitals today seem to be increasingly willing to invest in this area because it has been established that the immediate surrounding s can be used to reduce internal stresses in people. As result circulation spaces are being given special treatments so as to echo this principle. The use of colour, materials, finishes including stone tiles, wood veneer, fabrics, and stained concrete are being employed to achieve this principle.

### **2.3.12. WAY FINDING**

Way finding is be designed to meet the needs of different groups of people coming to the site, such as children, the elderly, the physically and visually impaired, patients with language problems or learning difficulties as well as for service delivery purposes and contractor.

Way finding considerations takes into account the accessibility and visibility of a minimal number of entrances both into the site and into the hospital facilities. The strategy creates focal points throughout the buildings and externally, recognising patients' varying needs at points in their journey through the hospital. Way finding should be consistent to the end of the journey within the hospital. Specific consideration is given to first impressions created in entrance areas. Use should be made of art in creating focal points both for internal and external areas.

Design solutions should create a series of views to external spaces and internal points of reference that will enable patients, visitors and staff to navigate around the hospital and understand its basic layout without depending on signage systems. Such solutions should be an integral part of any way finding strategy.

Entrances to the hospital are to be clearly identified to promote ease of way finding and distinctive 'landmarks', created through use of art or other distinguishing features should be incorporated into the design, particularly at main entrances.

All sign-posting and instructions must be capable of being understood by the community that the site serves. The design of sign-posting should be coordinated in colour and graphics style. Colour should be used to facilitate the identification of specific zones and areas. Non-specialist language should be used, including appropriate and understandable icons and pictograms.

Information points should be provided around the hospital and grounds which could include computerized maps and hospital information. Consideration should be given to using overhead rather than wall mounted signs to facilitate infection control.

## 2.4. COLOUR AND LIGHTING

The way a place looks, its aesthetic, always plays an important role in how people respond to time spent there. In a nursing home, that response can have much to do with a resident's comfort and wellness. No longer is it enough to simply "paint everything blue" in an attempt to provide a comforting, calming effect. More thought and knowledge are required to create what architects and health-care administrators call a "healing environment." Patient rooms are being made more home-like and common areas are being "deinstitutionalized" wherever possible.

Colour is a major factor in the aesthetic of a room. Knowing the basics of color and how to use it as a tool are important steps in creating an environment appropriate to a residential health care setting. There are really no hard and fast rules on how to use color, but some general guidelines can be helpful. Research has shown that color can influence human behaviour. Cool colours (blues and greens) can calm, while warm has on the human eye. Cool colours seem to retreat from the viewer, while warm colors give the impression of advancing toward the eye.

The size of a space, what that space is used for, and its available light all contribute to the effect color has on the people using that space. For example, a nursing home work area such as a nurses' station should be done in cool colours or those which are highly reflective. In any intense work environment, colors that reflect light reduce shadows and improve visibility, thus contributing to higher productivity. Those that reduce stress and tension- cool colours-can provide a comfortable, non-distracting environment. On the other hand, areas that are more social colours (reds and yellows) are more stimulating.



This results from the reflexive effect colour in their nature-cafeterias, lounges and lobbies-are better served by warmer, bolder colours; these encourage interaction and conversation.

Colour selection for a patient room depends largely on how long a person will be resident in that room. A scheme of neutral tones and pastel colours with a few visual accents is appropriate in a hospital where a patient is likely to spend only a few days or a week or two. But in a long-term care facility where a patient spends large quantities of time in one room over a long period, such a design is likely to become boring, as well as difficult to function in for low-vision elderly. In nursing homes, patient rooms should provide a balance of colour, a mix of contrasting tones. The idea is to keep the space looking fresh and interesting, day-in and day-out, with clearly defined visual cues.

For the visually competent, the goal at the very least should be to make their room as home-like as possible. To do that, you need to take into consideration the background and age of the people who will be "living" there. In an environment where most of the residents are elderly, designers have learned to avoid contemporary colours and patterns. Instead, they try to choose those which will create the greatest level of visual enjoyment for elderly patients, and research has shown that for most people, those colours and patterns come from the period when they were in their 40s and 50s, when they were both financially and physically comfortable.

Colour also can help to visually link renovated areas and additions with unchanged existing sections of a nursing home. For years, designers have used colour to emphasize positive design elements while minimizing unattractive ones, drawing attention to or

away from interior and exterior features. Handsome finishes, such as natural marble or rare hardwoods, can be showcased by using understated colors that blend and coordinate. This allows the focal point to remain on the material itself. On the other hand, the unattractive colour of a tile or laminate can be downplayed with the introduction of a distinctly different colour scheme. Necessary but visually distracting elements, such as columns, beams, and pipes, can be camouflaged by painting them the same colour as an adjacent wall or ceiling.

Specialized environments create their own design and color imperatives. In an Alzheimer's facility, for example, patterns should be avoided because they create confusion. Nothing is more effective in enhancing residents' function than high contrast. Countertops should stand out strongly from floors. Often an edge band of contrasting color on a tabletop or other raised surface can help the resident identify it appropriately. The same principle applies in visually defining a sink or a toilet. Color can help with way finding. For an Alzheimer's patient, a room may be recognized more easily by colour than by function.

## **2.5. PEDIATRICS**

### **2.5.1 DEFINITION**

Pediatrics is a branch of medicine that comprises the care and treatment of diseases of childhood and the study of normal growth. This specialty in medicine provides services for children from infancy to childhood and also adolescence with the upper age limit ranging from 14-21, depending on the country. From the above definition it therefore, suggest that the place at which these services are administered to children is a pediatric

centre. In Ghana, physiology and age are the bases for determining whether a person falls under this category and the age range is between 1 day and 12years(Ghana Health Service, assessed 2008).

### **2.5.2 HISTORY**

Spanning less than two centuries, pediatrics is a relatively young medical specialty. Prior to the development of pediatrics, the medical needs of infants and children were provided by families, friends, and midwives; physicians rarely contributed to the health of this population. However, events beginning in the 19th century resulted in the development of physicians who specifically addressed the medical problems of infancy and childhood; thus the pediatric specialty was born. These events therefore presented the bases of the cumulative forces responsible for the development of pediatrics as a distinct branch of medical practice.

### **2.5.3 PEDIATRICS TODAY**

The last decade has evidenced a dramatic increase in the development and utilization of pediatric health-related quality of life measures in an effort to improve pediatric patient health and determine the value of health care services. Various care methods have been tried to improve pediatric care today and one of such is Delmar's Pediatric Nursing Care. This includes care plans that have been developed to reflect comprehensive pediatric nursing care based on the most common psychosocial and physiologic alterations. This nursing process serves as a learning tool for readers and as a practice and documentation format for clinicians. This thorough assessment provides the nurse and all involved in this field to providing meaningful and workable interventions (Karla, 2007).To that end,



pediatric centres have been developed and equipped with the requisite facilities to meet the various challenges in this field. The medical services provided by these centres are grouped under three areas namely,

- The patient care areas
- Patient services area and
- Supporting facilities.

#### **2.5.4 PATIENT CARE AREAS**

This area of care is basically concerned with the inpatients and emergency cases. Here, care is in two parts namely; medical and surgical. Medical care is concerned with non surgical operations and techniques and these include diseases such as:

- Malaria
- Febrile Convulsion
- Anaemia
- Gastroenteritis
- Typhoid
- Pneumonia
- H.I.V Aids etc.

Surgical care on the other hand involves operations on or manipulations of the patient's body and usually, cutting the body open to perform operations. Here, cases are grouped under two main categories namely Septic and Aseptic diseases. Septic cases refer to that which is infectious thus require careful handling and examples of such cases include;

- Acute Typhoid

- Appendicitis
- Infections of the bone
- Acute Kidney infections etc.

Aseptic cases refer to non infectious diseases and these include;

- Burns
- Hernia
- Accident cases etc.

The neonatal intensive care unit is also found in this area. This unit is for newborn babies and infants. Most of the babies cared for need surgery for various problems, including TOF (tracheo-oesophageal fistula), diaphragmatic hernia and abdominal wall defects. Other babies come to NICU with problems not necessarily needing surgery, for instance breathing or feeding problems

In addition, there is also the emergency /casualty unit, where first aid and emergency cases are attended to. Here care is on temporary basis and patients upon recovery or revival are either admitted or discharged that very day.

### **2.5.5 PATIENT SERVICES**

This area which is sometimes referred to as the outpatient department (O.P.D) is concerned with the delivering of services to outpatients. Here services provided include;

- Provision of information and making of enquiries
- Keeping of patient records and statistics

- Consultancy services and
- Administration of the centre.

#### **2.5.6. SUPPORTING SERVICES**

This sector within the centre, in a way supplements the operations of the other two areas already discussed. It brings together all the examination techniques and treatments associated with internal medicine which, depending on the size of the hospital, can encompass: cardiology, angiology, pulmonary, endocrinology and metabolism, gastroenterology and laboratories.

#### **2.6. CHILDREN'S ARCHITECTURE AND FUNCTIONING**

Planning and designing spaces for young children are generally based on adult's perception that may not be relevant to the children's functioning. Form, shape, color and function are the parameters applied in designing and articulating the spaces inside and outside the architecture. The design approach is somewhat not consistent with the literature on children's functioning in indoor and outdoor spaces, which suggests that the

value of a place is determined by its function rather than form and color. In other words, adults perceive space more on form, function and aesthetic (Matthews, 1992) whereas children see the space more on its functions rather than aesthetic (Christensen, 2003). As such, architects perceive a pediatric ward of a hospital as a space that accommodates beds, aisle for movement, toilets and bathrooms, a nurse station, a doctor room and a dressing room. For play, a playroom is attached to the ward which housed toys and television and a floor for rest. Studies in pediatric nursing suggest that such setting leads

to boredom, anxiety, and stress to hospitalized children (Lau, 2002). Among the reasons that lead children to behave regressively are the health care settings: strange place to stay, no sense of control, little choice and lack of things to manipulate (Said, 2006).

Moreover, buildings designed by architect are final, that is, leaving little room for children to change or manipulate the architecture. According to the theory of childhood cognitive development and literature on children's perceptual psychology, such architecture may not generate sense of place attachment. Consequently, the children could not develop sense of favorite place to the architecture. As a result children feel bored to go to school or feel fear to stay in hospital. In other words, the architecture fails to stimulate the children's cognitive functioning, affords insufficient space for physical functioning on the children's terms, and allows little opportunities for the children to socialize in their own choice and control.

#### **2.6.1. FUNCTIONING OF EARLY AND MIDDLE CHILDHOOD CHILDREN**

In the perspective of child development (McDevitt and Ormrod (2002), it is posited that early childhood is a period of incredible fantasy, wonder, and play. They learnt the world as a forum for imagination and drama that is they reinvent the world, try on new roles, and struggle to play their parts in harmony. Through sensorial and motoric activities with peers and adults the children rapidly develop their language and communication skills.

Their physical movement is much influenced by the functions of the features that they get in contact including furniture and toys in the indoors (Olds, 1987), and plants and animals in the outdoors (Kellert, 2002). Their responses to the environments are immediate and inseparable from the sources of stimulation around them. For example, it has been

established that hospitalized children recognized the unfamiliar conditions of their ward, thus they reacted regressively. Consequently, when they played in the ward's garden, they are much aware to the presence of animals such as birds and insects suggesting their cognitive functioning have improved. In middle childhood, children are genetically programmed for exploration of the world and bonding with nature (Cobb, 1969). Therefore, the design of children spaces must conform to their physical, cognitive and social functioning and development.

