# PERFORMANCE EVALUATION OF PRIMARY HEALTH CARE (PHC) BUILDINGS IN THE FEDERAL CAPITAL TERRITORY (FCT).

**BY**

**BAYONLE IBRAHIM OLADOJA**

**DEPARTMENT OF QUANTITY SURVEYING**

**AHMADU BELLO UNIVERSITY, ZARIA**

**NIGERIA.**

**SEPTEMBER, 2015.**

**PERFORMANCE EVALUATION OF PRIMARY HEALTH CARE (PHC) BUILDINGS IN THE FEDERAL CAPITAL TERRITORY (FCT).**

**BY**

**Bayonle Ibrahim OLADOJA, B.Eng. Water Resources Engineering (1999)**

**M.Sc./ENV-DESIGN/ 36927/2012-2013**

**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA.**

**IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTERS OF SCIENCE IN PROJECT MANAGEMENT**

**DEPARTMENT OF QUANTITY SURVEYING**

**AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA.**

**SEPTEMBER, 2015.**

## DECLARATION

I declare that the work in the dissertation entitled PERFORMANCE EVALUATION OF PRIMARY HEALTH CARE (PHC) BUILDINGS IN THE FEDERAL CAPITAL TERRITORY (FCT) has been carried out by me in the Department of Quantity Surveying. The information derived from the literature has been duly acknowledged in the text and a list of reference provided. No part of this dissertation was previously presented for another degree or diploma at this or any Institution.

| Bayonle Ibrahim OLADOJA | _____ | _____ |
|---|---|---|
| Name | Signature | Date |

## CERTIFICATION

This dissertation entitled PERFORMANCE EVALUATION OF PRIMARY HEALTH CARE (PHC) BUILDINGS IN THE FEDERAL CAPITAL TERRITORY (FCT) by Bayonle Ibrahim OLADOJA meets the regulations governing the award of the degree of Master of Science (Project Management) of Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

_____ Date _____

Prof. A. D. Ibrahim

(Chairman, Supervisory Committee)

_____ Date _____

Dr. Y. M. Ibrahim

(Member, Supervisory Committee)

_____ Date _____

Dr. Y. M. Ibrahim

(Head of Department)

_____ Date _____

Prof. A. Z. Hassan

(Dean, School of Postgraduate Studies)

## ACKNOWLEDGMENTS

To God be the glory. I want to acknowledge all the people that contributed to the success of this painstaking work. I am grateful to my supervisors Prof. A.D. Ibrahim and Dr Y. M. Ibrahim for their guidance and contributions. My warm acknowledgement to Mr. B. A. Kolo and Dr. K. J. Adogbo for their constructive feedbacks and comments. Other staff of the Quantity Surveying Department, ABU, Zaria have contributed to guide and support me during this work. I appreciate them all; such as Dr. P.G. Chindo and Mr. M. Abdulrazaq.

Special thanks to Dr. A. Ahmad-Shehu and Mr. E. Onasoga of the National Primary Healthcare Development Agency (NPHCDA) for their support and assistance in getting the approval to visit the selected Primary Healthcare Centres (PHC). My appreciation also is extended to my colleagues and friends especially Mr. Lekan Olarewaju, and Timothy Musa for their assistance in data collection during this study.

I want to specially appreciate my dear wife and children; Seye, Olamide, Ayomide and Oluwademilade Oladoja. My parent – Mr. & Mrs. T. Oladoja, siblings (Mr. & Mrs. Akeem Oladoja, Mr & Mrs. Abdulrazak, Nurudeen Oladoja, Mr. & Mrs. M. Lawal and Mr. & Mrs. O. Suleiman ) for their kindness and support during the study. Thank you all.

## ABSTRACT

Existing studies have established that the physical characteristics of buildings have significant influence on occupants' satisfaction. However, studies has shown that the conventional ways that public hospital buildings in Nigeria are designed have contributed to stress, depression and anxieties because of loss of privacy, control over eating and sleeping times, and noise. And in addition contributed to dangers, allergies and other acquired infections called Hospital Acquired Infections (HAI) to patients and staff. This study assessed the performance of Primary Healthcare Centre (PHC) buildings which is identified to be the appropriate settings to tackle over 90% of the major causes of morbidity and mortality due to its proximity to about two-thirds of Nigerians. The objectives of this study were to; identify those standard performance criteria of healthcare buildings that aids healing of patients and positively influence users of PHC buildings; evaluate the perception of users on the performance of PHC buildings and outline appropriate steps to remedy the identified gaps to match up with the global standards. This was a descriptive cross-sectional study conducted in six PHC buildings across the six area councils of the Federal Capital Territory (FCT), Nigeria. A purposive sampling technique was used to select a total of 334 samples (patients, medical staff and visitors') from the target population. Data were collected with the aid of an adapted version of - *Achieving Excellence Design Evaluation Toolkit (AEDET)* questionnaires. Both descriptive and inferential statistics were used to present simple mean, standard deviation and test for statistical significance of the results. Ten criterion, categorized into three criteria namely; functionality, build quality and impact were identified as the required standards for healthcare building performance. They aid in the healing of patients, improve the productivity of medical staff and attract patronage from visitors. The results show that users' perception

on the *functionality* and *build quality* of the PHC buildings which concerns the extent to which it facilitates or inhibits the activities of the medical staff who carry out the functions inside and around the building was poor. Also, the staff and patient environment which was addressed by *impact* was assessed to be poor. In view of these, patients in PHC buildings do not have privacy during their stay for treatment and cannot be alone with others to have private discussions because of the multiple bed system that is currently run. The toilets, bathrooms and other facilities for the use of staff, patients and visitor are not befitting and dignified enough to attract patronage. The study recommends that the National Primary Healthcare Development Agency's (NPHCDA) Minimum Standards for Primary Healthcare and the Ward Minimum Healthcare Package upon which the design of PHC buildings in Nigeria is based should be updated and reviewed to reflect modern trends in healthcare architecture.

## TABLE OF CONTENTS

## LIST OF FIGURES

## LIST OF TABLES

## LIST OF APPENDICES

## LIST OF ABBREVIATIONS

AEDET: Achieving Excellence Design Evaluation Toolkit.

ASPECT: A Staff and Patient Environment Calibration Tool.

BPE: Building Performance Evaluation

BPE: Building Performance Evaluation.

BPI: Building Performance Indicators

BSRIA : Building Services Research and Information Association

CABE: Commission for Architecture and the Built Environment

CABE: Commission for Architecture and the Built Environment.

DOH: Department of Health

HBN: Health Building Notes

HTM: Health Technical Memoranda

IDEA: Inspiring Design Excellence and Achievements.

NEAT: NHS Environmental Assessment Tool.

NHS: National Health Services.

OHE: Optimal Healing Environment

POE: Post Occupancy Evaluation

POE: Post-Occupancy Evaluation.

RIBA: Royal Institute of British Architects

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background

A completed building with its facilities and services must be fit for the purpose. Meaning that it should be able to perform its functions in the manner that will ensure satisfaction to its occupants (Ilesanmi, 2010; Hinde, 2012). Although buildings are constructed for different purposes (housing, school, health, etc.), their performance either excellent or poor can be seen from the eyes of its users (Ilesanmi, 2010; Jiboye, 2012). The design quality of a building have been found to influence its functions (Haciric, 2008; Ibrahim, 2011; Jiboye, 2012). For example, a well-designed school has shown to improve the teaching and learning process of teachers and students thereby improved educational achievements (Khan and Kotharkar, 2012; Khalila, Kamaruzzamanb, Baharumb, and Husina, 2015). Also, a well-designed hospital has shown to help in quick patients' recovery, have positive impact on medical staff and visitors (Abbas and Ghazali, 2010; Ibrahim, 2011; Dandajeh, 2011).

A number of reasons have been provided on why buildings perform poorly in meeting users' needs and expectations. The major reason was lack of adequate knowledge of users' changing needs and preferences by architects and other professionals who design, construct and maintain these buildings. And the panacea to improve the overall performance of buildings is to explore and understand users' needs, expectations and aspirations through regular performance evaluation by means of Building Performance Evaluation (BPE) or Post Occupancy Evaluation (POE) (Natasha & Abdul Hadi, 2008; Ibema, Opoko, Adeboye, and Amole, 2013).

Building Performance Evaluation or POE can be defined as the process of obtaining knowledge about building performance from users, and using the feedbacks to inform what needs to be improved or fine-tuned in the existing building and also used to enhance the design qualities of future building projects (Ilesanmi, 2010; Jiboye, 2012; Said, 2012). The objectives of BPE or POE are the same for all buildings including those where healthcare services takes place either for primary, secondary or tertiary purposes.

The ability of a hospital building to facilitate healing process is termed 'therapeutic', which can be described as the overall environment both physical and non-physical created to aid the recovery process (Abbas and Ghazali, 2010; Dandajeh, 2011). Physical environments are considered therapeutic with healing qualities when there is direct evidence that a design intervention contributes to improve patient's outcomes (Department of Health, 2014). Evidence- based studies have confirmed and shown that better designed healthcare facilities help to improve the ease, efficiency of care, healing process and promote faster recoveries of patients. As such, an enhanced therapeutic environment will improve patients' experiences, help them to recover their health quickly resulting in better outcomes, shorter bed-stays and reduce the running costs of healthcare facilities (Department of Health Estates and Facilities, 2008; Dandajeh, 2011; Ibrahim, 2011). It is worthy to stress therefore, that how a health care facility is designed, looks and feels to work in can have significant impacts on the patients, staff and visitors alike.

Successful projects are those that are delivered on scope, time, cost, quality, risk and achieved the desired benefits (Hinde, 2012; Siegelaub, 2010). The specific benefit targets required from Primary Health Care system (PHC) in Nigeria are tailored to address the Millennium Development Goals (MDG) 4 and 5. The recent MDG report (2013) revealed that Africa is on-track on achieving three of the eight goals. But off-track in attaining goal 4 which was to reduce Infant Mortality Ratio (IMR) from 146 deaths per 1,000 live births to 98 deaths by the end of 2015. And also on goal 5; which was to also reduce Maternal Mortality Ratio (MMR). This MMR instead has increased from 545 deaths per 100,000 live births in 2008 to 576 in 2013. Statutorily, reducing child and maternal mortality in Nigeria falls under the aims and objectives for the establishment of the Primary Health Care system (PHC) that are run in buildings across the 37 states including the Federal Capital Territory (FCT). Available records from the Directory of Health Facilities in Nigeria (2011), confirmed that there are 30,098 registered PHC buildings. Yet with these large numbers of PHCs, Nigeria still has high rate of IMR, MMR and the low average life expectancy of 52 years against 58 years for Africa? Are the PHC buildings in Nigeria designed to aid healing of patients and encourage patronage from users? How functional and impactful are they (Asuzu, 2004; Ibrahim and Price, 2006; Dandajeh, 2011; African Development Bank, 2013)?

Findings from Khalil and Husin (2009); Forbes (2011) and Hinde (2012) has shown that design decisions when translated into physical facilities that accommodate health services and patients' care environments should be evaluated in order to determine if they are fit for purpose. This is because the shortage of POE means that planners and architects do not have access to accurate findings regarding healthcare buildings' performance and no evidence to

show how building designs and its environment management meets the needs of its client and users. Therefore, to avoid making repeated design mistakes and to even alignment with strategic business intent, POE is required for healthcare buildings.

