DESIGN OF PAEDIATRIC ONCOLOGY FACILITIES IN NAIROBI

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Declaration

This Thesis is my original work and has not been presented in any other University or Institution for the purpose of awarding a degree to the best of my knowledge.

This thesis is submitted in partial fulfilment of the examination requirements for the award of the Bachelor of Architecture degree, in the department of Architecture and Building Science at the University of Nairobi.

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Because the actualization of this treatise would not have been possible without the following:

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Mother: Thank you for always being in my team even when I had no team. For encouraging me when things got thick and the light at the end of the tunnel only triggered imaginations of an oncoming train. Your guidance, support and prayers are what has made me pull through all this. I am forever indebted.

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It has been 6 long and debilitating years yet we have grown stronger. A roller coaster of emotions and experiences it has been. I am humbled to affirm I worked and learned apace with great minds. It was all worth it.

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Design of Paediatric Oncology Facilities in Nairobi

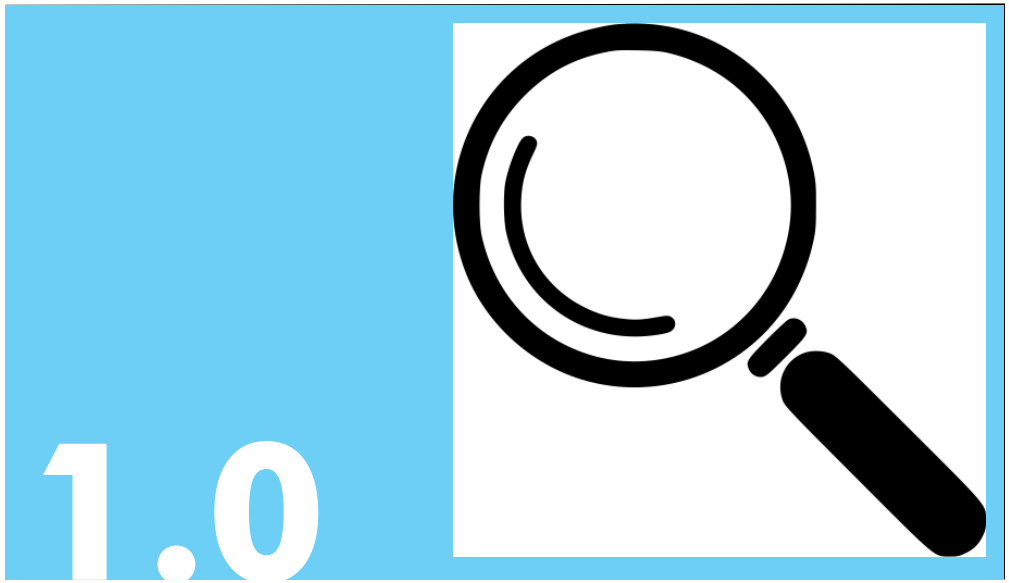
Over time, the design of health facilities has evolved to become more specialized putting to consideration factors such as the age and ailment of the patients. This study will focus on a spacial need created by such specialization, child cancer hospitals.

Bob Leonard, an oncologist at the St. Jude Children Research Hospital, in his address says, “In the National Health Service we call our buildings functional. But they are not, really. We’ve lost a lot. What we do in our homes and gardens is very important. Why shouldn’t care centres be like that for cancer patients?”.