Physical functioning is the motoric actions such as fluid rolling, jumping, tumbling, running, and skipping. Physical development is the patterns of bodily growth and maturation of children interacting with the surroundings, indoor and outdoor spaces and their features. Cognitive functioning is the perceptual responses of the children with the spaces and features. Visual, audio and tactile perceptions contribute much on the development of the children's cognitive development. The cognitive development examines the systematic changes in children's reasoning, concepts, memory, and language. Social functioning is the transaction of children with peers and adults that affords them to assimilate and accommodate the actions of others. And, social development explores the changes in children's feelings, ways of coping and relationships with peers.

### **2.6.2 CHILDREN'S EXPERIENCE OF A PLACE AND ARCHITECTURE**

Children physical movement, cognitive scanning and social transaction in a space directly influenced by the spatial and properties of the environment. These interactions involve complex sensorial and motoric actions. Perceptual responses (sight, tactile, audio, smell

and taste) and mobility in an environment reveal a lot of significant information. In other words, perception is an active experience, in which a child finds information through mobility. To give an example, found that architectural projects involving children's participation facilitate architects to create innovative design in accord with the children's perception and affection to space and building. Notwithstanding, the architecture and its landscape should be designed both to support function and to nourish the child's sensory and aesthetic sensibilities. For example, a hospital ward functions as a place to recover health and its garden for play and rest (Said, 2006).

A built environment that affords a child to be cognitively alert to the external stimuli through movement and social actions will encourage him or her to affiliate or create bonding with it (Chawla, 1992; Khan, 2002) the Cognitive experience is the formation of thinking and problem-solving skills; affective experience is the emerging of emotional and feeling capacities; and evaluative experience is the creation of values, belief and perspectives to the environment For example, after experiencing more than two days in a hospital garden, ill children established sense of attachment to the garden that is intending to come back to the hospital if they get ill again

It is clear that the functioning and development of the children are shaped by the children interaction and transaction in the physical features and people. Understanding of these knowledge enable architects and landscape architects to design and plan a setting, building and landscape, that affords to harness the three functioning, physical, cognitive and social.



An architecture and its landscape is understood by children as physiographic space affording a child to show his physical strength and dexterity to make contacts, both perceptual and physical, with the elements and climatic forces of the place, either routinely or occasionally (Wapner and Demick, 2000). In other words, the space is where children's senses are stimulated through sensual and motoric activities and posits that movement in play such as in playroom stimulates a child senses in a rhythmic patterns of predictable sameness. However, the playroom should also allow gradual change or moderate diversity that would trigger fascination and satisfaction. In childhood psychology, the phenomenon is known as difference-within-sameness that affords a child to develop a mental construct that the architecture is a structure and structure develops. Such development occurs frequently in the natural world. For example, in a forest setting, discovered that middle childhood Finnish children recognise the forest as a place affording them functional and construction plays, and these plays improved their motor abilities. And, in hospital setting, it was found that hospitalized children increased their locomotion and dexterity in experiencing hospital garden.

Moreover, children's physical participation with the architectural features and natural landscape elements extend to satisfaction and the experience stay in their memory (Sebba, 1994). And, memory is a derivative of place attachment. Positive emotions to a place of play permit a multitude of affective opportunities for engagement, discovery, creativity, revelation, and adventure surprise (In turn, the affection allows the children to evaluate the place with values. Therefore, experiencing the environment is an essential, critical and irreplaceable dimension in the growth and functioning of children

The architecture not only a milieu for learning or health recovery but also a physical setting that triggers the positive behavioural responses such as place attachment and place identity. When one critically looks at the design of kindergartens, it can be realized that such facilities are designed beginning with rigorous understanding of childhood cognitive development. And, the designs view the building and outdoor landscape as holistic entities for young children to learn and grow. The designs anticipate the children are attached to a place. Place attachment is when they show happiness at being in it and regret or distress at leaving it, and they value it not only for satisfaction of physical needs but for its intrinsic qualities. It will not surprise to find children longing to come back to school after leaving for home or going back to hospital after being discharged.

Finally, the architecture and its landscape is also a social space where children play with peers or adults and create friendship, acquaintanceship, reduced social regressions and reduced social withdrawals (Ladd, 1999). These are progressive responses of children's social development. This is because during social play children expand their cognition of the place by assimilating the actions of others particularly peers (McDevitt and Ormrod, 2002). Overtime, through repetitive encounter, children accommodate their actions creating a new schema which is an expansion from the previous one. Thus, interaction in a social space such as communication and turn taking offers more stimulations and feedbacks to the children. Therefore, the children's cognitive faculties including schema to the place is expanded. That is, how sensorial and motoric actions as well as social activities of children are influenced by the elements of architecture and landscape. Finally, the effects on children's functioning are discussed in terms of designing and planning buildings and landscape for the children.



## **2.7. PEDIATRICS AND ARCHITECTURE**

The movement in the health care design field to focus on "patient-centered care" and "healing environments" is often reflected in the health care facilities' incorporation of features meant to mitigate the stressful nature of serious illness.

Childhood and its needs are, by their nature, anti-institutional. The enlightened children's hospital does more than meet a child's medical needs. It creates an environment that addresses physical, social, developmental and emotional needs.

Moreover, it takes into account not only the child's needs but those of his family. More and more children's hospitals and paediatric facilities encourage family participation in the treatment and healing process not as just a matter of policy but by providing for families in the design of the facility.

Most healthcare facilities are now awakening to the importance of providing for families. In the case of children's healthcare facilities, providing for the family should not be considered an add-in design feature, but rather the starting point for planning any child-oriented medical environment. This means making parental sleeping accommodation part of the design from the beginning, providing a family lounge, perhaps, a meditation room-a quiet place to take a break from the emotionally and physically draining demands of caring for a seriously ill child. Sleeping accommodations may be as simple as a chair that opens out into a bed, placed in a patient room large enough to accommodate it, or as extensive as full guest suites. The need of siblings, too, should be remembered. Child care resources for siblings might be made available in a dedicated space. At the very least, a playroom should be part of the family accommodation.

Apart from making certain provisions for the child's family, there are other key goals that will also have to be achieved. Among these goals include;

- Interaction with peers. The inclusion of playrooms, lounges, and classrooms enhances social interaction among children. Even well designed corridors, especially those with alcoves and bays, invite such interaction. Depression and a sense of isolation are major psychological factors in any seriously ill person. They are often most intense in a child. Peer interaction does much for morale and therefore, promotes healing.
- Independence. The environment should promote a sense of independence, including (as much as possible) freedom of movement and a sense of competency. Colour coding can also aid by assisting way finding.
- Access to outdoors. Children love to play outdoors, therefore, amenities as a patio, play courts etc should be included in the design.
- Fantasy and stimulation of imagination. It is not necessary to structure the entire facility as a fantasy environment, but elements of fun can be worked into any design.(Hospitals and Health Centres,2002, p.303-314).

## **2.8. CONCLUSION**

From what has been discussed in this chapter, it can be concluded that planning and designing of health care centres for children go beyond the general parameters of hospital design. It involves critical analyses of certain key generators to promote a functional and efficient health care facility. This can be summarized as follows:

- Circulation routes are very crucial spaces in hospital design. It has been established that it does not only assist staff, patients and visitors in way finding within hospitals, but protects them from risks, provide the shortest routes for them to traverse. In addition it aids movement around, helps control traffic within hospitals and also facilitate the healing process by the use of certain design features and elements.
- Colour also plays a major role in hospital design, colour can do much to comfort, stimulate and reassure a nursing home resident, and experienced designers are working with color, pattern and texture in the surfaces they create for their environments. Recent trends in nursing home design have emphasized creating a home-like surrounding, even though the materials used must enhance function and have the "industrial-strength" quality required to weather the use of medical and assistive equipment and the routine application of strong cleaning agents. To meet these many goals, the nursing home administrator facing renovation or expansion should rely on products from manufacturers familiar with medical usage, and on designers trained in the use and psychology of color in health care institutions. This is as important a responsibility to good resident care as exterior design or the purchase of capital equipment.
- In addition, planning and designing for children should always be based on children's literature on functioning in indoor and outdoor spaces i.e. the design must conform to their physical, cognitive and social functioning and development. Otherwise it could lead to boredom, anxiety and stress to hospitalized children.

- Advancement in technology and medical care has led to a new approach to hospital design. Hospitals today are now divided into three main zones namely: patient care department, patient services department and supporting services department.
- Modern child health care centres have now awakened to the fact that provisions will have to be made for the patient's family at the design stage in order to participate in the healing process. This is being done by providing guest suites, family lounges and playrooms etc.
- Moreover, the architect should have knowledge about modern care plans that have been developed to respond to specific needs of each treatment model in order to come out with their architectural interventions.



## **CHAPTER THREE**

### **3.0. METHODOLOGY**

#### **3.1. DATA COLLECTION METHODS**

The methods employed in collecting data are classified under the following, primary and secondary. Primary methods include personal observation, interviews and photography and the Secondary methods also include published documents and internet search.

#### **3.2. PRIMARY METHODS**

##### **3.2.1. INTERVIEWS**

Here professionals in this field including pediatricians and architects were interviewed to establish problems faced in the use of some of these existing child healthcare centre and some new technologies in the health care sector were discussed. Areas considered were circulation, lighting, spatial configuration and supporting services. Efforts were also made to seek their views on how these problems can be eliminated or scaled down by architectural designs and also on how some of these modern trends in the healthcare sector including new treatment models could be introduced and reinforced in modern hospital projects.

In addition, questionnaires were administered to users of these facilities i.e. patients, staff and administrators to establish their views on some existing healthcare facilities. Here issues such as circulation, lighting, spatial configuration etc were discussed to ascertain to what degree how an architectural design affects treatment methods and the healing.

##### **3.2.2. PHOTOGRAPHY**

Photographs of some existing healthcare facilities that were visited were taken to aid the

design process. Here issues relating to wall, floor and ceiling design and finishing were considered. This was to help establish materials that have been employed in finishing various spaces within some of these hospitals. Moreover, at certain areas where we were forbidden from entering, photographs helped to determine from first principle the width and height of some of these spaces. Photographs were also taken of some machines and equipments in order to establish their spatial requirement and also their mode of operation.

### **3.2.3. PERSONAL OBSERVATION**

The main concern here was to gather some technical data and also experience conditions within some centres that were visited. Here I conducted a measured drawing of two child health care centres and also took measurements of machines and equipments to establish their spatial requirements. Room sizes, height, finishes, configuration and equipment arrangement were critically examined to make the design more efficient in use, cost effective and very functional.

## **3.3. SECONDARY METHODS**

### **3.3.1. ELECTRONIC AND PRINT MEDIA**

Most of the information used for this thesis design was gathered from the internet and the print media. Here articles published and books written by professionals and experts in this field were critically examined and analysed and also employed as guidance tools in the design process. The layout of some selected child health care centres both within and outside the country were studied to establish design flaws and positives that were to be discouraged and encouraged respectively. I also considered certain design elements and



features that have been employed by other designers to make their designs modern, functional and more interesting to use. Here issues regarding environment and outdoor space treatment were critically looked at.