## 1.2 Statement of the Problem

Existing studies have established that the physical characteristics of buildings have significant influence on occupants' satisfaction (Ibema et al, 2013, Jiboye, 2012). In Nigeria, studies has shown that the conventional ways that hospital are designed have contributed to stress, depression and anxieties because of loss of privacy, control over eating and sleeping times, noise, etc. And in addition contributed to dangers, allergies and other acquired infections called Hospital Acquired Infections (HAI) to patients and staff (Atata, Ibrahim, Akanbi, Olurinola, and Sani, 2006; David and Famurewa, 2010; Samuel, Kayode, Musa, Nwigwe, and Aboderin , 2010; Dandajeh, 2011).

Some of these assertions led to a research study by Dandajeh in 2011 on the appraisal of the therapeutic performance of teaching hospital buildings that accounts for less than one-third of Nigeria's population. However, no studies have specifically assessed the therapeutic performance of PHC buildings which is identified to be the appropriate settings to tackle over 90% of the major causes of morbidity and mortality due to its proximity to about two-thirds of Nigerians (Ibrahim, Price and Dainty, 2006; Ibrahim, 2011; Abdulraheem et. al., 2011).

There is the need therefore for this study to evaluate the performance of PHC buildings with a view to assess how well these healthcare buildings complies with best practices and aid the healing process of patients, productivity of medical staff and other users.

## 1.3 Significance of the Study

Recent research findings by Dandajeh (2011) confirmed the suitability of the use of the adapted versions of Achieving Excellence Design Evaluation Toolkit (AEDET) and All Staff and Patient Calibration Toolkit (ASPECT) for the assessment of the performance of hospital buildings (Tertiary Healthcare facilities) in Nigeria. But no record exist for that of the PHC. It is needful therefore to extend the use of this toolkit to assess users' satisfaction of PHC buildings. The results from this study shall serve as a baseline study on the therapeutic performance of PHC that will greatly benefit stakeholders, government authorities and designers responsible for its building in Nigeria. In addition, it shall provide a basis for improving PHC design quality and guide the decisions for future healthcare schemes.

## 1.4 Aim and Objectives

### 1.4.1 Aim

The aim of this study is to evaluate the perception of users on the performance of selected PHC buildings in the FCT with a view to assess how well these healthcare buildings complies with best practices and help in the healing process of patients.

### 1.4.2 Objectives

The objectives of this study are to:

i. Identify the standard performance criteria of healthcare buildings that aids healing of patients and positively influence users of PHC buildings.
ii. Evaluate the perception of users on the performance of selected PHC buildings.
iii. Compare the performance of the PHC studied in ii with the standards identified in i above to determine the areas requiring improvements.

iv. Outline specific steps to remedy the gaps in ii above to ensure the effective performance of the PHC buildings in accordance with the global standards.

## 1.5 Scope and Limitations

### 1.5.1 Scope

This research covered physical related assessments of PHC buildings in the Federal Capital Territory (FCT), and not on the services rendered by medical staff. This choice of the FCT is based on convenience and the fact that the design of most PHC buildings are the same throughout the country. In addition, the Comprehensive Health Care was selected as the study sites because it is the reference type in the health system structure where other health facilities (health post and clinics) transfer patients to for admission and comprehensive treatment. The target populations are patients, medical staff and visitors of these PHC buildings and Achieving Excellence Design Evaluation Toolkit (AEDET) is the only evaluation toolkit used in this research.

### 1.5.2 Limitations

The evaluation of the therapeutic performance of the studied PHCs were limited to the subjective perceptions of the various categories of PHC users in the FCT only. These perceptions could be different from other users in different locations even though the designs of PHCs are the same.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

Improved health care services, especially the Primary Health Care (PHC) is an important area of concern for governments in developing countries. This is because improvement in PHC services (accessibility, availability, affordability, acceptability and adequacy) will pave the way for advancement in the quality of lives of the people (Shrestha, 2010).

This present research study seeks to conduct a post-occupancy evaluation on the performance of PHC buildings in the Federal Capital Territory, with a view to provide records about their state (functionality, build quality and impact). This is because it is an established fact that patient's health outcome have direct relationship with the design and environment of the health facilities where they are treated (Ibrahim, 2011; Dandajeh, 2011). This literature reviews attempt to support and provide the conceptual basis, research findings and policy review on this subject of BPE, healing environment and patient's health outcome in the PHC level.

## 2.2 Building Performance

The Building Services Research and Information Association (BSRIA) (2011), Dandajeh (2011) and Jiboye 2012 define Building Performance Evaluation (BPE) as a form of Post-Occupancy Evaluation (POE) which can be used at any point in a building's life to assess energy performance, occupant comfort and make comparisons with design targets. Furthermore, BSRIA findings suggested that there is significant evidence that buildings do

not perform as well as was anticipated at the design stage; and the difference between anticipated and actual performance is known as the performance gap.

## 2.3 Building Performance Evaluation (BPE)

To support the continual improvement of the construction and procurement process, Post Project Evaluation (PPE) and Post Occupancy Evaluation (POE) of building programmes are mandatory (Scottish Government, 2012). BPE originated in the 1960s, and in 1964 the Royal Institute of British Architects (RIBA) plan of work was established to include this BPE aspect which enables architects to formally carry out post-project review of their design. But the drawback of this BPE then was that it did not capture the feedback from occupants of the buildings or in-use energy consumption. In 1972, a revision of the RIBA plan of work was made and it included the feedback from occupants of building, hence the term Post Occupancy Evaluation (POE) was used. Therefore, Building Performance Evaluation (BPE) is a form of Post-Occupancy Evaluation (POE) which can be used at any point in a building's life to assess energy performance, occupant comfort and make comparisons with design targets.

### 2.3.1 Building Performance Evaluation Methodology

The Building Services Research and Information Association (BSRIA) (2011) has reported the use of various techniques for conducting POE studies by PROBE using a sequential step or methodology. The identified eight steps for conducting POE are:

i. *Step 1*: Understanding the building being evaluated. Here, the building design intent and technical performance specification for the building systems are sought

to be understood by the assessor. These information are contained in the brief and most time sought from the facilities team.

ii. *Step 2*: Initial Walkthrough. This walkthrough is an opportunity to see the building as it is being used at the time of the occupancy.

iii. *Step 3:* Develop a BPE Strategy. The results obtained from step 1 and 2 will be used to develop a building specific strategy including the evaluation to be carried out and the data inputs required for analysis and make decisions.

iv. *Step 4:* Monitoring and Data Collection. This step is the collection of data, which will include meter reading for energy and water use, environmental performance data (such as noise levels, pollution levels, etc.), occupancy satisfaction feedback from different users of the building, management and designers' feedback, etc.

v. *Step 5:* Interpretation and reporting of data collected. The analysis and interpretation of data collected will done under this step. The analysis will depend on the type of data collected.

vi. *Step 6:* Optimizing Building Performance. A successful building performance evaluation should result in changes to correct areas of the building that is under performing. Under this step, solutions to optimize the identified lapses are recommended.

vii. *Step 7:* Re-monitor (If appropriate). For any changes to systems from step 6, the new performance level should be verified by further monitoring.

viii. *Step 8:* Feedback to the design team. The final step is to provide feedback to the design team so that the lessons learned from the study can be incorporated into future design work.

### 2.3.2 Building Performance Evaluation Tools and Techniques

As clients increasingly demand proof of performance, BPE is becoming a requirement on many projects, particularly in the public sector for schools, offices and healthcare buildings. BPE services can range from a complete evaluation to providing energy monitoring instruments for energy building performance. BSRIA (2011) has mentioned the following tools and techniques for conducting BPE or POE:

i. *Walkthrough*: This tool and techniques is such that the BPE evaluator visits the building while it is being occupied to review how the building is responding to the original brief.

ii. *Energy Audits*: Energy audit is done to determine how much energy the building is using. This can be done by taking the meter reading for the whole building and sub-meter level.

iii. *Detailed Energy Profiling:* This is a detailed analysis of energy over several days, weeks or more. The purpose is to highlight how and when energy is used by building systems, appliances, and as a direct result of the building users' activities.

iv. *Forensic Analysis:* Forensic analysis involves examining data or information about a system not performing as expected and to identify the reasons for poor performance.

v. *Spot Measurement:* Spot measurements involve taking readings of some physical quality in the building (such as temperature, air flow, energy, etc.), at reasonably representative locations from which the mean values can be calculated.

vi. *Occupant Survey:* This is used to find out what people think about the performance of their building, or part of a building. Commonly used surveys include the qualitative building use survey and the Design Quality Indicator.

## 2.4 User Satisfaction and Post Occupancy Evaluation (POE)

Satisfaction is a subjective evaluation of the performance of products or services in meeting the needs and expectations of users or customers or a response pertaining to a particular focus determined at a particular time ( Giese and Cote , 2002; Jiboye, 2012; Ibema, Opoko, Adeboye, and Amole, 2013). The results from studies have identified six Building Performance Indicators (BPIs), namely; spatial (functional) comfort, indoor air quality, visual comfort, thermal comfort, acoustic comfort and building integrity - structural and material performance. Others such as Meir et al. (2009) on the other hand argued that since BPE is based on the concept of building-users' experience, BPIs should be also be based on parameters related to thermal comfort such as heating, ventilation and air-conditioning; illumination and visual comfort; occupants' satisfaction and behavior as well as physiological and psychological comfort of users.

Post Occupancy Evaluations (POE) have been used to evaluate the degree to which buildings enable users to fulfill their intended goals. A comprehensive POE method, one that includes assessments of occupant well-being and productivity, completes the feedback loop that is essential for the successful future development and improvement of building design and practices (Abbaszadeh, Zagreus, Lehrer and Huizenga, 2006; Ilesanmi, 2010).

Findings by Nawawi (2008); Ilesanmi (2010) and Hashim, Aksah, and Said (2012) on POE of public and private buildings revealed that building elements, services and environment have a high correlation with the building occupants' satisfaction levels. More specific findings by Hashim, Aksah, and Said (2012), informed that the areas of buildings that have impact on the

satisfaction of occupants are the *strategic value, aesthetic and image, space, comfort, amenity, serviceability, safety, operational cost, life-cycle cost and operational management*. Also, Jiboye (2012) by POE studied certain performance characteristics of the residential environment which contribute to residents' satisfaction. The findings are that users are satisfied with buildings in terms of *functionality, accessibility, spatial adequacy and efficiency, aesthetics, security, privacy* among several others.

### 2.5 Organization of Health System and Health System Reforms in Nigeria

Health systems consist of all the people and actions whose primary purpose is to improve health. A health system is an organizational framework for the distribution or servicing of the health care needs of a given community (World Health Organization, 2010). The health system in Nigeria according to Asuzu (2004); Abdulraheem et. al. (2012) and Ibrahim and Price (2006) is structured along the three levels of primary, secondary and tertiary levels of care. These systems is run concurrently such that all the three levels of government - local, state and federal, even though they hold primary responsibility for only one level of the system each, can exceed it and provide services at any of the other two levels of care.

Asuzu (2004); Adeyemo (2005) and Emuakpor (2010) traced the history of the Nigerian health sector reforms beyond the organized colonial period and asserted that the Nigerian health care system can be said to have experienced five past reforms from the traditional health care system that existed in the individual Nigerian communities and ethnic groups before our western (British) colonization till date. It was a unitary health service system in 1950 then came the Second National Development Plan of the immediate post-independence era in the

1960s. The Third National Development Plan of the 1970s had the Basic Health Services Scheme as its focus. But following the Alma Ata Declaration, serious attempts were made at health systems reforms in the 1980s. Thus the National Health Policy (1988) based on the principles of primary health care and primary health care implementation were the results of that era. The Fourth National Development plan (1981-1985) addressed the issue of preventive health services through the implementation of the Basic Health Services Scheme (BHSS), which provides for the establishment of three levels of health care facilities; namely - Comprehensive Health Centers (CHC), Primary Health Centers (PHC) and Health Clinics (HC). These institutions were to be built and operated by state and local governments with financial aid from the federal government. By this policy therefore, the provision of health services would be the joint responsibility of the federal, state and local governments.