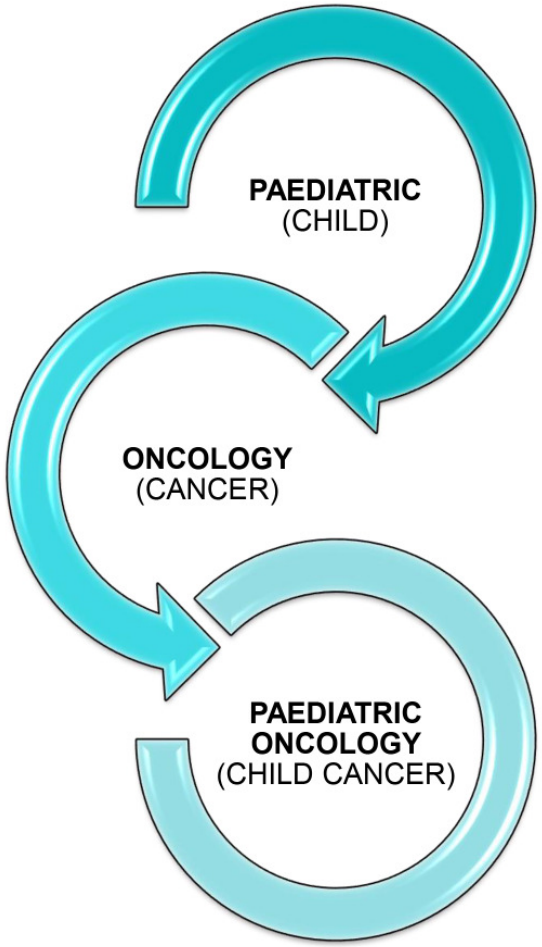
This study seeks to establish how the architectural design of cancer centres can be customized to make it more friendly and bearable to the ailing child. Several design parameters will be put on the scale and measured against their need and efficiency with which they improve the treatment and healing process. These are: Lighting and Acoustics, Spatial Definition or Privacy, Infection Control, Furnishing or Ergonomics, Surfaces or Material Usage, Interaction between the spaces and users, Movement, Accessibility and Exercise, Sense of Control, Familiarity, Contact with Nature and Positive Distraction.

This study outlines the findings from two cases. The criteria used in choosing them is based on the need to illustrate what is available in Nairobi vis a vis what is happening in the developed world as pertains the design of child cancer centres. The international case chosen is the Princess Maxima Centre for Paediatric Oncology in Netherlands which acted as the basemap against which the local case was compared. The local case chosen in the Aga Khan University Hospital in Nairobi, Kenya which has one of the most advanced healthcare system for all cancer patients in Kenya. The two cases were then analysed putting to consideration the design parameters mentioned earlier. The application and success or otherwise of the said parameters was then investigated and documented.

The findings reveal that before the commencement of the design process of child cancer hospitals, it is important to first understand the needs of the patients as children and not treating them like small adults. Architectural design that puts to consideration the parameters listed above in totality will most definitely create spaces that will aid in both the treatment and healing of ailing children. The comfort of the staff and visitors during this period is also very important hence the findings suggest ways in which these two groups can be made more productive through architectural design.



1.0 Introduction



>Fig 1.01
INFO GRAPHIC AIDING IN UNDERSTANDING THE DEFINITION OF THE TOPIC OF STUDY.

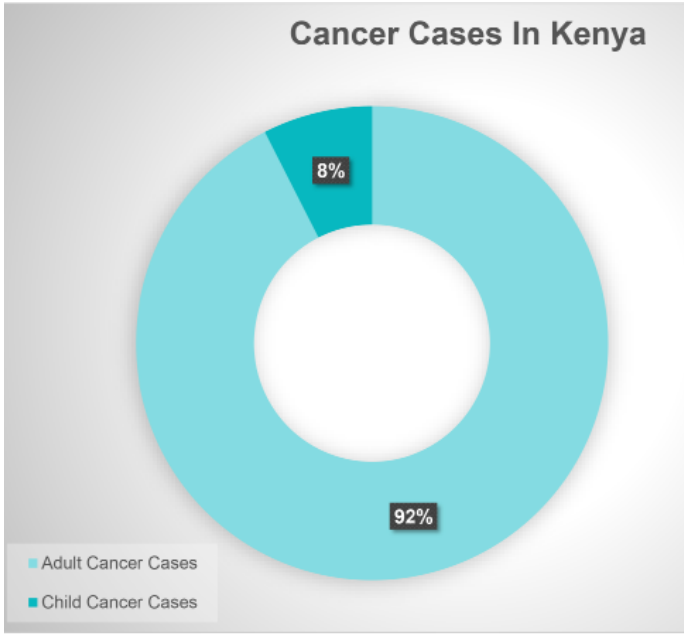
Source: *Author generated on 24th January at 1629hrs*

1.1 Preamble

Paediatrics is a branch of medicine that deals with the medical care of infants, children and adolescents. According to the United Nations, the age bracket that is considered as a child is between birth and 18 years or the completion of secondary education. **Oncology** on the other hand is a branch of medicine that deals with the prevention, diagnosis, treatment and study of cancer (Croke, 2012). When these two fields are joined together then we get the phrase **Paediatric Oncology** which can be defined as cancer that occurs in children between birth and 15 years of age. The facilities in question here are hospitals which deal with the prevention, diagnosis, treatment and palliative care of children suffering from cancer.