### **3.4. DATA ANALYSIS**

In order to establish what goes into the design of a pediatric centre i.e. the requirements and effects pediatric care has on architecture, qualitative studies have been conducted on some selected child health care facilities by applying the information gathered from the various methods employed for data collection to appraise these selected facilities. This has been done by critically examining and analyzing these facilities qualitatively under the following broad areas;

- Facilitation of activities
- Utilization of resources
- Modification of climate
- Meaning and delight

### **3.5. CHILD HEALTH DEPARTMENT, KORLE-BU**

This 250 beds/cots capacity facility is located adjacent the main administration block and opposite the emergency department. It provides medical services for children between the ages of 1 day – 12years. This facility is divided into three zones and these are;

- Patient care zone – concerned with inpatient care
- Patient service zone – concerned with outpatient care
- Supporting services zone – concerned with internal medical treatment and examination.



Fig. 3.1 Child Health Department, Korle-Bu (Source: Author, 2008)



Fig. 3.2 Out Patient Department, Child Health Department, Korle-Bu (Source: Author, 2008).

### 3.5.4 FACILITATION OF ACTIVITIES

In a study involving some circulation layout plans of some hospitals and interviews conducted, I observed some number of screwed-up schematics. In almost every one of them, I could trace the trouble to failure to heed the basic principles of circulation. And what is worrying is that these principles were violated not by starters alone but by experts

as well. One of such healthcare facilities is the Korle-bu child Health, and the outcome of this study has been organized under the following principles of circulation:

- Way finding
- Control of traffic
- Protection of patients, staff and visitors
- Exterior traffic
- Healing through change in environment and.
- Shortest route

The form of the building is highly influenced by its access and circulation routes. Its vertical arrangement is such that the treatment, supply and disposal, administration and medical services are connected to allow for work efficiency and the arrangements are as follows:

- Ground floor: main entrance, emergency unit, outpatient area, consulting rooms, information and records unit, and treatment areas.
- First floor: located on this floor are the surgical ward and the operating theatre.
- Second floor: on this floor are the administration and the medical ward “A”.
- Third floor: this is the floor that houses the medical ward “B” and the babies unit.

### **3.5.5. WAY FINDING**

As explained earlier on, it is designed to meet the needs of different groups of people coming to the hospital. This principle has however been violated by the designer and it is evidently clear from the point of accessibility and visibility. The change in level between the visitors’ parking area and the main entrance is 200mm and there is no provision of a ramp to aid especially paraplegics and the visually impaired to access the outpatient

department from the visitors' car park. The design does not also make provision for a drop off zone, as a result there is always human and vehicle conflict at the main entrance. In addition, the use of certain facilities has been limited to only able bodied patients, staff and visitors. This is apparent in areas such as washrooms where because doors are not automatically operated paraplegics experience difficulties in accessing them. Moreover, within the facility no attempt has been made to create views or landmarks that will aid patients and visitors navigate around the hospital and understand its basic layout without depending on signage systems.

Although accessibility signage has been provided to aid navigation around the hospital, it is inadequate. The child health department is vertically stacked and as a result lifts and ramps will have to be provided. However these lifts and ramps have been located at the rear of the building and no efforts has been made to use signage and instructions to direct patients and visitors towards their location as a result one will always have to ask for their location.

#### **3.5.6. CONTROL OF TRAFFIC**

From the main entry point of the hospital different types of traffic have been separated by the use of circulation routes. This has been very effective because it is very important to separate the exterior traffic before it even gets within the hospital. In actual fact, it is essential to separate the traffic outside in order that it is regulated inside. Upon entering the premises of Korle-bu Teaching hospital, one can either drive or walk straight to the main entrance of the child health department.

In a move to control vehicle traffic and confusion among staff and visitors, the designer has created three separate car parks. The first parking area which is located in front of the building is for use by patients and commercial drivers. The emergency unit which is about 20 metres from the main entrance to the outpatient department also has a parking area reserved for only ambulances and private vehicles bringing in emergencies. At the rear of the building is the third car park which is reserved for only staff and services. This is to prevent visitors bumping into staff and also screen off views of offloading deliveries, bulky items, clean and infectious linen or stuffs that could be detrimental to the health of patients and visitors. Another design approach adopted to control exterior traffic by the architect is the creation of a entry point from the car park which however does not go through the outpatient department but leads straight to the inpatient department. As results visitors who have their relatives in the inpatient department do not have to go through the outpatient department thus reducing human traffic.

### **3.5.7. SHORTEST ROUTE**

The main entrance is the only barrier between the visitors' car park and the outpatient department. The outpatient department consists of a pharmacy, records unit and a laboratory all coming together to form a triangle. In the middle of this working triangle is a nurses' station which faces the main entrance. This arrangement allows for shorter distance coverage because users will have to traverse routes instead of moving along.

### **3.5.8. PROTECTION FOR USERS**

This is one the chief principles that has to be well considered and handled. However it has been overlooked by the designer. The facility has been designed in a way that staff,



patients and visitors use the same corridors and lifts. According hospital design standards, the least width of a corridor should measure 1.8 metres but this is not so, as one will find some corridors measuring 1.2 and 1.5 metres respectively. It is within these corridors that patients on stretchers, wheel chairs and those walking use thus there is always traffic jam whenever medical cases increase. This can also give rise to hospital acquired infection since the sick and healthy ones are always in contact. In situations such as food distribution to patients, there can be food contamination. This can happen especially when a visitor is carrying a communicable disease. In some cases as well the presence of visitors, staff and patients can impede movement and as we all know in hospital administration time wasted can lead to loss of life.

#### **3.5.9. FACILITATION OF HEALING PROCESS**

Since this department is for only child health care, the designer tried as much as possible to create an environment that will make them feel at home or even at school. Wall papers and paintings similar to what one will see at a crèche or kindergarten has been used to decorate all walls within the facility. This according to psychologist makes children happy by boosting their immune system as a result reducing internal stress.

However, the corridors on the ground floor leading to the lifts and to the outpatient departments are badly lit and ventilated. This psychologically creates a state of fright as a result of the condition in there.

#### **3.5.10. UTILISATION OF RESOURCES**

Different materials and architectural elements have been combined in raising this structure. Materials employed ranges from structural to aesthetic elements and features.



The main structure is a column and beam structure in filled with sancrete blocks and covered with a cement and sand plaster mix.

The floors of the outpatients and visitors' waiting areas, the emergency ward and that of all external circulation routes are finished in terrazzo. Within the care areas, where the inpatients wards are located, the floors and corridors are finished in ceramic tiles.

Most of the walls of the facility are finished in different shades of cream emulsion paint with the exception of the wash rooms and sanitary areas where combinations of terrazzo and porcelain tiles have been employed. The surgical theatre on the other hand is finished in porcelain tiles from the floor to the ceiling level and this I was made to understand will allow for easy cleaning and maintenance of the interior spaces.

#### **3.5.11. MEANING AND DELIGHT**

According to the head of the child health department, a children's hospital should do more than meet a child's medical needs. It should create an environment that will addresses physical, social, developmental and emotional needs. Although, this challenge has not been achieved fully, certain provisions have been made to create such an environment. As a result, educational and entertainment facilities in the form of classrooms and playrooms have been incorporated in the department to help in the healing process.

In addition, most of the interior walls of the hospital are decorated with beautifully designed wall papers and paintings similar to what exist in crèches and kindergarten schools. It can be said emphatically that the environment has been treated like that of a kindergarten.

### **3.5.12. MODIFICATION OF CLIMATE**

In this area of the design, much effort has been made to bring in daylight as well as improve upon ventilation. The facility is oriented to have its longest facades facing the north and south cardinal points. This is to bring in the north light but at the same time cut off solar ingress. Walls demarcating circulation routes are honeycomb to bring in light. However, in bid to create more ward spaces the designer failed to address issues such as ventilation and lighting. Wards spaces at the inpatient areas have been designed to open up unto corridors. These wards lie on opposite sides of corridors thus prevents natural light from reaching the interior corridors. The interior corridors which are also the main circulation routes within the inpatient care areas are also badly ventilated. Air from outside travel through ward spaces before entering corridors and since openings in the wards are usually closed, it always leaves the corridors warm and ill ventilated. This can also give room to infections when patients diagnosed of communicable diseases can easily pass them on to visitors and staff who ply these areas.

### **3.6. CHILD HEALTH UNIT, TEMA GENERAL HOSPITAL**

Tema General Hospital is a Metropolitan Hospital located in Tema Metropolis, which is in the Greater Accra Region, the capital city of Ghana.

The Hospital has a total bed complement of 280 and ten wards. It offers both General and Specialist Care Services in all the major Clinical Disciplines including Internal Medicine, General Surgery, Pediatrics, Obstetrics and Gynaecology, Dental and Eye care. Statistics made available, according to the last census, suggest that in the year 2007, the outpatient department recorded as many as 533,713 cases with 36,129 being pediatric related. Out of this figure, 2987 were impatient cases and the remaining being outpatient.

Although the W.H.O recommends that any hospital with total year attendance exceeding 75,000 should have an independent child health department, this is however not so Tema General Hospital. The child care unit has an existing capacity of 33 bed/cots sub-divided into two namely; surgical and medical wings.



Fig. 3.3 Child Care Unit, Tema General Hospital (Source: Author, 2008)

### **3.6.1. FACILITATION OF ACTIVITIES**

The choice of access and circulation really affected the form of this hospital. The designer chose a spine form with branching sections (individual department). Entrance and exit to the facility is through one main gate. Pedestrians, visitors coming in vehicles and ambulances all use one access point thus creating conflict at rush hours. At the outpatient department, both adults and children share the same waiting area consulting rooms. This is very alarming since the medical needs of children in a way are quite different from that of adults and may also require extra attention. The support services in the hospital have been haphazardly arranged and signages are also not visible enough for visitors to read thus compounding one's problem in using the facility. After consultancy, depending on one's diagnosis, the child will either be admitted or discharged. However,

because of the small bed/cots capacity of the children's impatient unit, most cases which require admission and careful studies are diagnosed and turned away the same day.

### **3.6.2. UTILISATION OF RESOURCES**

The child care unit consists of two blocks, being medical and surgical blocks. These are basically of concrete and sancrete construction. All floor slabs and external circulation routes in the hospital have been finished with polished and rough terrazzo respectively. The surgical theatre, which is shared by both adult and children and the emergency unit floor slabs are however finished with ceramic tiles.

The walls and ceilings of the hospital have been finished with various shades of emulsion paint. The ceiling material employed here are all of timber, tongued and groved.

### **3.6.3. MEANING AND DELIGHT**

From all indication, not much effort has been put into the design to make children feel at home. This is evident from one's first point of call through to the child care unit (impatient). Despite the establishment that a hospital environment facilitates the healing process through design, this principle has been neglected. The environment is so open that children upon coming out of their wards will see fresh accidents victims being brought to the hospital. One will also see adults lying on floors crying in pain and shouting for help.

The only positives about the design of the child care unit are the provision of a playground and efforts made to make the interiors resemble a kindergarten classroom instead of that of a hospital ward. The wall mounted paintings and pieces of writing make it interesting and comforting for children to live within space.



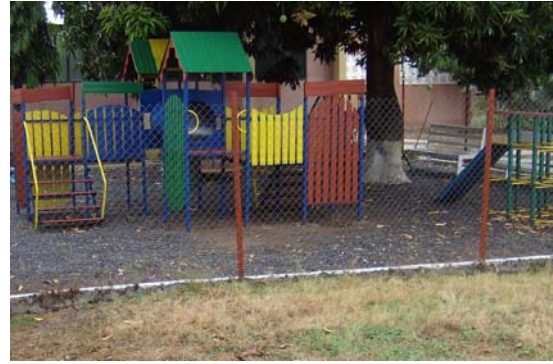


Fig. 3.4 Play Area, Child Care Unit- Tema General Hospital (Source: Author, 2008)

### 3.6.4. MODIFICATION OF CLIMATE

The general function of the building fabric to perform this function has failed miserably. Although all buildings on site have been orientated to face the north and south cardinal points, not much was done to improve on lighting and ventilation within interior spaces. As a result of smaller opening sizes within the long span structures and low ceiling heights (2.5m long), all interior spaces have a feeling of congestion and stuffiness. The child care unit is no exception and this condition if not resolved will continue to frighten children visiting the hospital.