Nigeria has 774 local government areas (LGA) and by the scheme proposed in the Fourth National Development plan, each LGA would have a minimum of 7 PHCs and 30 HCs with at least one CHC at the apex of the health care services. The larger LGAs would each have, at least 12 PHCs and 50 HCs feeding into one or more CHCs.

## 2.6 Conceptual Basis of Primary Health Care

PHC has been described as a philosophy that advocates the movement of health care services out of secondary and tertiary level such as hospitals; into community based settings, thereby bringing it closer to the people and making it more responsive to their needs (Ibrahim, 2011; Adeyemo, 2005; Asuzu, 2004; Egbewale and Odu, 2013; NPHCDA, 2010).

The concept of PHC according to Adeyemo (2005) was formulated by the 134 countries that met at the Alma Ata conference in Russia on 12th September 1978, organized under the auspices of the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). PHC is provided by local government authority through health centers and health posts and they are staffed by nurses, midwives, community health officers, heath technicians, community health extension workers and by physicians.

There are 10 components of Primary Health Care. They include

i. Education concerning prevailing health problems and the methods of preventing and controlling them;
ii. Promotion of food supply and proper nutrition;
iii. Adequate supply of safe water and basic sanitation;
iv. Material and child health care including family planning;
v. Immunization against the major infectious diseases;
vi. Prevention and control of locally endemic diseases;
vii. Appropriate treatment of common diseases and inquiries;
viii. Provision of essential drugs;
ix. Community mental health care; and
x. Dental Health.

Therefore PHC system encourages countries to shift their National Health Care strategy from urban to rural areas and location (Adeyemo, 2005; Abdulraheem, Olapipo and Amodu, 2012).

## 2.7 Health Care Building Architecture

There are common general considerations needed to be taken into account during the design process of any health care facility. Alalouch (2009) listed and elaborated on these considerations as follows:

i. **Size**: The size of any health facilities that has in-patient ward will usually occupy more floor area than any one that provides diagnostic, treatment and support services put together. Hence, proper design consideration should be given to any health facilities that will accommodate in-patients

ii. **Growth and change**: Health care facilities should be designed to have the ability to expand and change when needed as they can be affected by the development of other factors such as clinical, technical, economic, demographic and political forces including rearrangement in space functions.

iii. **Ventilation and energy consumption**: Health care designs should consider ventilation policy and energy consumption as it has a direct effect on the building form and the running cost of the hospital. For example, natural ventilation in hospitals will generate less energy consumption, reduce revenue and running cost of a hospital and improve the internal environment for patients and staff than the use of air-conditioning systems.

iv. **Entrances and internal traffic**: Proper consideration should be given to entrances and internal traffic within a health care facility because they are essential for conveniences of patients, staff and visitors.

v. **Internal environment**: A number of studies have found that improving the internal environment in hospitals has a positive effect on patients' recovery. As such, the use

of appropriate colours and lighting in different departments positively affects recovery rates and staff moral

Alalouch (2009) found that in-patient health facilities has more direct effect on the healing process of patients, because it is the place where the patient is accommodated to receive medical treatment, be prepared for surgery or recover after treatment. And a proper design, look and feel of such places will improve health outcome of patients considerably.

## 2.8 Health Care Environment, its Impact on Patient's Well-Being and Health Outcomes

Healing environment can be described as the physical and non-physical environments that support the recovery or the healing process. And researches have established that a conducive healing environment helped pediatric patients to heal faster, reduced the length of stay in the wards and enhanced their quality of life (Ghazali and Abbas, 2011). A number of research studies have been conducted on the relationship of health care healing environment and patient's outcome (Alalouch, 2009; R and D Report, 2007; Abbas and Ghazali, 2011). The common aspects with them have been POE studies that evaluated the physical qualities and staff and patients satisfaction levels using the adopted UK's NHS AEDET and ASPECT Evaluation toolkits.

The growing body of knowledge from 1000 scientific studies confirms that good design in the healthcare environment can make a significant contribution not only to the quality of lives of patients and their careers, but also to actual health outcomes (R and D Report, 2007). Furthermore, good design can reduce the running costs of healthcare facilities by making recruitment easier, reducing medical errors, lowering staff turnover and reducing length of

hospital stay. Research studies by Lawson and Phiri (2003), Hutton (2005) showed that the patients who are seriously ill are sensitive to and highly concerned about the architectural environment in hospitals.

### 2.8.1 Theoretical Approach for Healing Environments

The frameworks of integrated building design by Huisman, Morales, Hoof and Kort, (2012) in Table 2.1 can contribute to the understanding of all of the various aspects and dimensions that need to be taken into consideration throughout the process of designing and constructing healthcare buildings.

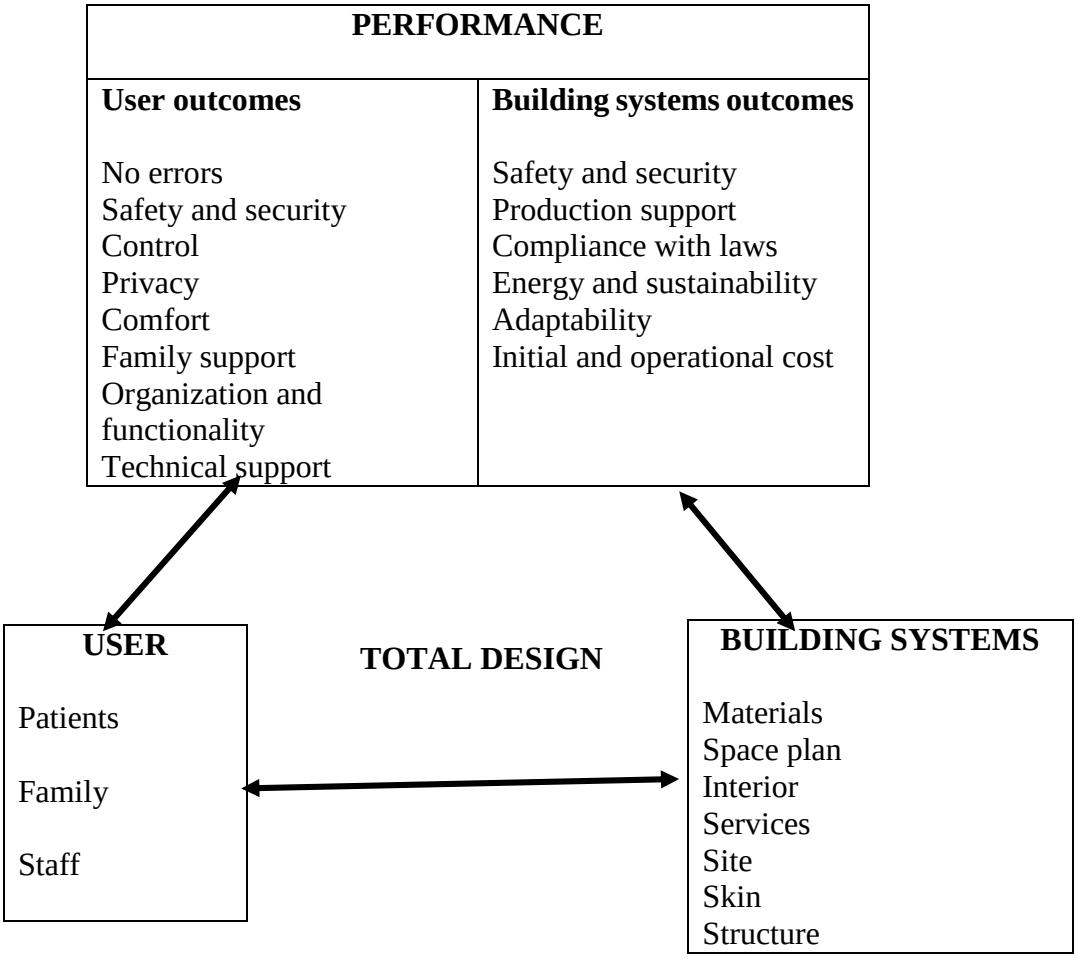


Table 2.1: The framework of integrated building design. Source: (Huisman et al, 2012)

According to Huisman et al, (2012), this framework describes a triangular relationship among the building system, the performance, and the users. Each single element affects the other two. Within the framework users are defined as patient, family or staff. Within the framework, a building delivers performances that are among the user needs and are installed and fitted to meet those user needs. In turn, the building systems are translated to user outcomes. Each building system has a specific set of functions which can be seen as solutions that contributes to the optimization of a particular user need. The success of the final design is the result of how well the needs of the stakeholders are met by the building systems.

### 2.8.2 Optimal Healing Environment Framework

Volumes of research studies have confirmed that physical environment contribute to healing of patients. Therefore, it could be hypothesized that a shorter patients' duration of stay or recovery period is the result of a better quality physical environment (R and D Report, 2007).

But recent studies by Abbas and Ghazali (2011) added more to these findings. Their study to investigate the influence of physical environment towards healing ended up with findings that identified other components that are supportive towards the creation of a therapeutic environment. Their eventual findings was that the quality of the physical environment need not necessarily be the major determinant of a therapeutic environment. There is a holistic environment that facilitates the healing of patient called the *Optimal Healing Environment (OHE)* which is synonymous to therapeutic environment. The Samueli Institute, a medical research organization based in the United States of America is in the forefront of propagating

this concept of OHE. OHE was coined in 2002 by the Samueli Institute and has been described as "the social, psychological, physical, spiritual, and behavioral components of healthcare support that can stimulate the body's innate capacity to heal by itself" (Ananth and Smith, 2008; Smith, Firth, Ananth, and Reece, 2009; Firth and Smith, 2010). This framework involves two major parts of *inner* and *outer environment*. And both comprise of eight components as shown in figure 2.1.

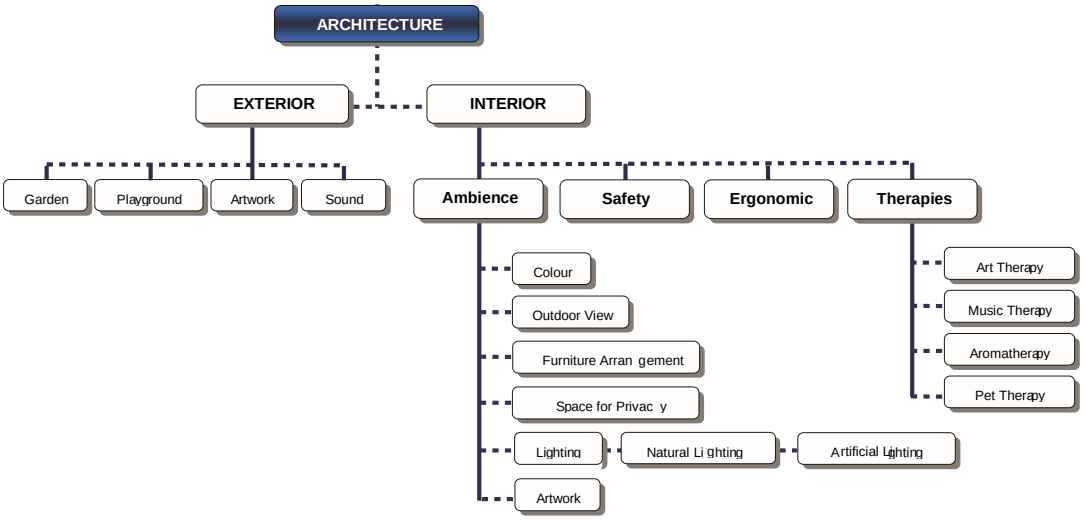


Fig 2.1: Modified Building Healing Environment Framework Based on the OHE. Source: (Abbas and Ghazali, 2012)

i. INNER ENVIRONMENT

   a. Developing Healing Intention

   b. Experiencing Personal Wholeness

   c. Cultivating Healing Relationships

   d. Creating Healing Organization

ii. OUTER ENVIRONMENT

a. Practicing Healthy Lifestyle

b. Applying Collaborative Medicine

c. Building Healing Spaces

d. Fostering Ecological Sustainability

According to the Institute, an OHE supports and stimulates patient's healing by combining one or more of the following eight approaches: *Developing healing intention, experiencing personal wholeness, cultivating healing relationships, practicing healthy lifestyles, applying collaborative health care, creating healing organizations and building healing spaces.*

A survey of optimal healing environments (OHE) conducted by Ananth and Smith (2008) from a convenience sample of 125 hospitals shows that the hospitals surveyed are developing and implementing initiatives that relate to all eight of the components in the OHE framework. And prominent among these components was the healing spaces. This confirmed the increasing amount of evidence available to validate the positive effects of using physical space to improve health outcomes and hospital performance. The building of healing spaces and fostering ecological sustainability are the prominent components of consideration in this study, because they contribute to the performance of healthcare buildings..