1.2 Background Study

Globally, cancer is the highest cause of non-communicable disease related deaths. Cancer cases in the whole world are in a constant increase. Kenya is no exception as the country recorded about 40,000 new cancer cases in 2017 compared to 11,995 in 2010 and 12,574 in 2012. 28,000 cancer related deaths were recorded in Kenya alone in 2017. The number of hospitals in Kenya with the capacity to offer prevention, diagnosis and treatment to cancer patients are few and cannot handle this high number leading to many of the patients having to either travel abroad for medical care or suffer at home without treatment. In Kenya statistics show that one in every fifteen (1 in 15) cancer patients is a child between zero and 18 years of age. This represents between 2,500 and 3,000 children per year. In Kenya only 1 in 10 children survives cancer as compared to the developed countries where it is 7 in 10 children.



>Fig 1.02
A CHART SHOWING THE PREVALENCE OF CHILD CANCER CASES VERSUS ADULT CANCER CASES IN KENYA (I IN EVERY 15 CANCER PATIENTS IS A CHILD)

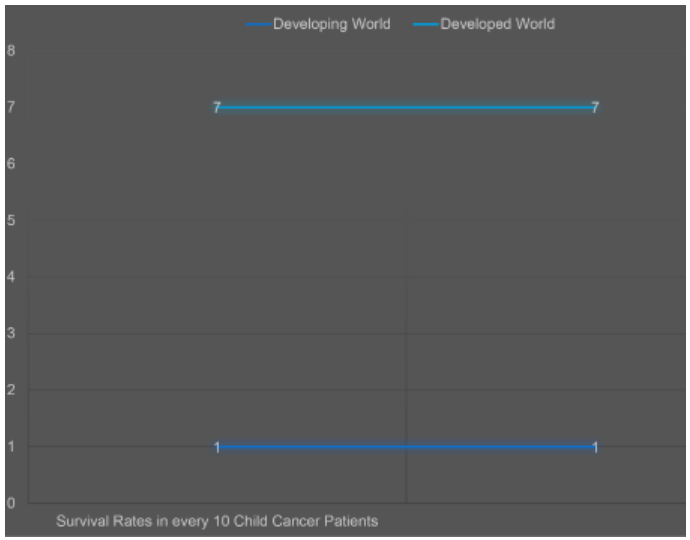
Source: *Author generated on 24th January at 1642hrs*

At the Moi teaching and referral hospital in Eldoret for instance, the survival rate for all childhood related cancers stands at 19%. The Kenyatta National Hospital (KNH) has plans underway to construct a separate Paediatric centre which will increase the bed capacity from the current 280 to about 700 and establish Paediatric Centres for excellent treatment of Cancer among other children diseases.

1.3 Problem Statement

The number of facilities that are dedicated to handling only cases of cancer in children in Kenya are very few. This has been sited in many avenues as a leading cause of the misdiagnosis of childhood cancers inhibiting timely treatment. Most of the available oncology facilities are basically designed for the adult cancer patients then upon realisation that children also require cancer treatment and care they provide for a special ward where they try to customize the space to accommodate children by having colourful walls, interesting paintings on the walls and plastic chairs for the children (This is the case at KNH). The children get desperately bored in these environments as they depend only on well wishers who visit the hospitals once in a while to engage them in fun activities like games, arts, singing and dancing. These children however need more than that to enable them brace and overcome the pain that comes with cancer. They need to have the life of the children their age leading a normal everyday life coupled with play time and interaction with family. For this reason they need playing spaces accommodative of children their age and equipment that will be appropriate for them from the furniture and spaces to the landscape and playing equipment.

The available facilities do not put children to consideration in circulation around the facility making way finding impossible without the company of adults. Presence of steps along the circulation routes makes the children highly susceptible to accidents caused by stumbling.



>Fig 1.03
A GRAPH SHOWING A COMPARISON BETWEEN THE SURVIVAL RATES OF CHILD CANCER PATIENTS IN THE DEVELOPED WORLD AND THE DEVELOPING WORLD.