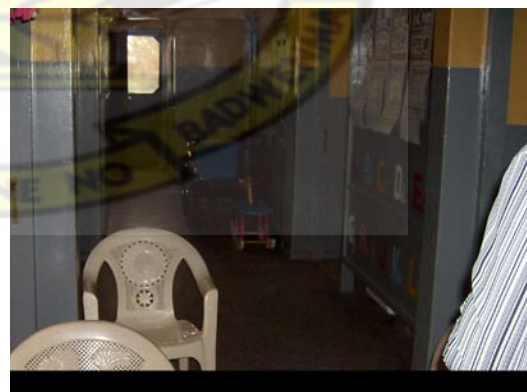
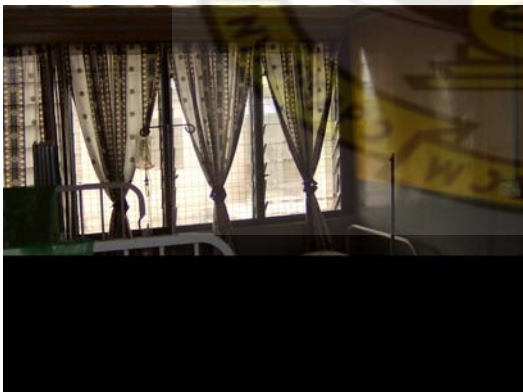


Fig. 3.5 Impatient Ward, Child Care Unit, Tema General Hospital (Source: Author, 2008).

### **3.7. CHILDREN'S HOSPITAL AND HEALTH CENTRE, SAN DIEGO, CALIFORNIA-U.S.A**

#### **3.7.1 FACILITATION OF ACTIVITIES**

This facility covers an area of 190,000 square feet. Visitors to the hospital enter through the base of a large clock tower. The lobby is also the reception area and waiting room for families of children visiting outpatient clinics, which are located on the first floor. Also on the first floor, but separated from these reception and ambulatory areas, is San Diego's only children's emergency department. The second floor contains patient rooms, and the third floor contains critical – care rooms and pediatric intensive care facilities.

#### **3.7.2 UTILISATION OF RESOURCES**

Its architecture combines elements of indigenous Spanish Mission style with broad elements of childlike fantasy and fun. The result being a cohesive, decidedly noninstitutional and unthreatening massing of surprises including downspouts that empty into concrete collector cubes decorated like tic-tac-toe boards, interactive art and playfully landscaped courtyards. Inside, the patient rooms are grouped into clusters designed to evoke cozy neighbourhood feelings. The overall effect is of a fairy-tale castle.

#### **3.7.3 MEANING AND DELIGHT**

The patient floors consist of ten-bed neighbourhood arranged around a nurses' station. The stations are made to resemble garden walls and fences. Columns are fashioned into lampposts. Green carpeted areas imitate lawns. At night, fibre optics provide the illusion of twinkling stars in the vaulted ceilings over the nurses' stations.



The patient rooms themselves are designed to resemble children's bedrooms and they include brightly painted cabinetry for clothes and personal belongings. Children are offered a catalogue when the check in from which they may select toys and art prints to decorate and personalize their room. The rooms on the second floor have exterior doors that lead to six perimeter courtyards, each of which is landscaped thematically. There is, for instance, a sensory court (with plants of varied textures, smell and appearance) and court of names featuring plants with children's names such as Johnny Jump-Up and Creeping Jenny. A large central courtyard is available to staff, families and patients. Covered by a conical skylight, this courtyard features a large patch of lawn for picnics.



Fig. 3.6 Children's Hospital and Health Centre, San Diego, California – U.S.A, (Source: Hospitals and Health Centres, p.311).



Fig 3.7 Reception and Information Desk (Source: Hospitals and Health Centres, p.311).

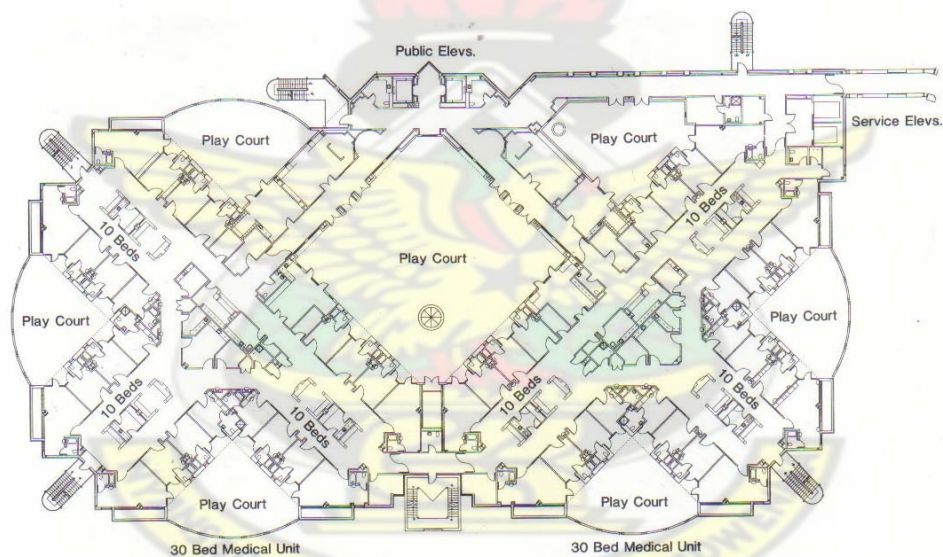


Fig.3.8 Children's Hospital and Health Centre, San Diego, California - U.S.A. Floor plan.(Source: Hospitals and Health Centre, p. 306-307).

### **3.8. CHILDREN'S MEDICAL CENTRE OF ISRAEL, PETAH TIKVA, ISRAEL.**

#### **3.8.1 FACILITATION OF ACTIVITIES**

This facility designed by the Cannon architectural firm covers an area of 390,000 square feet and it opened its doors in the late 1992 to all children of the Middle East, regardless of nationality, race or religion. The owners and architects had two major goals:

1. To create a building that would house effectively very advanced care and medical research and
2. To create a building that is in itself a healing environment for children.

Stress is minimized, in part, by maintaining contact with the outdoors. Daylight is abundant, as a main circulation path leads through a five storey, skylight-capped atrium, which is at the core of the inpatient area. The atrium is decorated with large trees and comfortable, casual furniture, suggesting a village square rather than a hospital lobby. The goal is to maintain a comforting feeling of being outdoors, so that you get almost to a patient room before you feel like you've entered the building.

#### **3.8.2 MEANING AND DELIGHT**

Patient-room windows look out onto the atrium and glass-enclosed elevator allow children to watch visitors, come and go, including parents. By observing the parents as they leave the building, the child feels less alone and less abandoned.

In contrast to one current patient-focused strategy which concentrates as much treatment in the patient room as possible. The Children's medical Centre of Israel clusters fifteen patient rooms around a central treatment room. Children are brought here for most procedures. The objective is to preserve their own room as a safe haven, a place for rest

and comfort but not pain and anxiety. Likewise, while the patient –focused rooms emphasize privacy, they actually have windows along the inside corridors – not so much for the nurse to look in as for the child to gaze out.

Bathrooms are located on the outboard (external) wall rather than the more conventional inboard (interior) wall. This not only provides a clear line of sight into the corridor. It provides an alcove that can serve as private space for parents who choose to remain in the room with the child. The alcove has a reading lamp and a lounge chair that converts into a sleeper.

Colour schemes are bright throughout and magnetic chalkboards are available in each room so that children can personalize their space.



Fig. 3.9 Children's Medical Centre of Israel, Petah Tikva, Israel. The centre's atrium is designed to resemble a village square rather than a hospital lobby (Source: Hospitals and Health Centres, p.308).



### **3.9. CHILDREN'S HEALTH CENTRE, DUKE UNIVERSITY MEDICAL CENTRE, DURHAM, NORTH CAROLINA - U.S.A.**

Completed in 2000, the Children's Health Centre at Duke University was designed by Kaplan McLaughlin Diaz with the belief that the patient's immediate environment is critical to the healing process and to fit well within the surrounding university medical centre.

#### **3.9.1 MEANING AND DELIGHT**

The glazed atrium windows resemble the adjacent buildings during the day and at night display a bright expansive facade. Beacons along the exterior guide patients at night to the centre. Inside the 125,000 square feet facility, the Children's Health Centre is packed with "positive distraction" to make the experience of its young patients and families as stress-free as possible.



Fig.3.10 Children's Health Centre, Duke University Medical Centre, Durham, North Carolina.( Source: Hospitals and Health Centres, p.311)

One such celebratory space is the atrium at the centre's entrance, which serves as the facility's centerpiece and toward which the entire Children's health Centre's public spaces are oriented. Entering, the visitors pass geometric sculptures framed by generous green space and a special pediatric garden with spaces for children to play. Just past this area, the five storey atrium has on one side a dramatic glass curtain wall and on the other a series of curving balconies that reinforce the whimsy and playfulness of the décor. Included among the positive distractions of the space are interactive toys, oversized aquariums, large kinetic sculptures and patterned finishes. The curved open pathways overlooking the atrium and leading to the clinic block add to the whimsy and make way finding fun as well as easy.

The project includes a three- storey, 100,000 square feet pediatric specialty ambulatory care centre, a 48,000 square feet, women and children's inpatient facility and a 150- car parking structure.



Fig. 3.11 Children's Health Centre, Duke University Medical Centre, Durham, North Carolina (Source: Hospitals and Health Centres, p.312).



### 3.10. CONCLUSION FROM CASE STUDIES

It may be concluded from these case studies that;

- The various designs took into consideration and respected the values of children .i.e. independence, interaction with peers, fantasy
- With the exception of the local facility, the rest have made provisions for the families of patients. This is because they all believe the family plays a role in the healing process.
- The designs conformed to children's physical, cognitive and social functioning and development
- One must have an idea of how children function both indoor and outdoor.
- In health designs, functionality over-rides form, that is, form should follow function.
- The climate of the area must be considered in the earlier stages of the design a facility that will be environmentally friendly and energy efficiency.
- Issues relating to services and supply must be well tackled to allow for the proper functioning of the hospital.

## **CHAPTER FOUR**

### **4.0. FINDINGS**

#### **4.1. PREAMBLE**

This chapter is in two parts, the first takes into consideration key issues that have been identified and are very critical for the design of an efficient and functioning pediatric centre. The second part further explains how these key issues have been worked at to reflect the objectives of this thesis.

#### **4.2. REQUIREMENTS OF A PEDIATRIC CENTRE**

Deductions from the case studies conducted on some selected child healthcare facilities has revealed that the health needs of children are very unique and therefore require special attention. Apart from the general hospital standards which were observed by both local and foreign hospitals understudy it can be realized that almost all the foreign hospitals had a philosophy. The foreign designs had architectural character that promoted the values of children and helped in achieving their objectives. The architectural characters identified, worth discussing and incorporating in my design has been expatiated below.