### 2.8.3 Healing Space Requirements in Built Environment

Healing environments through "evidence-based design" make hospitals less stressful and promote faster healing for patients and improve well-being for their families, as well as creating a pleasant, comfortable and safe work environment for staff (Huisman et al., 2012).

Research findings by Smith et al. (2009) and Sarhan et al. (2014), highlighted the following requirements that were found to influence the performance of healthcare buildings:

i. Color and light
ii. Art, music and sound
iii. Eco-friendly green (landscaping)
iv. Space and privacy

### 2.8.3.1 Color and light as Healing Space Requirements in Built Environment

Sarhan et al. (2014), reported the impact of daylight on patients outcomes. It revealed that higher level of light exposures compared to lower levels are effective in reducing depression in patients. And that the morning light is twice effective than the efternoon light in improving patients conditions.

Choi, Beltran and Kim in 2012 investigated the impact of indoor daylight environment on patient's average length of stay (ALOS). This study showed that patients in rooms with brighter orientations have shorter length of stay in the hospital than those in darker orientation. And that excessive daylight and glare has caused visual discomforts to patients. The benefits of daylight was that when patients are provided with options to control daylight in rooms, it was found to improve their physiological and psychological conditions.

Findings by Anjali (2006) showed that daylight impacts outcomes in healthcare settings by reducing depression among patients, decreasing length of stay in hospitals, improving sleep and circadian rhythm, lessening agitation among dementia patients, easing pain, and improving adjustment to night-shift work among staff. The presence of windows in the

workplace and access to daylight have been linked with increased satisfaction with the work environment; and exposure to light is critical for vitamin D metabolism in the human body.

Colors according to Salonen, Marjaana, Lappalainen, Nevala, Knibbs, Morawska, and Reijula, (2012) affect blood pressure, heart rhythm, the psyche, and the electrical activity of the brain. Good interior color design therefore can reduce feelings of alienation and thus promote wellbeing and recovery.

The summary of these findings are that there is a significant relationship between indoor daylight environment as created by designers and patients' length of stay in hospitals. It behooves therefore that design consideration should be given to windows and other lighting facilities in healthcare buildings.

#### 2.8.3.2 Art, Music and Sound as Healing Space Requirements in Built Environment

Several studies by Salonen et al. (2012), Haciric (2008) and Huisman et al. (2012), has shown that music and art have healing effects. Pleasant music, when controlled, can promote relaxation, reduce anxiety or stress, improve coping with pain, affect sleep patterns, improve stroke patients' memories and decrease the amount of sedative medication needed for some patients. Art allows patients and visitors to focus on something other than their condition. Art improves the perception of care at the hospital, serves as an element that users identify with, makes the hospital less intimidating, is a destressor for patients, staff members and visitors, and can serve as landmarks for patients and visitors. The mechanism underlying the impact of art is assumed to be a lowering of stress and anxiety levels, promotion of restoration from stress, and improvement in mood.

The integrations of proper colors and artwork play a role in the healthcare environment. It creates a dramatic environment which gives positive impact, relieve stress and distract illness from pediatric patients (Sarhan et al., 2014).

#### 2.8.3.3 Green Garden as Healing Space Requirements in Built Environment

According to Jiang (2014), the horticultural therapy school believes that working in a garden is particularly obvious, meaningful, and enjoyable, hence therapeutic. The primary goal of healing garden is stress relief. Natural healing garden design should emphasize sensory environment, green visual scenery, sound of birds and water, aroma from plants to stimulate the sense of smell, and encourage people to touch plants and water.

A number of studies by Ulrich (2008) and Marcus (2007) have presented strong evidence that about 3 to 5 minutes of contact with nature can significantly decrease stress, reduce anger and fear, and increase pleasant feelings. This calming effect can be achieved by providing views to the outside, interior gardens or aquariums, or artwork with a nature theme. Also for a patient, visitor, or member of staff, spending long hours in a hospital, nearby access to natural landscape or a garden can enhance people's ability to deal with stress and thus potentially improve health outcomes.

#### 2.8.3.4 Space and Privacy as Healing Space Requirements in Built Environment

On the element of space for privacy, Alalouch (2009) investigated the implications for space and privacy in hospital ward design revealed that patients in single-bed space experience quick recovery than those in multi-bed space. This has re-emphasized the concept of patients'

privacy and its importance for patients' well-being. These findings puts pressure on hospital designers to offer a better level of privacy for individuals especially in multi-bed wards where there is more potential for a breach of privacy.

### 2.9 Standard Criteria for Hospital Design and Design Quality Indicators (DQI)

The need to improve healthcare delivery in the United Kingdom (UK) necessitated the Department of Health (DOH) in 2004 to establish the goals of reducing waiting time, patient length of stay in hospitals, the use of medicine, increase staff work effectiveness and increase staff time per patient in hospitals (Haciric, 2008). These goals were responsible for various research studies conducted to investigate those design criteria or parameters that affects patients' outcome in particular. In an attempt to investigate the implication for space and privacy in hospital ward design by Alalouch (2009), findings revealed that experts in ward design unanimously agreed that the main information sources of criteria for ward design and hospital design in general are the NHS guidance and publications such as: *Health Building Notes (HBNs)* and *Health Technical Memoranda (HTMs).*

The Health Building Notes (HBNs) series gives advice on best-practice in the design and planning of healthcare buildings. And it covers a wide range of health building design criteria to support the briefing and design process of NHS projects. On the other hand, the Health Technical Memoranda (HTMs) series gives comprehensive advice and guidance on the design, installation and operation of specialized building and engineering technology used in the delivery of healthcare. And this HTM is based on eight core areas of decontamination, medical gases, ventilation systems, water systems, fire safety (Fire code), electrical services,

environment and sustainability and specialist services (Department of Health, 2014; Haciric, 2008; Alalouch, 2009; Department of Health, 2013).

Since evidences shows that patients recover faster in better designed hospitals, then there should be indicators that judge how effective a health care facility is. This is known as the Design Quality Indicator. The Design Quality Indicator (DQI) is a process for evaluating and improving the design and construction of new buildings and the refurbishment of existing buildings. And the DQI for Health in particular has been developed as a design quality evaluation tool for all types of healthcare projects. The DQI process follows a clear structure that is linked to the industry phases of a building project. It consist of five DQI Stages of: Briefing, Concept Design, Detailed Design, Ready for Occupation and In-Use (Design Quality Indicator, 2014).

Evidence based literatures together with findings from various research studies and reports have identified and recommended standard therapeutic criteria that facilitates patient's outcome. These criteria have been extracted and synthesized into the various evaluation toolkits (AEDET, ASPECT, IDEA, NEAT) developed by the Department of Health. A total of 128 criteria were summarized as healthcare design criteria by Alalouch (2009) from available toolkits used for healthcare evaluation.

However, according to the Department of Health (2013); Design Quality Indicator (2014); Alalouch (2009) and Abbas & Ghazali (2011) of all these criteria there are ten essential ones that have been mapped into three areas of functionality, impact and build quality. They serve as the Design Quality Indicators or performance criteria for any health care buildings. These are:

i. **Functionality**
Access

Uses

Space

ii. **Build Quality**
Performance

Engineering

Construction

iii. **Impact**
Urban and Social Integration

Staff and patient Environment

Form and Materials

Character and Innovation

### 2.9.1 Functionality

This section deals with all those issues that has to do with the primary purpose or function of the building. It deals with how well the building serves these primary purposes and the extent to which it facilitates or inhibits the activities of the people who carry out the functions inside and around the building (R and D Report, 2007; NHS, 2007). This section has three criteria to consider:

i. Access

Access criteria focuses on the way the users of the building can come and go. It asks whether people can easily and efficiently get onto and off the site using a variety of

means of transport and whether they can logically, easily and safely get into and out of the building.

ii. Use

Use is concerned with the way the building enables the users to perform their duties and operate the healthcare systems and facilities housed in the building. The building will be highly functional and efficient, enabling people to have enough space for their activities and to move around economically and easily.

iii. Space

This criteria concentrates on the amount of space in the building in relation to its purpose. It asks if this space is well located and efficient and whether people can move around in it efficiently and with dignity.

Evidence from many post-occupancy evaluations and Surveys of users in healthcare buildings confirm that people like unambiguous entrances that are logically positioned. That multiple entrances are confusing, are a source of security concerns, increase stress levels in patients and staff, and should be avoided. Furthermore, patients and staff like to be able to control their privacy and their interaction with others. In buildings and places where they are able to do so, people report increased satisfaction with their environments ( Department of Health, 2014; HaCIRIC, 2011; Lawson and Phiri, 2003).

### 2.9.2 Build Quality

This build quality aspect deals with the physical components of the building rather than the spaces. This is therefore what might be thought of as the more technical and engineering aspects of the building. It asks whether the building is soundly built, will be reliable and easy to operate, will last well and is sustainable. It is also concerned with the actual process of construction and the extent to which any disruption caused is minimized (R and D Report, 2007; NHS, 2007). This section has three criteria to consider:

i. Performance

Performance is concerned with the technical performance of the building during its lifetime. It asks whether the components of the building are of high quality and fit for their purpose.

ii. Engineering

Engineering is concerned with those parts of the building that are engineering systems as opposed to the main architectural features. It asks whether the engineering systems are of high quality and fit for their purpose, will be easy to operate and if they are efficient and sustainable.

iii. Construction

Construction is concerned with the technical issues of actually constructing the building and with the performance of the main components.

Post-occupancy evaluations indicate that users have fewer complaints when they are able to perform their duties and to operate the healthcare systems and facilities housed in the building.

Patients show general consensus, as do staff, about wanting light and airy hospitals. This can be achieved by the use of materials, color, natural light and artificial light. In addition, scenes of nature are found to induce calm if it is not possible to see the real thing ( Department of Health, 2014; Haciric, 2011; Lawson and Phiri, 2003).

### 2.9.3 Impact

Impact aspect deals with the extent to which the building creates a sense of place and contributes positively to the lives of those who use it (staff and patient) and are its neighbors (R and D Report, 2007; NHS, 2007). This section has four criteria to consider:

i. Urban and Social Integration

Urban and social integration criteria deals with the way the building relates to its surroundings. It asks whether the building plays a positive role in the neighborhood be it urban, suburban or rural.

ii. Staff and patient Environment

The staff and patient criteria allows a more detailed evaluation of the building against the latest known research on the impact of design on patient and staff satisfaction and patient health outcomes. It essentially deals with how well an environment complies with best practice as indicated by the research evidence.

iii. Form and Materials

This criteria deals with the nature of the building in terms of its overall form and materials. It is primarily concerned with how the building presents itself to the outside world in terms of its appearance and organization. Although it deals with the materials

from which the building is constructed, it is not concerned with these in a technical sense but rather the way they will appear and feel throughout the life of the building.

iv. Character and Innovation

Character and innovation aspects deals with the overall feeling of the building. It asks whether the building has clarity of design intention, and whether this is appropriate to its purpose. A building that scores well under this heading is likely to lift the spirits and to be seen as an exemplar of good architecture of its kind.