Source: *Author generated on 24th January at 1705hrs*

Some of the children are of school going age but since they are admitted in the cancer hospitals for extensive periods of time, they are derived of the basic right of access to education. Lucky for some, volunteers will check in once in a while to offer books and/ or tuition but then the children are not allowed to sit any examinations thereafter which is counter productive to the efforts of these volunteers.

Toddlers need their caregivers to be with them throughout their treatment period yet in the available cancer facilities there is no special consideration of these caregivers and family members to make their lives comfortable as they accompany the toddlers through the treatment and recovery period.

1.4 Research Objectives

The aims and objectives of the study are as listed below:

1. To understand the general design requirements and functioning of paediatric oncology hospitals.
2. To assess the current state of paediatric oncology facilities in Nairobi.
3. To propose better alternatives of designing paediatric oncology facilities.

>Fig 1.04
INFO GRAPH ILLUSTRATING THE DESIGN CONSIDERATIONS ADVOCATED FOR AFTER THE PARADIGM SHIFT IN THE DESIGN OF PAEDIATRIC HEALTHCARE FACILITIES IN THE 20TH CENTURY.

Source: *Author generated on 24th January at 1725hrs*

1.5 Research Questions

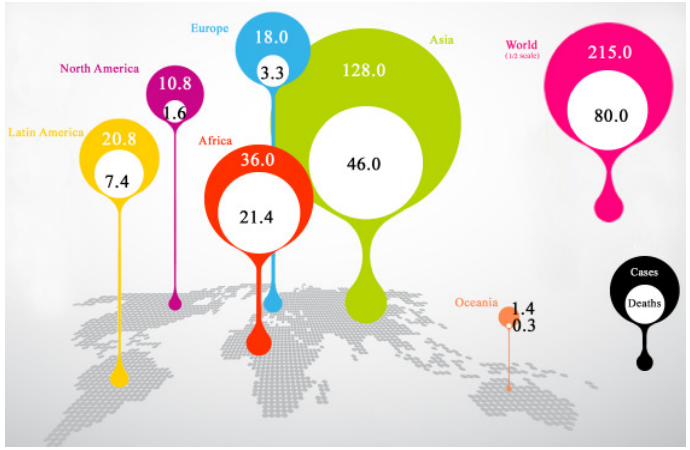
The questions that will guide the study are as listed below:

1. What are the general design requirements for the functioning of paediatric oncology hospitals?
2. What is the current state of paediatric oncology facilities in Nairobi?
3. Which alternatives does architecture present in the design of paediatric oncology facilities?

1.6 Justification of Study

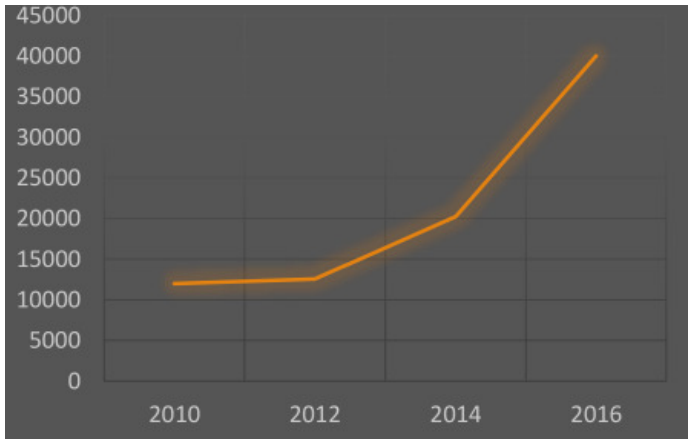
The design of health facilities has been changing over the years to be more accommodative of the patients depending on the specific requirements which vary with age, gender, religion among other variable factors. Designing facilities with children in consideration became more popular in the late 20th century being adopted first in Europe and America then later in other parts of the world. In this paradigm shift major consideration is made to the:

- Lighting and Acoustics
- Spatial Definition / Privacy
- Infection Control
- Furnishing / Ergonomics
- Surfaces / Material Usage
- Interaction between the spaces and users
- Movement, Accessibility and Exercise
- Sense of Control



>Fig 1.05
INFO GRAPHIC SHOWING ESTIMATED NUMBERS OF CANCER CASES AND DEATHS (IN THOUSANDS) FOR AGES 0-14 YEARS IN 2010s USING DATA FROM IARC.