##### **4.2.1 FACILITATION OF ACTIVITIES**

First of these characters is the general issue of functionality overriding form, that is, form should follow function. This can be explained in plain terms as letting the design of the hospital follow the various processes that takes place chronologically. This character when achieved by the designer makes the facility more efficient and saves cost. This is given credence when we consider general issues such circulation and lighting. Circulation

is very critical because it can either encourage or put-off people from visiting a health care facility. A hospital design with good circulation layout allows patients and staff to traverse the facility without building up stresses because the shortest routes are always used. It allows for easy wayfinding both within and outside the facility and helps in controlling traffic.

However this quality is lacking in almost all the local child healthcare facilities visited in the country. Some of the circulation routes have no sense of direction and in addition there were no signs to help users find their orientation within them. This is very dangerous, especially for visitors since they could end up entering prohibited spaces. This can also lead to accidents because patients, staff and visitors may end up using the same routes. A critical examination of some of the local hospitals shows that no efforts have been made to protect visitors and patients. The design therefore makes it very easy for diseases to be transferred from and to users.

Another important area which is very critical to child health care is the acquisition and use of technical data. This area takes into consideration the sizes of beds, cots, wheel chairs, incubators etc. A special study of these above mentioned health items aids the designer in determining and allocating space to accommodate them. Configuration of areas and spacial allocation for circulation routes, departments, wards, sanitary areas depends on these studies coupled with anthropometrical data obtained from the study of human body and its parts and capacities.

#### **4.2.2 MODIFICATION OF CLIMATE**

Lighting is another issue that requires critical consideration and analyses. Naturally darkness is associated with fear as a result if a very sick patient have to go through dark places within a hospital, it will psychologically increase the fear factor thus aggravating the patient's condition. A well designed hospital makes use of a lot of natural lighting. This cuts down on cost since the use of artificial lighting is limited and makes one have contact and a feel of the natural environment. This quality has also been poorly tackled architecturally in our local health care facilities. An example is the Korle-Bu child health care facility where we have ward spaces aligned along an internal corridor. This has led to total darkness in the corridors and makes circulation difficult unless by the aid of artificial lighting.

#### **4.2.3 MEANING AND DELIGHT**

The issue of fear factor among children visiting hospitals for medical treatment is another major issue characteristic of pediatric centres. From the study it can be realised that the foreign architects did their best to eliminate this issue of fear factor. This can be seen in the design of both the Children's hospital in San Diego, Carlifornia-U.S.A and Children's Medical Centre of Israel, Petah Tikva, Israel. Here outdoor and indoor spaces have been designed to look like a kindergarten and a children's bedroom respectively. Walls have been given brighter colours with paintings of plants, animals and other objects they study at school. Ward spaces have been designed to open out unto courtyards and these yards have large patches lawn for picnics. Most patient rooms are clustered around treatment rooms. It is within these treatment rooms that all procedures take place thus preserving the patient room as a safe haven, a place for rest and comfort but not pain and anxiety.

Entrances, lobbies and waiting areas have been designed to minimize stress by making patients and visitors have contact with the outdoor. This has been achieved by introducing features and elements that makes it look like an outdoor space rather than a hospital lobby or waiting area. As a result of this design approach, stress is reduced and the issue of fear factor in children is erased thus facilitating the healing process.

In addition efforts were made to achieve the goal of designing a facility which is self healing. Here the various designs took into consideration and respected the values of children .i.e. independence, interaction with peers, fantasy. Children by nature like interacting with peers and play together. This encourages those who are very ill want to join their colleagues recuperating play thus psychologically reduces stress and quickens the healing process. It is also believed that presence of the patient's family contributes to the healing process but to what degree it is not known. As a result most designs have made provision for family interaction spaces. Here patients can have contact with their siblings and parents and seeing them come and go everyday will make them want to join them go home thus psychologically quickens the healing process.

An equally important area when designing for children is to know how they function both indoor and outdoor. This is very important because children's function in space is different from that of adult. Adults perceive space more on form, function and aesthetics whereas children see space more on its functions rather than aesthetics. As such when adult perceptions are used in designing for children it leads to boredom or children feel scared to stay in hospitals.

#### **4.2.4 UTILISATION OF RESOURCES**

The choices of materials for the construction of such facilities are vital and crucial. From studies conducted on some selected health centres, it could be deduced that the choice of material for their construction are basically concrete, steel and sancrete. However, areas of concern expressed by designers and users are the types of finishes employed to make the facility more efficient and user friendly.

Walls have been painted in brighter colours to arouse the interest of users especially children. They have also been treated to allow for easy cleaning and reduce the risk of accidents in facilities. The type of floor finishes employed for various areas was also a major concern. Depending on the use of a place, the right material has to be selected to facilitate usage of these. It can be realized from the studies that materials such as tiles, terrazzo and granolithic screed were employed depending on the performance requirement of that area. At Korle-Bu for instance, all washrooms have been given ceramic tile finish and internal and external circulation routes given tile and terrazzo finishes respectively.

#### **4.3. INFLUENCE OF FINDINGS ON DESIGN**

In an attempt to make the facility more user friendly, the proposed health facility was designed according to the principle “form follows function”. Here, a master circulation plan was produced showing the relationship among the various departments within the facility. This layout shows how various spaces are related and how they can be assessed. In addition, the master layout plan shows the various circulation routes within the facility thus making it very easy for users, patients and visitors to orient themselves. This design



approach not only helps control traffic but also allows for easy way finding and shorter distance coverage. Again it gives protection to users by making them aware of routes meant for each user. Because patients, staff and visitors are always on the move, it educates them on which routes to use so as to avoid accidents and risks. It also promotes efficiency in service delivery because in some cases, the use of the same circulation route by staff, patients and visitors can impede movement and lead to loss of life since time is very critical when it comes to health care.

Another important goal achieved by this design is that of making the pediatric centre a healing environment for children. This has been made possible by the various facilities provided within the centre and how they have been designed to affect the wellbeing of children. The first approach was to design the centre to look like a kindergarten. The facility has been painted in brighter colours and all walls, floors and ceilings treated to look like what one sees when he/she visits a kindergarten. Paintings of notable and famous school characters run along walls from the outpatient department to the inpatient units. This move according to pediatricians and psychologists reduces or eliminates the fear factor among children when they visit health facilities.

Another important measure that has been put in place in order to reduce stress build up in children at the outpatient department is to make them feel very comfortable. This has been achieved by providing play areas at every consulting area. It allows patients who are yet to receive attention to play among themselves. These spaces have been designed playfully with architectural elements and features and equipped with toylike structures and legos. At the inpatient unit, wards have been designed to look like children's bedrooms and each provided with playing materials. This has been done because it is

believed that the very sick child upon seeing his colleagues playing will be motivated and encouraged to join them and as a result, psychologically speed up the healing process.

An equally important goal which has been successfully achieved is the introduction of the patient's family in the design process to facilitate the healing process. This has been done by providing family rooms, play grounds and snack bars. Here families visiting are allowed to take their children to the family rooms so that they can interact. This not only allows a patient to feel at home but also prevents families visiting from disturbing other patients. The wards have also been designed to open out unto a playground which is equipped with child's play fantasies and other entertaining facilities like merry-go-round and see-saws, teetertotter etc.

In order to promote and improve child healthcare delivery technological advancement that has been made in the healthcare sector has to be incorporated in modern health care facilities. In taking care of these advancements, effective measures were put in place at the design stage to take care of these advances. This is evident from functional spaces provided to effectively house the widely varying patient characteristics and treatment models and also potential for growth. At the inpatient unit, provision of spaces such as classrooms, procedure rooms, staff rest rooms, surgical ward and medical wards etc will not only promote service delivery, but also improve upon it.

Above all, the most important factor that influenced this design is that of anthropometrical and technical studies. The information gathered here aided in determining the sizes of spaces all the way from the outpatient department through to the

intensive care unit. The resultant effect being, well configured spaces as well as housing effectively equipments and latest treatment models.

It can be deduced from above that the major objectives of this pediatric centre which are basically; making the facility more user friendly to promote health care delivery, creating a building that is in itself a healing environment for children and creating a building that would house effectively very advanced care and medical research has been successfully achieved (Appendices A-T).



## CHAPTER FIVE

### 5.0 CONCLUSIONS AND RECOMMENDATIONS

#### 5.1. CONCLUSION

A review of the Paediatric centre reveals that the children's hospital does not only consider the medical needs of a child but it also creates the environment to address physical, social, developmental and emotional needs. It critically looked at issues such as;

- The values of children .i.e. independence, interaction with peers, fantasy etc. Here the environment has been designed to promote a sense of independence, including freedom of movement and a sense of competency and in addition the inclusion of playrooms, classrooms and lounges to enhance social interaction among children
- Anthropometry and Technical study .i.e. this concerned the study of the human body and its parts and capacities. The choice of items such as hospital beds, cots, wheel chairs and other equipments used for the care of children depends on data gathered from anthropometrical study. This study is very crucial because it affects greatly the quality of services offered to patients. Once this issue is well tackled coupled with accessibility, the canker of high morbidities and mortalities in child care today will reduce drastically.
- The provision for the family .i.e. in the case of children's healthcare facilities, providing for the family was not considered an add-in design feature, but rather considered at the starting point for planning this child oriented medical environment. Parental accommodation has been made part of the design from the beginning, providing a family lounge and perhaps a quiet place to take a break

from the emotionally and physically draining demands of caring for a seriously ill child.

- The need for affiliation between health providers and various health institutions in an effort to train more human resources to man the centres and the material resources to support such centres.
- Services, so as to allow for the smooth running of the facility. Issues such as power and water supply, ventilation, telecommunication, medical gas supply, lighting etc have been considered and the necessary measures put in place.
- Safety measures such as escape stairs, protection against fire etc have been put place
- Future expansion. The use of the structural column grid system easily allows for upgrading.

Therefore with these provisions, the pediatric centre will be able to meet the medical needs in addition to others that will be required of it.

## **5.2. RECOMMENDATION**

Following to the research, it is recommended that these important guidelines listed below are observed and achieved in the design of any new child health care facility in order to make it more user friendly and efficient.

### **5.2.1 FACILITATION OF ACTIVITIES**

- When designing for children, provisions will have to be made for the family from the start of the design.

- It is also known that the physical environment of a treatment program affects patient outcome, but how and to what degree is not known, therefore, the environment within which the facility is sited will have to be well designed to aid in the healing process.
- Use of anthropometrical and technical data are very critical since they give the designer an idea of space required for items and equipments as well as improving upon the quality of services.

### **5.2.2 MEANING AND DELIGHT**

- The design of a pediatric centre should as much as possible look like a kindergarten rather than a hospital. This will erase the fear factor among children.
- The values of children should always be respected and brought into play whenever we design for children.

### **5.2.3 MODIFICATION OF CLIMATE**

- With the exception of areas such as surgical theatres which do not require natural lighting and ventilation, efforts must be made to bring into the design as much day light as possible and also openings should be positioned to allow for effective ventilation. This goes a long way to cut down on cost.

### **5.2.4 UTILISATION OF RESOURCES**

- It is recommended that the choice of material for the finishing of a place be governed by the performance requirement of that space. Choice of materials for wall, floor and ceiling be critically considered so as to facilitate activities.



- It is also important that our health institutions train more human resources to man these centres and material resources to support such centres.