Design reviews indicate that a successful building has clarity of design intention. It should communicates a strong positive image throughout all the various places such as arriving, circulation, waiting etc. Furthermore, evidences from scientific studies show that not only comfortable conditions but the ability to control levels of comfort for oneself in the different types of places are very important in reducing stress and alleviating anxiety (Department of Health, 2014; Haciric, 2011; Lawson and Phiri, 2003).

## 2.10 Healthcare Building Evaluation Toolkits

The Department of Health in association with different academic and industrial institutes has developed four toolkits to assist in determining, managing and monitoring of health care design requirements from the initial proposals through to post project evaluation. These are: Achieving Excellence Design Evaluation Toolkit (AEDET); A Staff and Patient Environment Calibration Tool (ASPECT); Inspiring Design Excellence and Achievements (IDEA) and NHS Environmental Assessment Tool (NEAT) (Alalouch, 2009; Department of Health, 2014; Dandajeh, 2011; Haciric, 2008).

According to various studies, the significance of these toolkits is that they incorporate the design-related criteria of health care buildings the relevant evidence-based research in a non-technical way. As a consequence, most of design information sources which are related to healthcare building design have been covered in these toolkits in a relatively accessible way. They allow the user to monitor aspects like quality of design, patient and staff environment and the environmental impact of healthcare buildings. They can be used as evaluation tools for new buildings as well as refurbishments (Dandajeh, 2011; Alalouch, 2009; Abbas and Ghazali, 2012; R and D Report, 2007; Haciric, 2008).

### 2.10.1 Achieving Excellence Design Evaluation Toolkit (AEDET) Evolution

AEDET Evolution is a result of work carried out by the NHS, The Commission for Architecture and the Built Environment (CABE), The Construction Industry Council (CIC) and Sheffield University. AEDET enables the user to evaluate the design of healthcare facilities by posing a series of clear, non-technical questions, encompassing the three key areas of Impact, Build Quality and Functionality, which split into 10 assessment criteria as shown in Figure 2.3. Scoring these criteria assesses how well a healthcare building complies with best practice (Alalouch, 2009; Abbas and Ghazali, 2011; Abbas and Ghazali, 2012; Design Quality Indicator for Health Guidance, 2014; Haciric, 2008; Department of Health, 2014). The objective of AEDET Evolution is to assist Trusts and the NHS in determining and managing their design requirements from initial proposals through to post project evaluation. Generally it has been used as a benchmarking tool (Haciric, 2008).

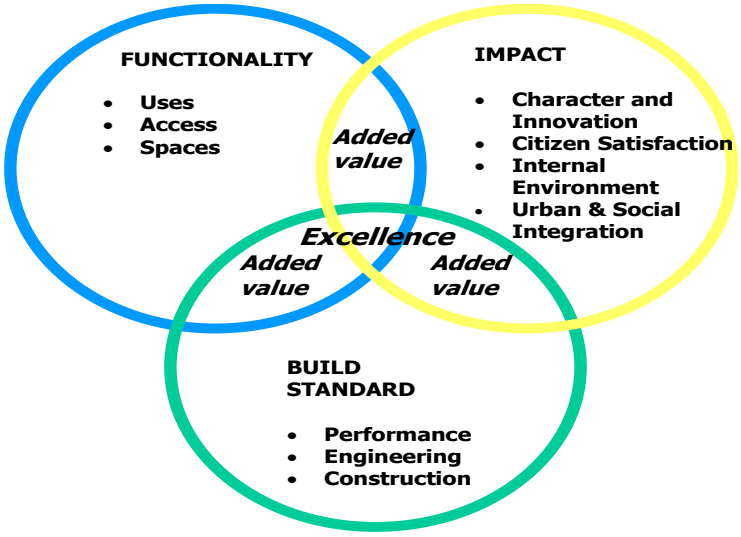


Fig 2.2: AEDET Evolution sections and headings (Source: Department of Health, 2014; NHS, 2007).

AEDET's main function is to evaluate the quality of design in healthcare building by delivering a profile that determines the strengths and weaknesses of a design. AEDET Evolution consists of three layers: scoring, guidance and evidence layers. During an evaluation process, users of AEDET Evolution respond to assessment statements by giving each a score on a 6 point scoring scale using the *scoring layer*. The *guidance layer* provide more explanation about each statement to help users understand what and how to score and the *evidence layer* summarizes the research evidences that support each section. The average score for each section provides an indicator of how successful the design is with regards to this section (NHS Estates, 2005). An eventual output of AEDET from the Microsoft Excel spreadsheet version is shown in Table 2.2.

**Table 2.2: Output of AEDET from Microsoft Excel spreadsheet (Source: NHS Estates, 2005).**

| | CRITERIA | SCORES |
|---|---|---|
| A: | ► Character and innovation | 0 of 5 scored |
| B: | ► Form and materials | 0 of 5 scored |
| C: | ► Staff and patient environment | 0 of 8 scored |
| D: | ► Urban and social integration | 0 of 4 scored |
| E: | ► Performance | 0 of 4 scored |
| F: | ► Engineering | 0 of 5 scored |
| G: | ► Construction | 0 of 7 scored |
| H: | ► Use | 0 of 7 scored |
| I: | ► Access | 0 of 7 scored |
| J: | ► Space | 0 of 6 scored |

A summary of the ten key assessment criterion used by AEDET Evolution in the evaluation process are:

i. *Uses*:
Service philosophy, functional requirements and relationships, workflow, logistics, layout, human dignity, flexibility, adaptability and security.

*ii.* *Access:*
Vehicles, parking, pedestrians, disabled people, way finding, fire & security.

*iii.* *Spaces:*
Space standards, guidance and efficient floor layouts.

iv. *Character and innovation*:
Excellence, vision, stimulation, innovation, quality and value.

*v.* *Citizen satisfaction:*
External materials, color, texture, composition, scale, proportion, harmony, and aesthetic qualities.

vi. *Internal environment*:
Patient environment, light, views, social spaces, internal layout and way finding.

*vii.* *Urban and social integration:*
Sense of place, sitting, neighborliness, town planning, community integration and landscaping.

viii. *Performance*:
Daylight, heating, ventilation, air conditioning, acoustics, passive thermal comfort.

ix. *Engineering*:
Emergency systems, fire safety, engineering standardization and prefabrication.

x. *Construction*:
Maintenance, robustness, integration, standardization, prefabrication, health & safety.

The Department of Health (2007) guidance notes that the purpose of AEDET is to provide:

i. Assistance to Primary Care Trusts (PCTs) and NHS Trusts to develop design specifications for their schemes;

ii. A methodology for evaluating and assessing the design of healthcare building proposals;

iii. Assistance to NHS Estates in performing their approval role on behalf of the Department of Health;

iv. The basis for a national benchmarking system of design quality for healthcare buildings.

### 2.10.2 A Staff and Patient Environment Calibration Tool (ASPECT)

ASPECT is based on 600 research studies that are related to the relationship between health building environment and patients' and staff satisfaction, patients' healing process and staff

performance. This tool is a more detailed and accurate measure of the quality of design of staff and patients environment in healthcare buildings. ASPECT also consists of three the scoring, guidance and evidence layer which work in a similar way to AEDET. It is split into 8 sections. The score of each section is the average score of the statements in this section based on a 6 point scoring scale. These sections are: *Privacy; company and dignity; Views; Natural and outdoors; Comfort and control; Legibility of space; Interior appearance; Facilities and Staff as* shown in Table 2.3 (Alalouch, 2009; Haciric, 2008; R & D Report, 2007; NHS Estates, 2005).

**Table 2.3: Output of ASPECT from Microsoft Excel spreadsheet(Source: NHS Estates, 2005)**

| | CRITERIA | SCORES |
|---|---|---|
| C1: | ► Privacy, company and dignity | 0 of 5 scored |
| C2: | ►Views | 0 of 5 scored |
| C3: | ►Nature and outdoors | 0 of 3scored |
| C4: | ► Comfort and control | 0 of 6 scored |
| C5: | ► Legibility of place | 0 of 6scored |
| C6: | ► Interior appearance | 0 of 8 scored |
| C7: | ► Facilities | 0 of 8scored |
| C8: | ► Staff | 0 of 6 scored |

### 2.10.3 Inspiring Design Excellence and Achievements (IDEA)

IDEAs was conceived and developed by the University of Sheffield as a way of utilizing the latest research evidence. As the name implies, IDEAs is intended to aid healthcare architects and design consultants by providing inspiration and informing design briefs towards a good design, rather than evaluating proposals from the beginning of the process. It can be used to

assist in the generation of design briefs, proposals and schemes for both interior and exterior design of healthcare buildings.

The uniqueness of IDEAs is that it approaches health care design based on the movement or activities of patients, staff and visitors through a hospital rather than individual spaces or rooms. Examples of activities that occur in hospitals upon which this IDEA is based include: arriving, bathing, beds, circulation, consulting, shopping, sanctuary, socializing and waiting. IDEA is based on the findings of a research by the University of Sheffield that it was more beneficial to concentrate on the needs and activities of all users – patients, staff and others when starting to design appropriate healthcare spaces, rather than begin with the functions of rooms ( Department of Health, 2014).

How IDEA works can be divided into three stages. The first stage is called *Challenges.* This stage seeks to understand the activity, functional and emotional needs of the people involved (patient, staff, visitors, etc). The next stage, called *Considerations*, looks at what the design can do to respond to these requirements, and the last stage called *Precedents* provides information about some existing successful examples of solving the problem (R and D Report, 2007; Alalouch, 2009; The Scottish Government, 2010).

### 2.10.4 NHS Environmental Assessments Toolkit (NEAT)

NEAT was produced in response to a Government Construction Client Panel which places a requirement on all Government Departments that new buildings and refurbished are required to be sustainably constructed. NEAT has been developed to estimate the impact of healthcare

buildings on environmental and social issues. It aims to help raise the awareness of the impacts that the NHS facilities and services can have on the environment and also to estimate the level of environmental impact taking place.

NEAT can be used in different stages of the project to estimate environmental performance, specify performance or monitor ongoing performance. It covers ten issues: Management, Energy, Transport, Water, Materials, Land use and ecology, Pollution, Internal environment, Social and finally Operational waste. Each one of these issues is split into relevant subcategories. NEAT consists of a set of questions in each section. The rating scale of NEAT is: Fail, Pass, Good, Very good and Excellent. As a general rule of thumb, a score rating of Excellent is required for new buildings and Very good for refurbishments (R and D Report, 2007; Alalouch, 2009; NHS Estates and Facilities Policy, 2012). Most recently, BREEAM for healthcare buildings has replaced NEAT (NHS Environmental Assessment Tool) as the preferred environmental assessment method and certification scheme for healthcare buildings in the UK ( Department of Health, 2014).

## 2.11 Conclusion

The summary of this review is that there are growing body of research studies and findings indicating that the design of the healing environment impacts on patient recovery and on staff, and that good quality environments impact positively on patient care and vice versa.