Source: *Image sourced from www.uicc.org*



>Fig 1.06
GRAPH SHOWING THE NUMBER OF NEW CANCER CASES IN KENYA BETWEEN 2010 AND 2016.

Source: *Author generated on 16th November at 0652hrs*

- Familiarity
- Contact with Nature
- Positive Distraction

There are a number of facilities dealing with Paediatric oncology in Nairobi and this study will seek to scrutinize the design of at-least one of them against these factors and the internationally recognized standards in the design of such facilities.

1.7 Scope and Limitations

Since the scope of work is large in the design of paediatric oncology facilities, this study will concentrate on: Lighting & Acoustics, Spatial Definition / Privacy, Infection Control, Furnishing / Ergonomics, Interaction between the users, Movement & Accessibility, Familiarity, Contact with Nature and Positive Distraction.

The study will be based on the already documented and set standards in the design of paediatric oncology facilities. This will be followed by a desk study of cases (paediatric oncology facilities) whose functionality satisfies these standards. Once all this information has been collected then a field study will be conducted in one selected facility within Nairobi which is the Aga Khan University Hospital because of its high success rates in treatment of child cancers. The facility will be measured against the set standards to gauge its efficiency in dealing with the prevention, diagnosis, treatment and palliative care of children with cancer.

>Fig 1.07
INFO GRAPH SHOWING THE THREE MAJOR INFLUENCERS OF THE STAY OF CHILDREN IN PAEDIATRIC HEALTHCARE FACILITIES

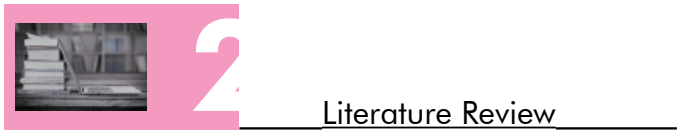
Source: *Image sourced from www.glassdoor.co.in*

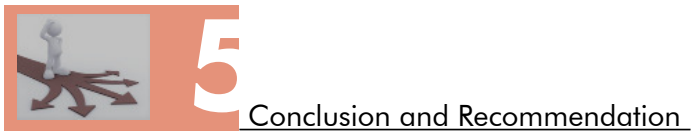
The Limitations of the study are:

- The time allocated may not be sufficient for a detailed study and documentation of all the paediatric oncology facilities both locally , within Nairobi, and internationally.
- Some of the areas of focus such as movement & accessibility and Interactions cannot be quantified via measurement hence necessitating interviews and questionnaires which are biased to a great deal depending on a number of factors beyond the researcher's control.
- The available resources will limit the depth and level of detail of the study. It is almost impossible to make trips to all the facilities to be studies especially in the international cases. This means that some of the information collected in desk study will not be verifiable.

1.8 Significance of Study

This study is intended to illustrate different design principles that affect the perception of space by children within paediatric oncology facilities. This will not introduce new standards in the design of health facilities but rather use the set standards alongside the children needs and requirements to come up with the perfect environs for the treatment, healing and palliative care of children with cancer. By studying the set standards and merging them with the needs of children then the study will suggest better alternatives in the design of such facilities going forward.





>Fig 1.08
INFO GRAPH ILLUSTRATING AUTHOR'S STUDY ORGANISATION.

Source: *Author generated on 24th January at 1856hrs*

1.9 Organisation of Study

Chapter I of this study will seek to introduce the background of the terms used such as paediatric, oncology and paediatric oncology facilities. By doing this the user gives the reader a better understanding of the topic of study. The problem being studied is also introduced.

Chapter II entails the review of both the published and unpublished works relating to the subject of study. It interrogates the general and specific requirements in the design of cancer facilities for children and their use both locally and internationally. The set standards obtained from this chapter form the basis in which chapter IV will be studied.

Chapter III outlines the techniques that will be used in conducting this research. It shows the techniques that will be employed in the collection, analysis and presentation of data for the research.

Chapter IV contains a detailed analysis on the facilities suggested as case studies using the parameters recorded in chapter II. The case studies will only be studied in terms of the principles recorded in the scope of work.

Chapter V will give the lessons learnt from the case studies and how they will be employed to provide better solutions for the design of paediatric oncology facilities.

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