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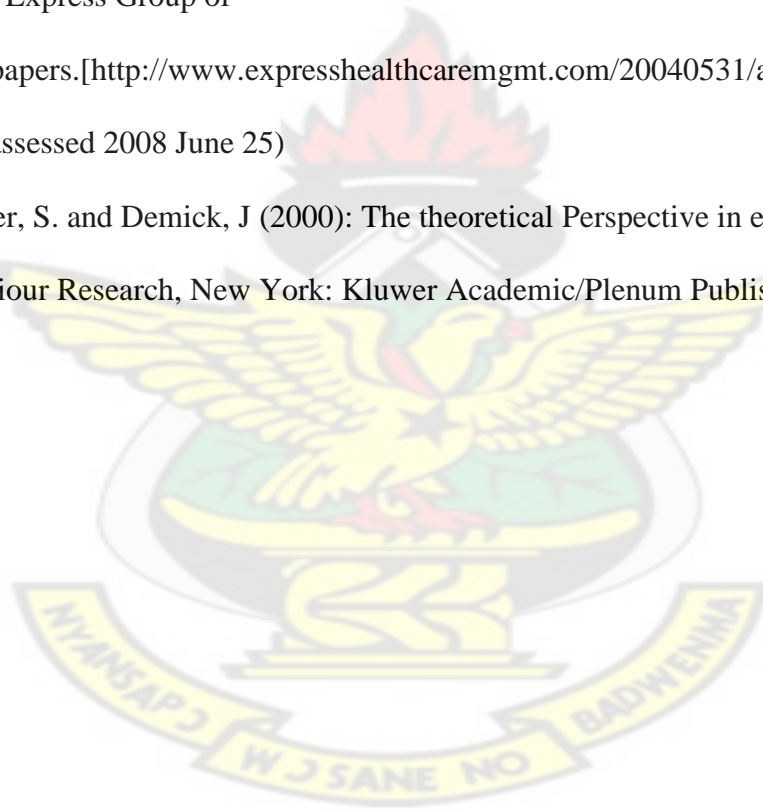


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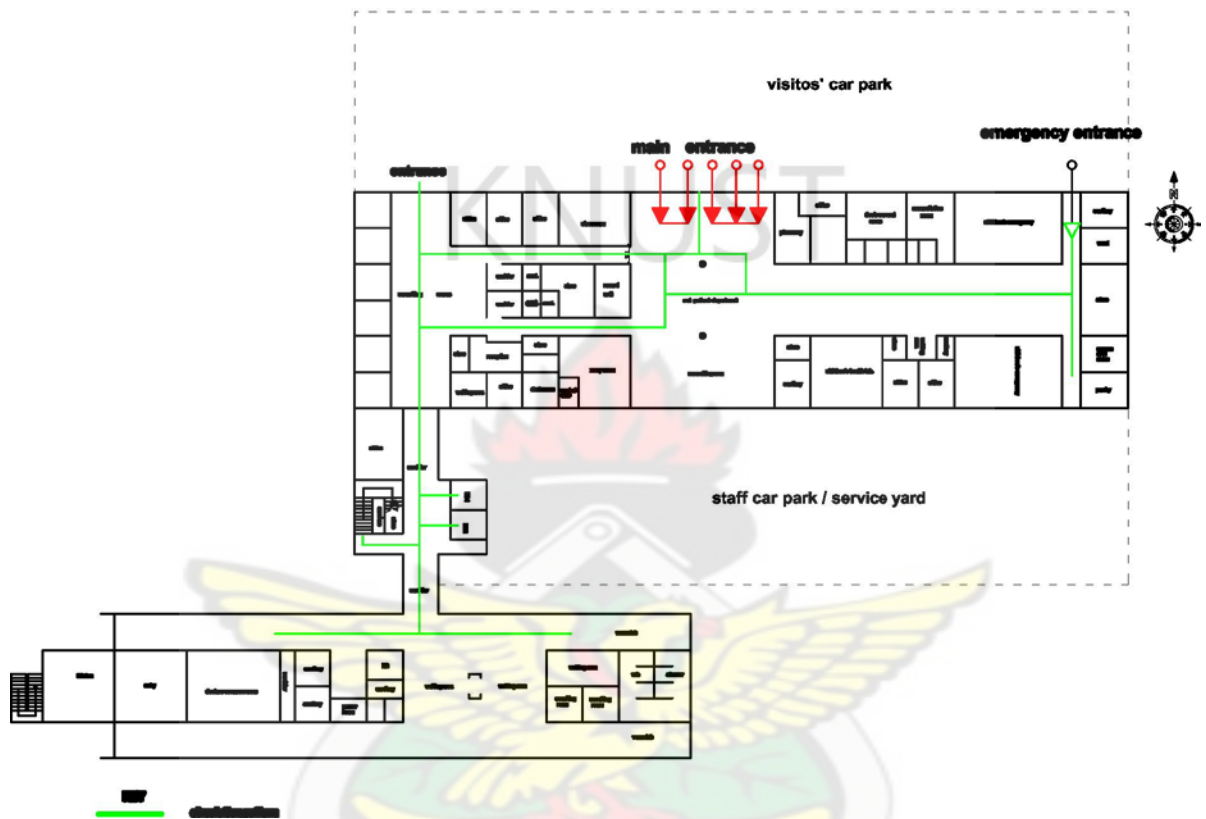
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## APPENDICES:



APPENDIX A: Ground Floor Plan Layout of Korle-Bu Child Health Department



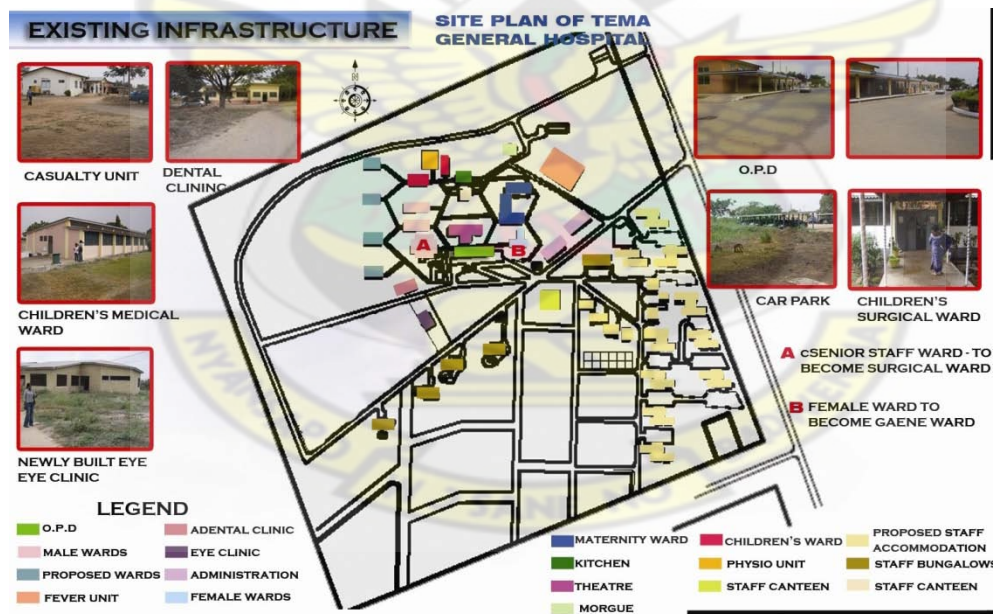


APPENDIX B: First Floor Plan Layout of Korle-Bu Child Health Department

71

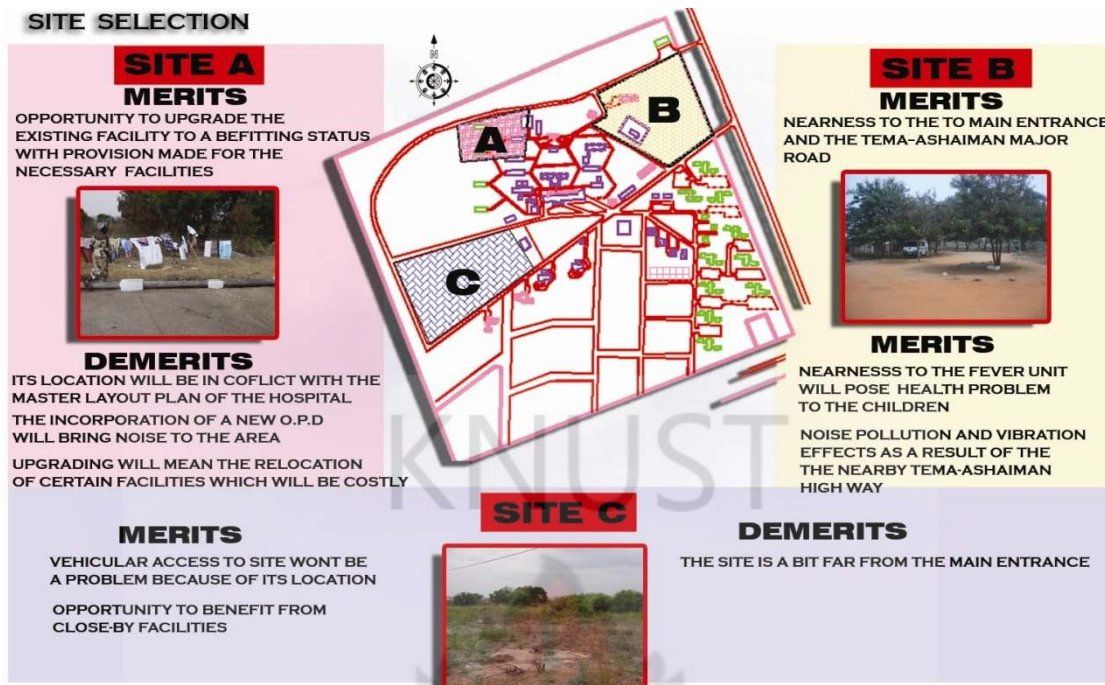


APPENDIX D: Peripheral Studies (photo by author).