This chapter has addressed the first objective of this research by identifying those standard therapeutic environment criteria which contribute to positively influencing patients' recovery, impacts on staff performance and other users. These criteria serve as the design quality indicator (DQI) that qualify any health care buildings to be functional and impactful. They are Access, Uses, Space, Performance, Engineering, Construction, Urban and Social Integration, Staff and patient Environment, Form and Materials and Character and Innovation.

Finally, the thorough review of literatures, reports and research studies has not shown any evidence of Building Performance Evaluation (BPE) or Post Occupancy Evaluation (POE) conducted for any PHC building in Nigeria.

# CHAPTER THREE

# RESEARCH METHODOLOGY

To achieve the three research objectives in chapter one, research methods and methodology seeks to provide the techniques employed for data collection, analysis, the strategy of choosing the methods and linking them with the results (Alalouch, 2009).

Ibrahim (2007); De Jager (2007) and Dandajeh (2011) have all examined the use of adopting standard data collection instrument used in different places. In this case the AEDET and ASPECT evaluation toolkits for health care buildings. Their conclusions were that if a valid questionnaire exists it should not be altered significantly as this affects the validity and reliability of the tool, but minor adaptation to the language is often needed in order to make it understandable to the local culture or context. Therefore, the methods and methodology used for this study were tailored and adapted to the Nigerian context, especially the National Primary Health Care Development Agency's Minimum Standards for Primary Health Care in Nigeria.

## 3.1 Research Design

A descriptive cross-sectional survey research design method is suitable and used for this study. Asika (2010) and Osuala (2005) had advocated that a cross-sectional descriptive survey method is used for research studies where the behavior of one or more of the variables are to be observed all at once in one shot study without interference, manipulation or control.

## 3.2 Study Population

The population of study is a census of all items or subjects that possess the characteristics or that have knowledge of the phenomenon being studied (Asika, 2010). The quality of healthcare design and its environment imparts on the medical staff, patients and visitors of PHCs. Therefore, the medical staff, patients and visitors are the target population across the six PHC buildings used as the study site for this research study. The medical staff comprise of doctors, nurses, pharmacists, community health extension workers (CHEW) and laboratory scientists. While the patients considered are both the out patients and those on admission. The visitors are the people visiting the PHC either to see the patients on admission, or as carers to the patients at the time of conducting this research.

## 3.3 Sample Size and Sampling Procedure

### 3.3.1 Sampling Frame

The available records of the target population from each of the selected PHCs was used to draw a sample frame for this study. This is shown in tables 3.1 – 3.4.

#### 3.3.1.1 Sampling Frame of medical staff in each selected PHC

A field survey was conducted to ascertain the number and categories of medical staff for each selected PHCs. These medical staff category were doctors, nurses/midwife, pharmacists, community health extension workers (CHEW and JCHEW) and laboratory scientists. Table 3.1 is the presentation of medical staff:

**Table 3.1: Sampling frame of Medical Staff in each PHC**

| Sn. | PHC Name | Area Council | Doctors | Nurses | Pharmacist | Lab. Sci. | Med. Records | Community Health Officer | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 1 | 6 | 1 | 2 | 2 | 8 | 20 |
| 2 | Comprehensive PHC Dei-dei | Bwari | 1 | 9 | 2 | 2 | 2 | 7 | 23 |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 3 | 9 | 2 | 2 | 3 | 14 | 33 |
| 4 | Kuje PHC Centre | Kuje | 2 | 7 | 2 | 2 | 2 | 10 | 25 |
| 5 | Dabi Comprehensive Health Centre | Kwali | 2 | 6 | 2 | 2 | 2 | 10 | 24 |
| 6 | Gidan Magoro Health Post | Amac | 2 | 6 | 2 | 2 | 3 | 9 | 24 |
| | **Total Medical Staff** | | **11** | **43** | **11** | **12** | **14** | **58** | **149** |

Source: Field Survey (2015)

### 3.3.1.2 Sampling frame of visitors in each selected PHC

Similarly, field survey was conducted to ascertain the number of visitors in each selected PHC and presented in Table 3.2. Since there was no register for visitors, the number of visitors was determined based on the traffic census carried out daily during visiting hours over a five days period in each PHC. These visitors are the people visiting the PHC at the time of conducting this research, either to visit or accompany patients or to see medical staff of these PHCs.

**Table 3.2: Sampling frame of visitors in each PHC**

| Sn | PHC Name | Area Council | Visitor |
|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 40 |
| 2 | Comprehensive PHC Dei-dei | Bwari | 60 |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 78 |
| 4 | Kuje PHC Centre | Kuje | 36 |
| 5 | Dabi Comprehensive Health Centre | Kwali | 38 |
| 6 | Gidan Magoro Health Post | Amac | 49 |
| | **Total number of visitors** | | **301** |

Source: Field Survey (2015)

#### 3.3.1.3 Sampling frame of patients in each selected PHC

Finally, field survey was conducted to ascertain the number of patients in each selected PHC at the time of this research and presented in Table 3.3. The records of the patients were obtained from the PHCs and then an average was taken over a period of five days. The patients considered are those on observations and in-patients on admission within 24 hours or more. In addition, because most of the selected PHCs have minimum of five to maximum of ten in-patient bed space capacities; this research study was conducted over a period of five days for each PHC. This was done to accumulate the required number of respondents that would be sufficient for this study.

**Table 3.3: Sampling frame of Patients in each PHC**

| Sn | PHC Name | Area Council | Patients |
|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 101 |
| 2 | Comprehensive PHC Dei-dei | Bwari | 120 |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 140 |
| 4 | Kuje PHC Centre | Kuje | 90 |
| 5 | Dabi Comprehensive Health Centre | Kwali | 85 |
| 6 | Gidan Magoro Health Post | Amac | 106 |
| | **Total number of Patients** | | **642** |

Source: Field Survey (2015)

### 3.3.2 Sample Size

In calculating sample size for a descriptive study, Fox, Hunn & Mathers (2009) informed that two criteria need to be established. The level of confidence required concerning the true value of a mean or proportion called the confidence level. Also the degree of precision which we can accept which is often presented in the form of a confidence interval. A proportion of 1:1:1 for the staff, patient and visitor was used to calculate the sample size. According to Zodpey (2003), in cases where the size of the target population can be readily determined, a minimum sample size can be calculated to represent the desired confidence level and interval. For this study with a total population of 1,092, as shown in Tables 3.1 – 3.3, a minimum total sample size of 284 is required for 95% confidence level and 5%

confidence interval that was adopted and used for this study, using the Zodpey (2003) sample size table. Table 3.4 shows the sample size collected and used for this study.

**Table 3.4: Sample size collected from each PHC**

| | PHC Name | Area Council | MEDICAL | PATIENT | VISITOR | TOTAL |
|---|---|---|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 18 | 20 | 19 | **57** |
| 2 | Comprehensive PHC Dei-dei | Bwari | 11 | 16 | 11 | **38** |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 26 | 29 | 25 | **80** |
| 4 | Kuje PHC Centre | Kuje | 21 | 17 | 10 | **48** |
| 5 | Dabi Comprehensive Health Centre | Kwali | 17 | 20 | 15 | **52** |
| 6 | Gidan Mangoro Health Post | Amac | 21 | 20 | 18 | **59** |
| | **TOTAL RESPONDENTS** | | **114** | **122** | **98** | **334** |

Source: Field Survey (2015)

### 3.3.3 Sampling techniques

The sample frame was already stratified into medical staff, patients and visitors. Therefore, a purposive sampling technique was used to select the samples (Govender et. al, 2014; Asika, 2010) for this study as shown in Table 3.4 above.

## 3.4 Data Collection Technique

A pilot study was initially conducted to test the validity and reliability of the data collection instrument in one of the PHC buildings using the well-structured questionnaire and self-administered to about 20 samples. At the end of the first day, the data collection technique was reviewed and interviewer administered to the samples was used instead. This was due to the literate level of understanding the content of the evaluation tools. A team of six field assistants with B.Sc. qualifications were trained to administer these

questionnaires. The NHS AEDET Evolution (Achieving Excellence Design Evaluation Toolkit) was adapted to reflect those questions within the context of the PHC in Nigeria. They were used to evaluate the physical environment of the selected PHC building through a series of statements which consisted of three main areas namely Impact (character & innovation, form & materials, staff & patient environment, urban & social integration), Build Quality (performance and engineering) and Functionality (use, access, space).

This Adapted AEDET Evolution questionnaire consists of two sections: A and B.

Section A of the questionnaire contains the background information of the respondents in respect of qualification, experience and other related issues that could assist the researcher to ascertain the reliability of the information provided.

Section B provided the respondents the opportunity to assess their perception of the therapeutic value of the PHC based on five point Likert scale. The five levels of scoring were '*strongly agree'* (5 points), *'agree'* (4 points), '*fairly agree* (3), *'disagree'* (2 point) and *'strongly disagree* (1).

Out of 360 questionnaires administered in the six study sites, 345 were returned and 334 were found suitable for analysis. This is shown in Table 3.4 above. The 334 questionnaires returned represented 92% of the total number sent out. This 92% return rate is considered sufficient for the study based on the assertion of Nulty (2008) and Govender et. al (2014) that the result of a survey could be considered as acceptable if the return rate is more than 50%.

### 3.5 Data Analytical Technique

The data collected from field survey need to be processed with appropriate methods to yield the desired information that can be used to suggest conclusions and present findings. In statistical applications according to Gelman (2004), data analysis can be divided into descriptive statistics, exploratory data analysis (EDA), and confirmatory data analysis (CDA).

A descriptive analysis was used on the data collected for this study to analyze and present simple weighted means and standard deviation. The numerical values of 5, 4. 3, 2 and 1 were assigned to Likert scale responses of *'strongly agree', 'agree', 'fairly agree' 'disagree',* and *'strongly disagree'* respectively. Then the weighted mean and standard deviation of each statements in the questionnaires was determined. The IBM Statistical Package for the Social Science (SPSS) 21 was used to present the mean and standard deviation used for this study.

The Standard deviation was used to measure the extent to which individual scores or data point deviated from the population mean. This weighted means was the basis for evaluating the perception of the respondents on the therapeutic performance of the PHCs (Department of Health Estates and Facilities, 2008). Also, inferential statistics was used to test for statistical significance of the results of the groups.

The Department of Health Estates and Facilities (2008) and Dandajeh (2011) have recommended that for interpretation purposes, the weighted mean of above 4.50 is excellent, 4.00-4.49 is 'very good', 3.00-3.99 is 'good' 2.00-2.99 is 'poor' below 2.00 is 'very poor'.

### 3.6 Ethical Considerations

Ethical approval was obtained from the National Primary Health Care Development Agency and Federal Capital Territory (FCT) Primary Health Care Board to visit the six study sites and administer the questionnaires. All the participants were informed about the purpose of the study and also obtained their consent for participation and on protecting their confidentiality.

# CHAPTER FOUR

# DATA PRESENTATION, ANALYSIS AND DISCUSSION

This chapter contains the detailed presentation of the data collected from the questionnaires. These data were further analyzed and discussed in an attempt to achieve the aim and objectives of this study.

## 4.1 GENERAL INFORMATION ON THE RESPONDENTS

### 4.1.1 General Information on Medical Staff

The categories of the medical staff that responded to the questionnaire are shown in Table 4.1

**Table 4.1: Category of Medical Staff**

| Sn | PHC Name | Area Council | Doctors | Nurses | Pharmacist | Lab.Tech | Community Health Extension Worker (CHEW) | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 1 | 5 | 2 | 2 | 8 | 0 | 18 |
| 2 | Comprehensive PHC Dei-dei | Bwari | 0 | 7 | 0 | 0 | 0 | 4 | 11 |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 2 | 5 | 3 | 5 | 0 | 11 | 26 |
| 4 | Kuje PHC Centre | Kuje | 1 | 3 | 1 | 0 | 0 | 16 | 21 |
| 5 | Dabi Comprehensive Health Centre | Kwali | 1 | 4 | 2 | 4 | 5 | 1 | 17 |
| 6 | Gidan Magoro Health Post | Amac | 0 | 7 | 2 | 1 | 3 | 8 | 21 |
| | **Total** | | **5** | **31** | **10** | **12** | **16** | **40** | **114** |
| | **Percentage of Medical Staff (%)** | | **4** | **27** | **9** | **11** | **14** | **35** | **100** |

**Table 4.2: Working Experience of Medical Staff**

| Sn | PHC Name | Area Council | 1-5 years | 6-10 years | 11-15 years | 16-20 years | Above 20 years | Total |
|---|---|---|---|---|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 4 | 11 | 0 | 2 | 1 | 18 |
| 2 | Comprehensive PHC Dei-dei | Bwari | 1 | 5 | 2 | 1 | 2 | 11 |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 10 | 6 | 3 | 5 | 2 | 26 |
| 4 | Kuje PHC Centre | Kuje | 10 | 6 | 2 | 1 | 2 | 21 |
| 5 | Dabi Comprehensive Health Centre | Kwali | 9 | 7 | 1 | 0 | 0 | 17 |
| 6 | Gidan Magoro Health Post | Amac | 6 | 2 | 9 | 1 | 3 | 21 |
| | **Total Medical Staff** | | **40** | **37** | **17** | **10** | **10** | **114** |
| | **Percentages of Medical Staff Years of Experience** | | **35%** | **32%** | **15%** | **9%** | **9%** | **100%** |

Source: Field survey (2015)

Table 4.1 reveals that 4% of the respondents were doctors, 27%, 9%, 11%, 14% were Nurses, Pharmacist, Laboratory Technologist and Community Health Extension Worker (CHEW) respectively. The remaining 35% of the respondents were other personnel in the operation of PHC such as Junior Community Health Extension Worker (JCHEW), Support Staff, Health Attendants/Assistants, Etc. This shows that the respondents cuts across all the categories of medical staff of PHC. Also, Table 4.2 shows that 65% of the medical staff respondents from the six PHCs have experience of over six years, while the remaining 35% have between one

to five years'. This indicates that majority of the respondents have the requisite experience in their work, and their assessment of PHC building can be said to be reliable.

### 4.1.2 General Information on Patients

**Table 4.3: Length of stay of patients sampled in the PHCs**

| Sn | PHC Name | Area Council | Within 24 hours | Over 24 hours but less than 36 hours | Total |
|---|---|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 13 | 7 | 20 |
| 2 | Comprehensive PHC Dei-dei | Bwari | 13 | 3 | 16 |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 17 | 12 | 29 |
| 4 | Kuje PHC Centre | Kuje | 5 | 12 | 17 |
| 5 | Dabi Comprehensive Health Centre | Kwali | 15 | 5 | 20 |
| 6 | Gidan Magoro Health Post | Amac | 16 | 3 | 19 |
| | **Total number of patients** | | **79** | **42** | **121** |
| | **Percentages of Patient's stay** | | **65%** | **35%** | **100%** |

From Table 4.3, it can be seen that 65% of patients from the six PHCs in the FCT were those on observation or on appointment within 24 hours. While 35% are those that stayed over 24 hours but not more than 36 hours. This shows that majority of the patients were those within the specified 24 hours for observation after which they are referred to a secondary healthcare facility.

**Table 4.4: Sex of patients sampled in the PHCs**

| Sn | PHC Name | Area Council | Male | Female | Total |
|---|---|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 6 | 14 | 20 |
| 2 | Comprehensive PHC Dei-dei | Bwari | 4 | 12 | 16 |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 7 | 22 | 29 |
| 4 | Kuje PHC Centre | Kuje | 2 | 15 | 17 |
| 5 | Dabi Comprehensive Health Centre | Kwali | 5 | 15 | 20 |
| 6 | Gidan Magoro Health Post | Amac | 2 | 17 | 19 |
| | **Total number of patients** | | **26** | **95** | **121** |
| | **Percentages of Patient's stay** | | **21%** | **79%** | **100%** |

Table 4.4, shows that 79% of patients from the six PHCs were female and 21% were male. It confirms that more female patients visit the PHC more than the men. This is in line with the concept and primary objectives of the PHC which seeks to provide maternal and child health services, family planning, etc. to women (Abdulraheem et al., 2011).

### 4.1.3 General Information on Visitors

**Table 4.5: Educational qualification of visitors sampled in the PHCs**

| Sn | PHC Name | Area Council | Primary School | SSCE | OND | BSC/HND | PG Cert. | Others | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Comprehensive Healthcare Centre | Abaji | 1 | 5 | 8 | 5 | 0 | 0 | **19** |
| 2 | Comprehensive PHC Dei-dei | Bwari | 0 | 3 | 4 | 3 | 0 | 1 | **11** |
| 3 | Gwagwalada Township Clinic | Gwagwalada | 1 | 4 | 8 | 6 | 6 | 0 | **25** |
| 4 | Kuje PHC Centre | Kuje | 0 | 2 | 4 | 4 | 0 | 0 | **10** |
| 5 | Dabi Comprehensive Health Centre | Kwali | 1 | 3 | 7 | 3 | 1 | 0 | **15** |
| 6 | Gidan Magoro Health Post | Amac | 0 | 3 | 9 | 4 | 2 | 0 | **18** |
| | **Total Visitor** | | **3** | **20** | **40** | **25** | **9** | **1** | **98** |

Source: Field survey (2015)

Table 4.4 reveals that 75 of the visitors which represents 77% have a minimum of Ordinary National Diploma (OND) as their educational qualification. It confirms that more of the responses were from educated and informed sources.

## 4.2 ASSESSMENT OF THE PERFORMANCE OF PHC BUILDINGS

There are increasing body of literature recognizing and highlighting the impacts of design as well as the environment on health and work-place outcomes. It is argued that good design adds value culturally, economically, environmentally and socially; by increasing quality, image and the use of space among others (Arthur, Wilson, Hale, Forsythe, and Seymour, 2010)**.** The perceptions of the users on the healing environment of PHCs in the FCT are presented as follows:

### 4.2.1 Perception of users on functionality of PHC buildings.

The functionality aspects of PHC deals with those issues that have to do with the primary purpose or function of the building. It is about how well the building serves its primary purpose and the extent to which it facilitates or inhibits the activities of the people who carry out the functions inside and around the building (Alalouch, 2009; NHS Estates and Facilities Policy, 2012; Department of Health, 2014). Three sections in the AEDET Evolution toolkit addresses the functionality aspect of PHC buildings. These are *use, access* and *spaces*.

## Table 4.6: Functionality of PHC building

| Functionality | Respondents | | | |
|---|---|---|---|---|
| | Medical Staff | | Visitors | |
| Criteria | Mean | S.D | Mean | S.D |
| **USES** | | | | |
| Building is capable of handling the projected work | 2.72 | 1.216 | - | - |
| Building is adaptable to change and enable expansion | 2.78 | 1.087 | - | - |
| Spaces are standardized and flexible in use patterns | 2.74 | 1.031 | - | - |
| The layout of the building facilitates easy security and supervision | 2.80 | 1.138 | - | - |
| **ACCESS** | | | | |
| Roads widths, turning circles etc in the PHC building are safe and convenient | - | - | 2.46 | 1.237 |
| PHC building designed to accommodate public transport | - | - | 2.84 | 1.062 |
| Entrance is good and big enough for all vehicles | - | - | 2.76 | 1.065 |
| Parking areas are adequate and well sign-posted | - | - | 2.82 | 1.125 |
| Separate parking for disabled people is provided close to entrances | - | - | 2.81 | 1.071 |

| | | | | |
|---|---|---|---|---|
| Pedestrians routes are free from obstacles, suitable for wheelchair users and people with other disabilities | - | - | 2.85 | 1.238 |
| Routes are well lit at night | - | - | 2.95 | 1.255 |
| Outdoor spaces are provided with appropriate and safe lighting indicating paths, ramps and steps | - | - | 2.66 | 1.215 |
| **SPACE** | | | | |
| Design achieves appropriate space standards | 2.54 | 1.161 | - | - |
| Ratio of usable space in the building to the total area of the PHC is good | 2.70 | 1.159 | - | - |
| Circulation distances travelled by staff, patients and visitors are minimized in the building | 2.87 | 1.060 | - | - |
| Isolation and segregation of spaces is achieved in the PHC building | 2.61 | 1.053 | - | - |
| The design makes appropriate provision for gender segregation | 2.40 | 1.095 | - | - |
| Storage spaces in PHC building are adequate | 2.56 | 1.137 | - | - |
| There are floor spaces in the PHC building that are under-sized | 2.44 | 1.089 | - | - |
| There are floor spaces in the PHC building that are overprovided | 2.22 | 1.046 | - | - |
| Storage spaces in the PHC building are adequate in number to accommodate all needs | 2.34 | 1.088 | - | - |
| The rooms and spaces sizes provided in the building are enough to handle the projected workloads (beds, waiting spaces, storage, etc). | 2.35 | 1.341 | - | - |

Source: Field survey (2015) SD= Standard Deviation

i. **Uses**

Information from Table 4.6 show that the highest mean score for the questions on use is 2.80. This score falls under the poor category**.** It means that the size of spaces and circulation in the PHCs are not adequate to meet the demands made at peak times and they feel uncomfortable throughout the operating period. Furthermore, from appendix v, Table 1, 65% of the respondents represented with a mean of 2.80 disagreed that the layout of the PHC building facilitates easy security and supervision.

ii. **Access**

Access focuses on the way the users of PHC buildings can come and go. It asks whether people can easily and efficiently get to and off the site using a variety of means of transport. In addition, whether they can logically, easily and safely get into and out of the building. Table 4.6 shows that 2.95 was the highest mean score for the questions representing access. This score is poor. Additional information from appendix vi, Table 2 confirms that 74% of the respondents disagreed that the roads widths, turning circles etc in the PHC building are safe and convenient; the parking areas for visitors are adequate, well sign-posted and the routes are well lit at night.

iii. **Space**

Space concentrates on the amount of space in the building in relation to its purpose. It asks if this space is well located and efficient and whether people can move around in it efficiently and with dignity. Information from Table 4.6 and appendix vii, Table 3

reveals that 69% of respondents, representing a mean of 2.87 disagreed that the circulation distances travelled by staff, patients and visitors are minimized in the building. Also that storage spaces in the PHC building are adequate, the rooms and space size provided in the building are enough to handle the projected workloads (beds, waiting spaces, storage, etc). This mean score of 2.95 correspond to the poor category**.**

### 4.2.2 Perception of users on Build Quality of PHC buildings.

The build quality sections deal with the physical components of the PHC building. It asks whether the building is soundly built, will be reliable and easy to operate, last well and is sustainable. It is also concerned with the actual process of construction and the extent to which any disruption caused is minimized (Alalouch, 2009; NHS Estates and Facilities Policy, 2012; Department of Health, 2014). Three sections in the AEDET Evolution toolkit addresses the build quality aspect of PHC buildings. But only two of the three was adapted and used for this study. These are *performance* and *engineering*.