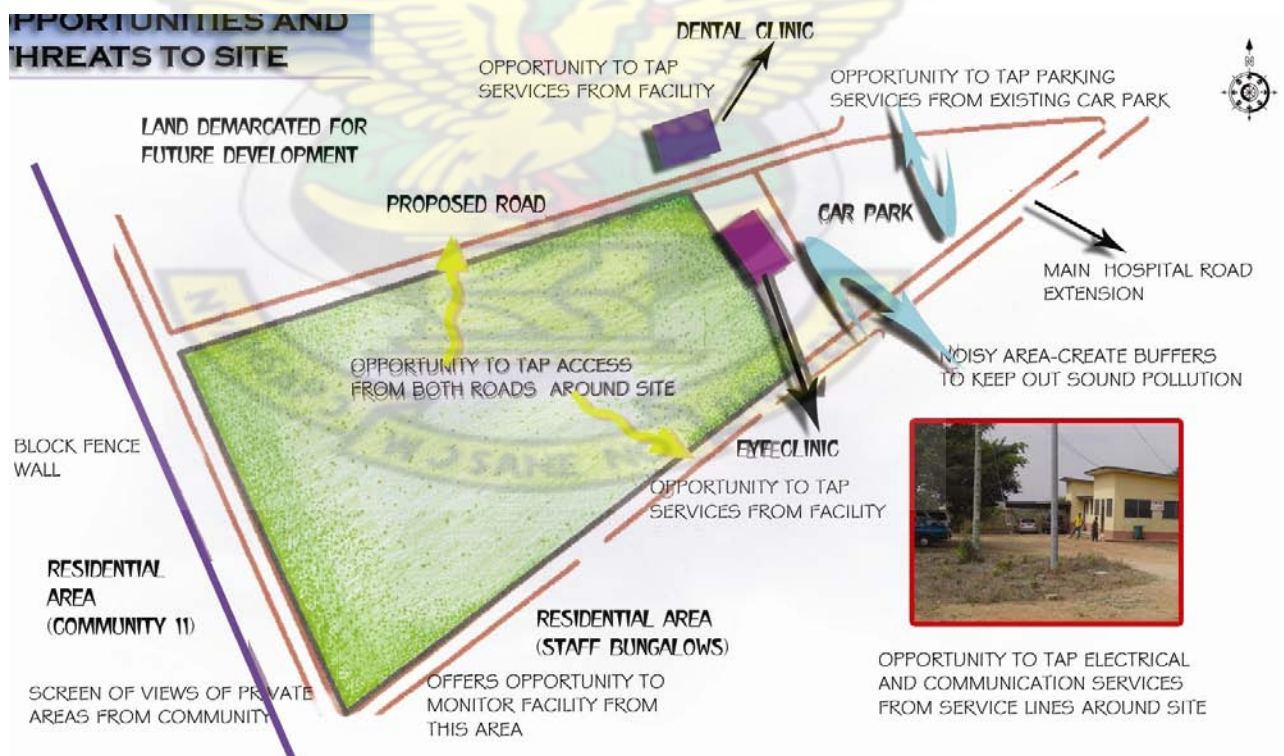


APPENDIX F: Existing Infrastructural Study



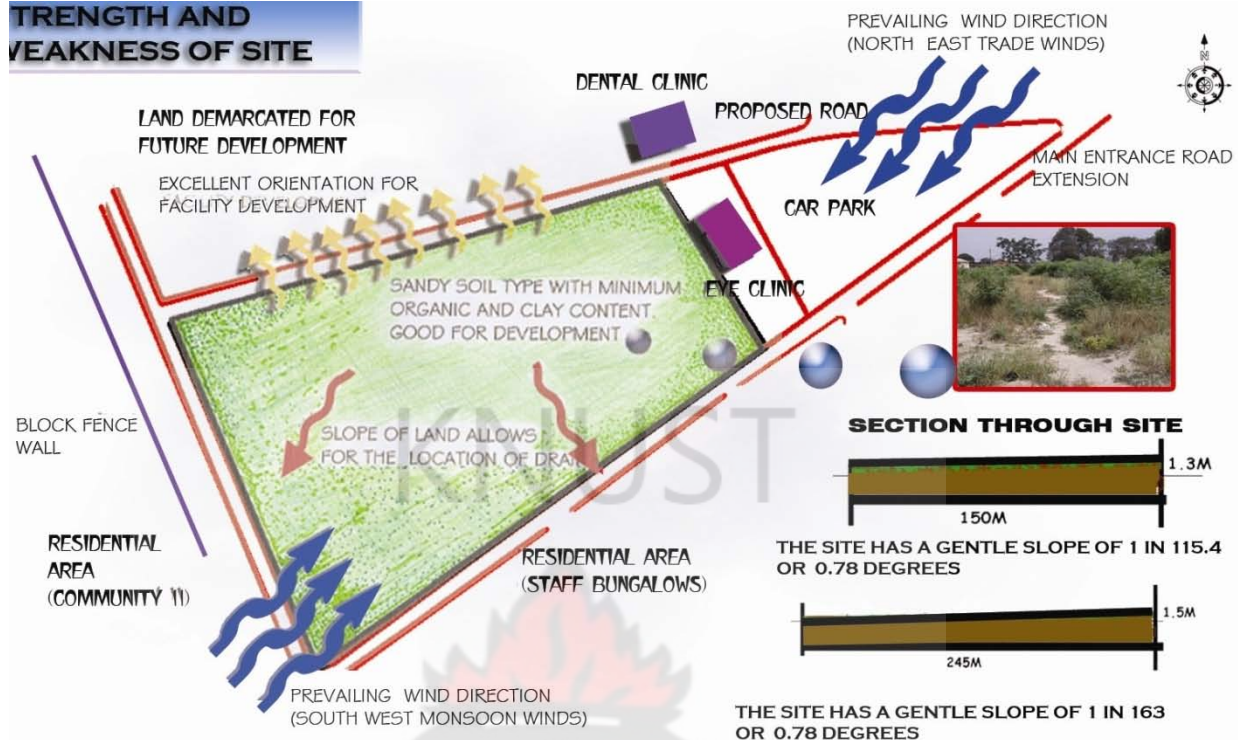


APPENDIX G: Site Selection



APPENDIX H: Site Analysis

## TRENGTH AND WEAKNESS OF SITE



## APPENDIX I: Site Analysis

### ACCOMMODATION SCHEDULE

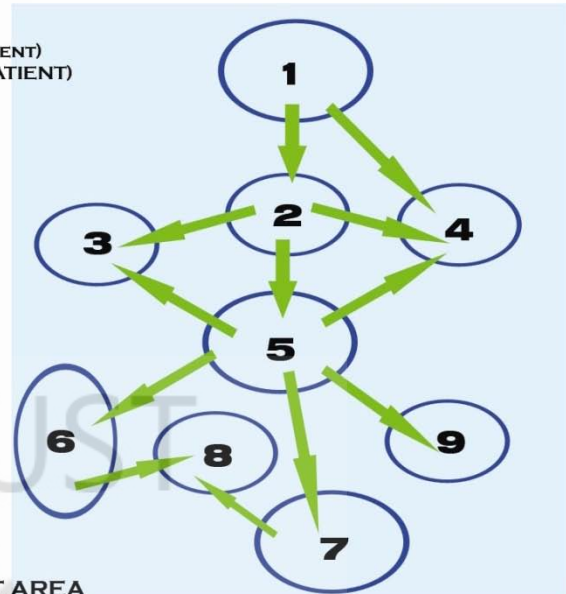
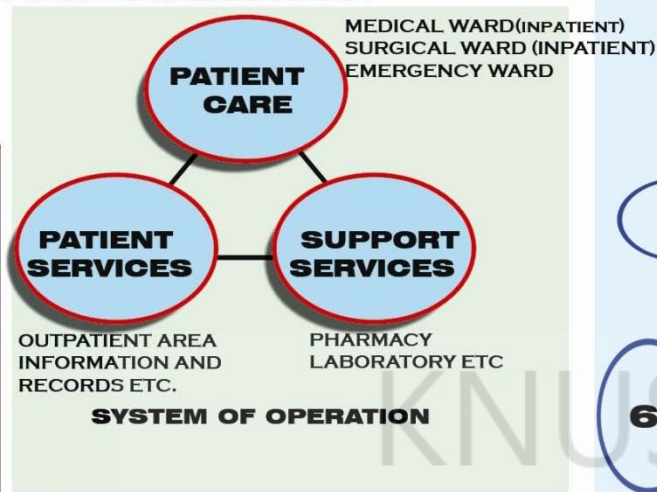
OUTPATIENT AREA		
SPACE	AREA(m <sup>2</sup> )	COMMENTS
WAITING AREA	311.04	
INFORMATION/RECORDS	25.92	
CONSULTING ROOM	207.36	FOUR IN NUMBER
NURSES' STATION	12.96	
SANITARY	311.04	
STORE	12.96	
UTILITY ROOM	12.96	
DOCTORS' REST ROOM	25.92	
NURSES' REST ROOM	25.92	
MEDICAL UNIT		
GENERAL WARD	51.84	
ISOLATION WARD	12.96	
V.I.P WARD	12.96	
NURSES'S WORK STATION	12.96	
SENIOR NURSE'S OFFICE	25.92	
DOCTOR'S OFFICE	25.92	
PROCEDURE ROOM	25.92	
TREATMENT ROOM	25.92	
GAMES/CLASSROOM	51.84	
SLUICE ROOM	12.96	

MEDICAL UNIT		
SPACE	AREA(m <sup>2</sup> )	COMMENTS
BABIES UNIT	77.76	
DOCTOR'S OFFICE	25.92	
STORE	38.88	
SURGICAL UNIT		
GENERAL WARD	51.84	
ISOLATION WARD	12.96	
V.I.P WARD	12.96	FOR AFFLUENT FAMILIES
SENIOR NURSE'S OFFICE	25.92	
NURSES'S WORK STATION	12.96	
DOCTOR'S OFFICE	25.92	
PROCEDURE ROOM	25.92	
DRESSING ROOM	25.92	
SLUICE ROOM	12.96	
STORE	38.88	
SANITARY AREA	51.84	INCLUDES WASHROOMS
GAMES/CLASSROOM	51.84	
THEATRE		
SUPPORTING FACILITIES		
EMERGENCY WARD	51.84	
LABORATORY	25.92	
PANTRY	25.92	
PHARMACY	51.84	

## APPENDIX J: Accommodation Schedule.



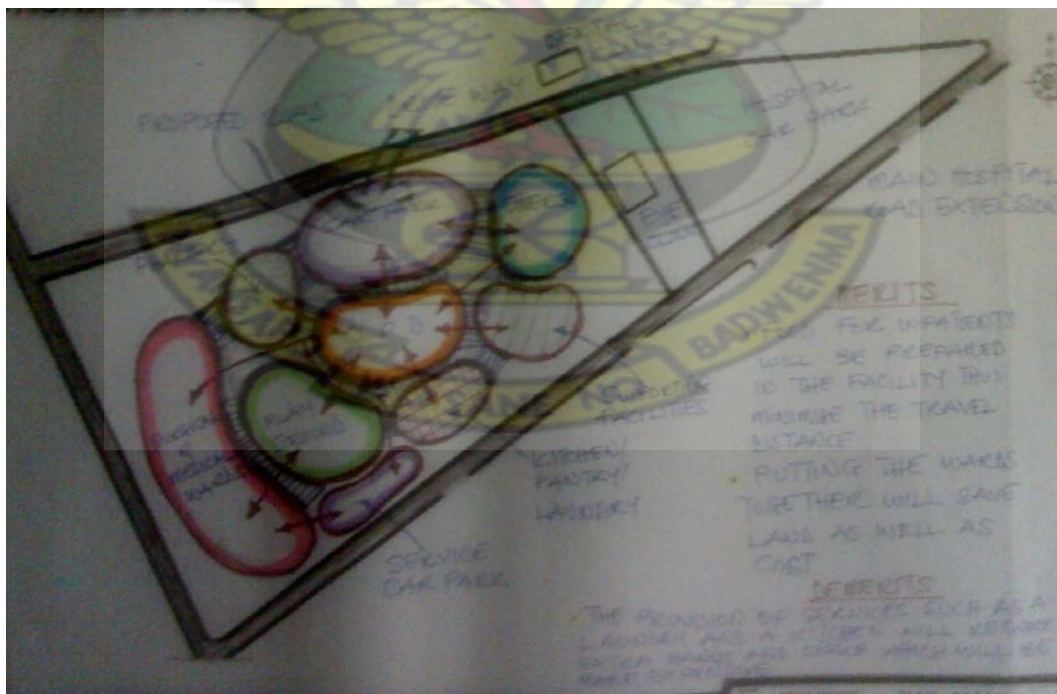
## FUNCTIONAL DIAGRAM



### LEGEND

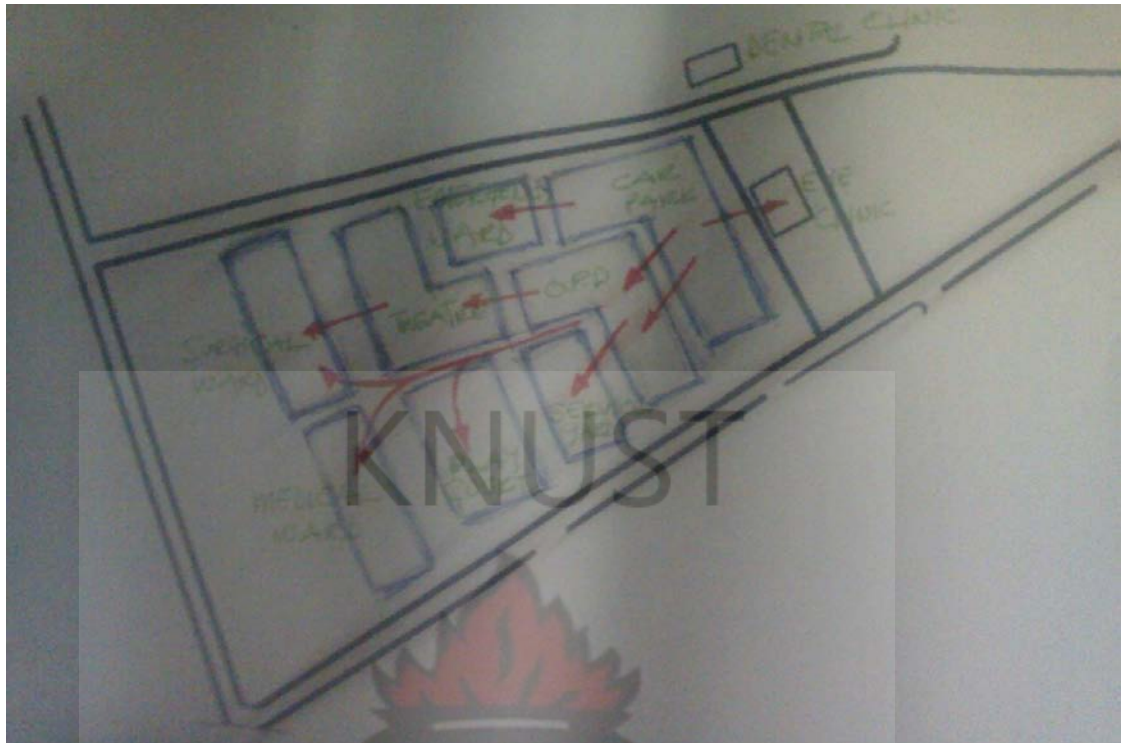
- |                         |                          |
|-------------------------|--------------------------|
| <b>1</b> PARKING AREA   | <b>5</b> OUTPATIENT AREA |
| <b>2</b> MAIN ENTRANCE  | <b>6</b> MEDICAL WARD    |
| <b>3</b> RECORDS        | <b>7</b> SURGICAL WARD   |
| <b>4</b> EGERGENCY WARD | <b>8</b> PLAYGROUND      |
|                         | <b>9</b> SERVICE YARD    |

## APPENDIX K: Functional Relationship Diagram

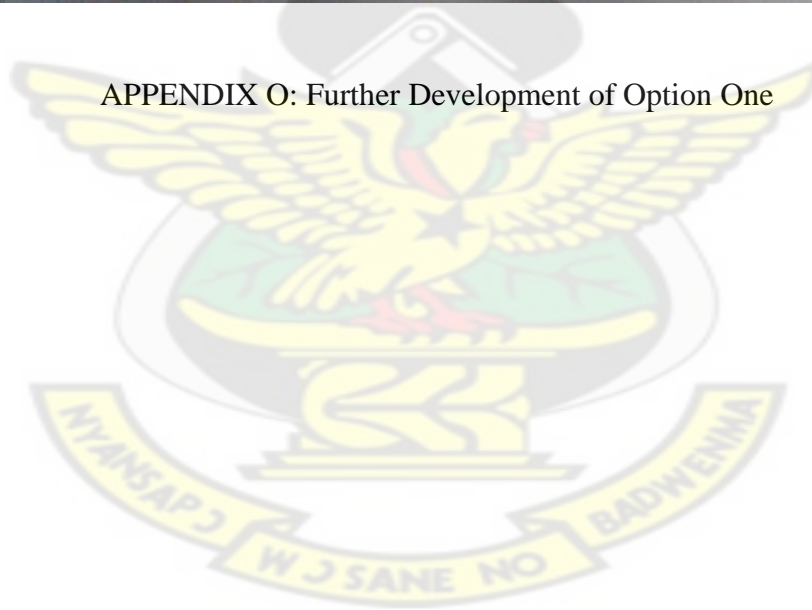


## APPENDIX L: Option One (Conceptual Site Planning)

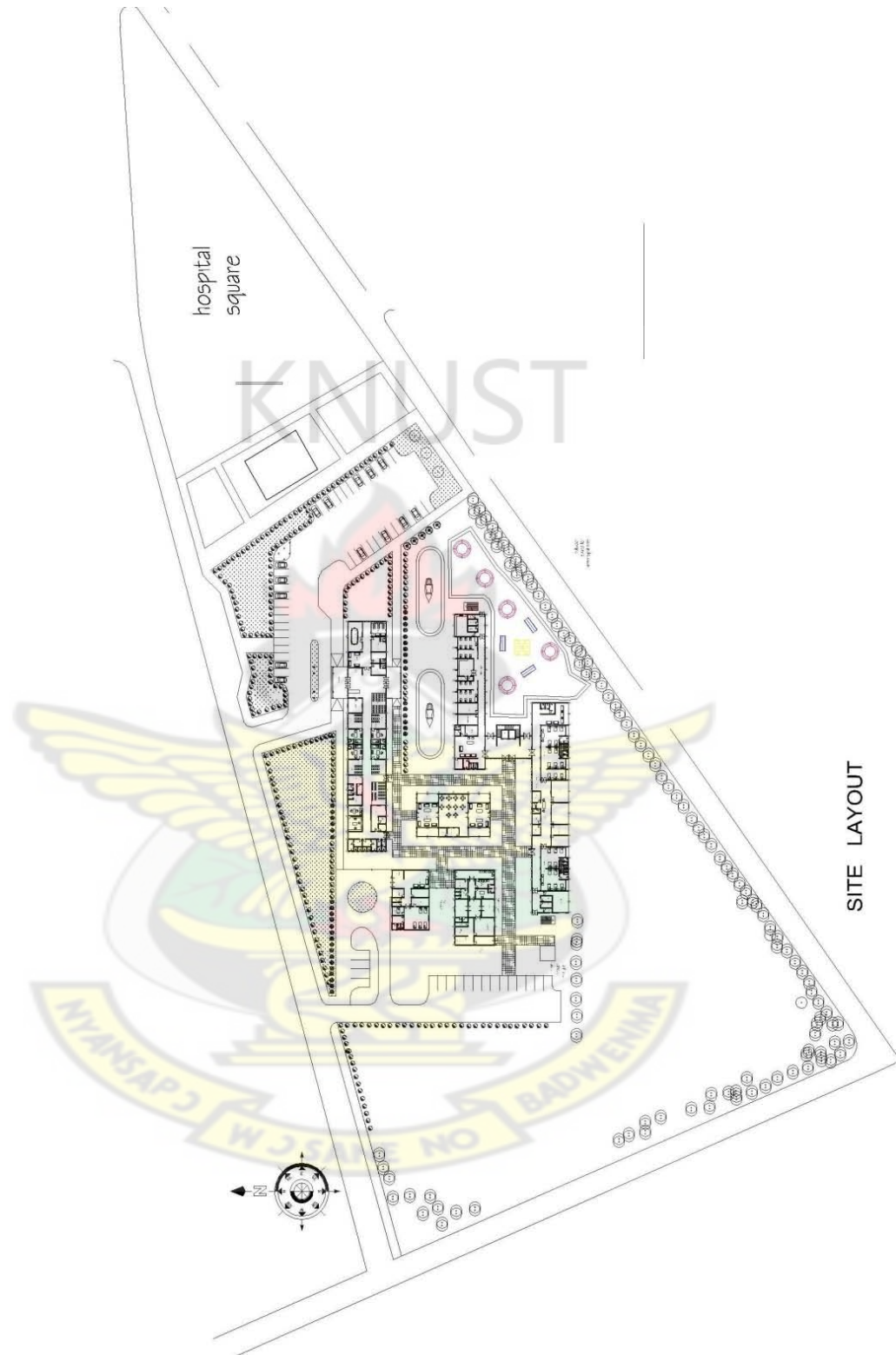




#### APPENDIX O: Further Development of Option One







APPENDIX P: Site layout

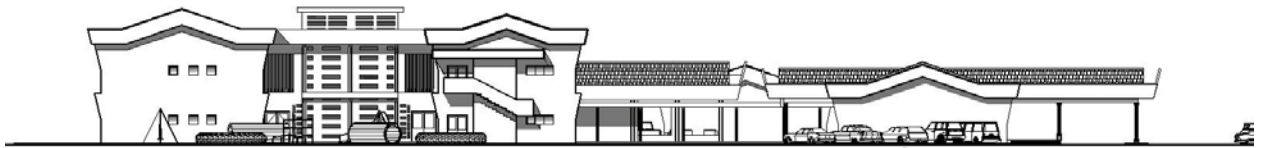




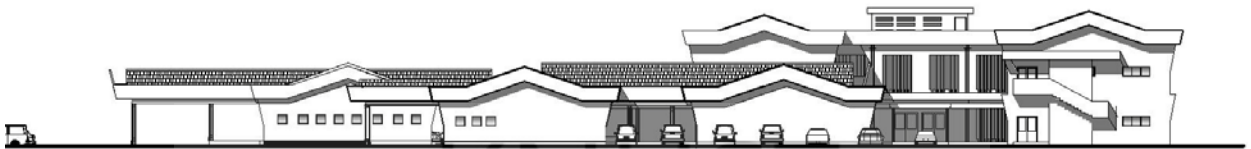
APPENDIX R: First Floor Plan







EAST ELEVATION



WEST ELEVATION

# APPENDIX S: Elevations



**A VIEW OF THE MAIN ENTRANCE**



APPENDIX T: Three Dimensional Views of proposed Pediatric centre.

## Appendix U- Questionnaires

### Patient (child)

a. What is your name and age?

.....

b. How do you feel when you visit a hospital?

.....

c. What is it about this hospital that frightens you?

.....

d. How do you want a hospital to look like and why?

.....

e. Do you feel comfortable staying in your wards?

.....

f. Do you like the paintings and colour of paint employed on the hospital walls? If yes why?

.....

g. Do you want your parents to be around when you are admitted?

.....

**Parent/Guardian**

- a. Do you like the outdoor space? What are the possible features you would like to see?

.....

- b. Does the design of this hospital allow for easy wayfinding?

.....

- c. Would you like to be involved in the medical procedures of your child?

.....

- d. As a mother, father or guardian, what are your expectations in this hospital?

.....

- e. Can you state any suggestions that can architecturally improve on this facility?

.....



**Staff**

f. What is your name?

.....

g. Do you see the need to involve the family (mother, father or guardian) in any of the medical procedures you offer to the children? Are any provisions made for them?

.....

h. What do you make of the hospital environment in terms of it facilitating the healing process?

.....

i. Are the lighting levels and ventilation within each interior space good enough to facilitate medical procedures?

.....

j. Are the various departments well configured to allow for easy traversing?

.....

k. Architecturally, what can be done to erase the fear factor associated with hospitalized children?

.....

l. What do you make of the colour scheme employed for this hospital?

.....





# KNUST