## Table 4.7: Build Quality of PHC building

| Build Quality | Respondents | |
|---|---|---|
| | Medical Staff | |
| **Criteria** | **Mean** | **S.D** |
| **Performance** | | |
| Building is easy to move by staff and carry out activities in their departments | 2.82 | 1.250 |
| Building will make your work easy | 2.88 | 1.146 |
| Building is easy to clean | 2.97 | 1.186 |
| Building has appropriately durable finishes | 2.60 | 1.037 |
| **Engineering** | | |
| The engineering systems are well designed, flexible and efficient to use | 2.42 | 1.063 |
| The engineering systems are energy efficient | 2.46 | 0.979 |
| There are emergency backup systems that are designed to minimize disruptions. | 2.45 | 1.065 |

Source: Field survey (2015) SD= Standard Deviation

iv. **Performance**

Performance is concerned with the technical performance of the building during its lifetime. It asks whether the components of the building are of high quality and fit for their purpose. Information from Table 4.7 indicate that the mean score of this criteria was 2.97 which falls under the poor category. It means that the PHC buildings in the FCT are not easy to move around by staff and carry out activities in their departments, it is difficult to clean because of the way it is designed and they do not have durable finishes. This findings is further corroborated with additional information from appendix viii, Table 4 which shows that 79% of the medical staff respondents do not agree that PHC in the FCT are fit for their purpose and that the components of the building are of high quality.

v. **Engineering**

Engineering section is concerned with those parts of the PHC building that are engineering systems as opposed to the main architectural features. It asks whether the engineering systems are of high quality and fit for their purpose, will be easy to operate and if they are efficient and sustainable. Information from Table 4.7 indicates that the mean score of this criteria is 2.46 which is poor**.** Additional information also from appendix ix, Table 5 confirms that 84% of the respondents disagreed that the engineering systems provided in the PHC are well designed, flexible and efficient to

use and that there are emergency backup systems designed to minimize disruptions during operations.

### 4.2.3 Perception of users on Impact of PHC buildings.

The four impact sections deals with the extent to which the PHC building creates a sense of place and contributes positively to the lives of those who use it and its neighbors. It also concerns the way people in a healthcare building are able to control their privacy and their interaction with others (Alalouch, 2009; NHS Estates and Facilities Policy, 2012; Department of Health, 2014). These criteria are *character and innovation, urban and social integration, forms and materials* and *staff and patients environment.*

**Table 4.8: Impact of PHC buildings**

| **Impact** | **Respondents** | | | | | |
|---|---|---|---|---|---|---|
| | **Medical staff** | | **Patient** | | **Visitors** | |
| **Criteria** | **Mean** | **S.D** | **Mean** | **S.D** | **Mean** | **S.D** |
| **Character and Innovation** | | | | | | |
| The building is interesting to look at and move around in. Especially with **Art** works. | 3.20 | 1.304 | 2.55 | 1.271 | - | - |
| Building raises staff / patients morale | 3.19 | 1.096 | 2.69 | 1.183 | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| The building design is a reflection of modern day design and can serve to influence future PHC designs. | 3.13 | 1.148 | - | - | - | - |
| The building projects a caring and reassuring atmosphere | 3.30 | 1.136 | | | | |
| **Urban and Social Integration** | - | - | - | - | - | - |
| Building contributes positively to its locality | - | - | - | - | 2.70 | 1.379 |
| Hard and soft landscapes around the building contribute positively to the locality | - | - | - | - | 3.13 | 1.127 |
| Building is sensitive to neighbors and passer-by | - | - | - | - | 3.18 | 1.143 |
| **Form and Materials** | | | | | | |
| Building is welcoming | 3.12 | 1.311 | 2.60 | 1.339 | 2.68 | 1.404 |
| Entrances are obvious and logically positioned in relation to likely points of arrival on site. | 3.16 | 1.216 | 3.06 | 1.213 | 3.07 | 1.237 |
| External materials in the PHC building is of high quality | 2.89 | 1.43 | 2.82 | 1.133 | 2.87 | 1.012 |
| External colours and textures seem appropriate and attractive | 3.11 | 1.132 | 2.85 | 1.269 | 3.18 | 1.115 |

Source: Field survey (2015) SD= Standard Deviation

### vi. Character and Innovation

Character and Innovation deals with the overall feeling of the PHC building. It asks whether the building has clarity of design intention, and whether this is appropriate to its purpose. A building that scores well under this heading is likely to lift the spirits and to be seen as an exemplar of good architecture of its kind. From Table 4.8 above,

a minimum mean score of 3.13 was awarded to this criterion by the medical staff respondents, which falls under the good category. Supporting information from appendix x, Table 6 shows that just 52% of the medical staff respondents agreed that the PHC building is interesting to look at and move around in even though there are no art works. Also that PHC building projects a caring and reassuring atmosphere to the staff. However, there are contrary views from the perceptions of the patients on this criteria. This is shown in Table 4.8, where the maximum mean score was 2.69. This falls under the poor category.

vii. **Urban and Social Integration**

This criteria deals with the way the building relates to its surroundings. It asks whether the building plays a positive role in the neighbourhood be it urban, suburban or rural. A building that scores well is likely to improve its neighbourhood rather than detract from it. A good mean score of 3.18 was scored by this criteria. It means that the locations of the PHC buildings are sensitive to neighbors and passers-by but the designs and build quality are poor and they do not contribute positively to its locality. In addition, appendix xi, Table 7, confirms that even though 74% of the respondents agreed that PHC buildings are sensitive to neighbors and passer-by because of its conspicuous locations, 67% of them disagreed that PHC buildings contributes positively to its locality.

viii. **Form and Materials**

Form and Materials focuses on the nature of the building in terms of its overall form and materials. It is primarily concerned with how the building presents itself to the outside world in terms of its appearance and organization. Although it deals with the materials from which the building is constructed it is not concerned with these in a technical sense but rather the way they will appear and feel throughout the life of the building. An average mean score of 2.95 for the four questions under this section is poor. Respondents agreed that even though the entrances are logically positioned to all the users, the staff respondents feels that the building is welcoming, but the patients and visitors feel otherwise. The users generally agreed that the external materials used in the PHC buildings are not of high quality and the colours used on them are not attractive to the patients. Additional information shows that 68% of the respondents made this statements.

ix. **Staff and Patients Environment**

Studies have been conducted to investigate staff and patient preferences for outdoor behaviors and settings and the relationship between attributes of ideal settings. Staff and patient environment deals with how well a PHC environment complies with best practice as indicated by research evidences (Alalouch, 2009; NHS Estates and Facilities Policy, 2012; Department of Health, 2014). A specific section of the AEDET assessment toolkit used for this study handled the assessment of staff and patient environment criteria. Table 4.9 is the presentation of these findings

**Table 4.9: A Staff Patient Environment Calibration Tool (ASPECT) for PHC Buildings**

| ASPECT | Respondents | | | | | |
|---|---|---|---|---|---|---|
| | Medical staff | | Patients | | Visitors | |
| Criteria | Mean | S.D | Mean | S.D | Mean | S.D |
| **Privacy, Company and Dignity** | | | | | | |
| Patients can choose to have visual privacy. | - | - | 2.35 | 1.145 | - | - |
| Patients have place to be with others and have private conversation | - | - | 2.69 | 1.109 | - | - |
| Patients can be alone | - | - | 2.69 | 1.252 | - | - |
| Toilets/bathrooms are located logically, conveniently and discretely | - | - | 2.76 | 1.176 | - | - |
| **Views** | | | | | | |
| Spaces where patients and staff spend time have windows for clear views | 3.04 | 1.185 | 2.74 | 1.209 | - | - |
| Hospital premises are calming and interesting | 3.15 | 1.083 | 2.84 | 1.232 | - | - |
| **Nature and Outdoor** | | | | | - | - |
| Patients and staff can go outside the premises easily | 3.29 | 1.239 | 2.65 | 1.276 | - | - |
| Patients and staff have access to usable landscaped areas | 2.96 | 1.088 | 2.94 | 1.142 | - | - |
| Patients and staff can easily see plants, vegetation and features | 2.87 | 1.125 | 2.96 | 1.338 | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Comfort and Control** | | | | | | |
| There is a variety of artificial lighting patterns appropriate for day and night | 2.44 | 1.183 | 2.11 | 1.086 | - | - |
| Patients and Staff can easily control the artificial lighting | 2.65 | 1.137 | 2.35 | 1.022 | - | - |
| Patients and Staff can easily control the temperature | 2.70 | 1.152 | 2.40 | 1.084 | - | - |
| Patients and Staff can easily open windows/doors | 3.25 | 1.135 | 2.72 | 1.018 | - | - |
| The design layout minimizes unwanted noise in patients and staff areas | 3.09 | 1.094 | 2.69 | 1.117 | - | - |
| Sound levels are comfortable | 3.10 | 1.152 | 2.67 | 1.165 | - | - |
| **Legibility of place** | | | | | | |
| The building entrance and exits are obvious | 3.19 | 1.254 | 2.62 | 1.312 | 2.87 | 1.329 |
| It is easy to understand the way the building is laid out | 3.25 | 1.156 | 2.92 | 1.100 | 3.14 | 1.218 |
| Different parts of the building have different characters | 2.87 | 1.117 | 2.53 | 1.119 | 3.06 | 1.024 |
| It is obvious where to go to find a member of staff | 3.09 | 1.141 | 2.76 | 1.190 | 3.03 | 1.088 |
| There is a logical hierarchy of places in the building | 2.89 | 1.016 | 2.65 | 1.014 | 3.14 | 1.035 |
| Routes are pleasantly landscaped | 2.99 | 1.035 | 2.69 | 1.118 | 3.00 | 1.218 |
| Lobbies, sub reception areas and sub waiting areas are attractive and well defined | 2.76 | 1.222 | 2.69 | 1.296 | 2.99 | 1.358 |
| **Facilities** | | | | | | |
| bathrooms are provided with non-slip flooring, a shelf for toiletries, handrails, and hangers | 2.12 | 1.206 | 2.24 | 1.176 | - | - |
| There is a space where religious observances can take place | 2.25 | 1.156 | 2.33 | 1.075 | - | - |
| There are chairs, tables and desks in the patients' spaces | 2.45 | 1.297 | 2.27 | .983 | - | - |
| Patients and staff have facilities to make drinks | 2.23 | 1.183 | 2.59 | 1.174 | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| There are facilities for patients' relatives or friends to stay overnight | 2.21 | 1.215 | 2.50 | 1.177 | - | - |
| Patients can have a choice of bath/shower assisted/unassisted | | | 2.64 | 1.271 | | |
| **Interior Appearance** | | | | | | |
| The interior has a variety of colours, textures and views | - | - | 2.45 | 1.438 | - | - |
| The interior looks clean, tidy and care for | - | - | 2.80 | 1.022 | - | - |
| The interior has provision for art, plants and flowers | - | - | 2.45 | 1.118 | - | - |
| Ceilings are designed to look interesting | - | - | 2.73 | 1.103 | - | - |
| Patients can have and display personal items in their own space. | - | - | 2.61 | 1.143 | - | - |
| Floors are cover with suitable materials e.g. tiles, rug etc | | | 2.84 | 1.096 | | |
| Patients spaces feel homely | | | 2.59 | 1.101 | | |

Source: Field survey (2015) SD= Standard Deviation

### (a) Privacy, Company and Dignity

Information from Table 4.9 shows that the highest mean score of the questions under this heading is 2.76. This is poor. It means that patients in PHC buildings cannot choose to have visual privacy, do not have private place to be with others, cannot be alone and the toilets / bathrooms are not located logically and convenient to use. These statements are confirmed by 76% of the respondents.

### (b) Views

Table 4.9 indicates that the spaces where staff spend time have windows for clear views and that the PHC premises are calming and interesting from the perspectives of medical staff respondents. This is represented with a mean score of 3.15 which is good. But patients'

respondents differs with these statement from their mean score of 2.84 which falls under the poor category for the same statements. It therefore means that the spaces provided for the staff are more convenient compared to that of the patients.

(c) **Nature and Outdoor**

Patients and staff do not have access to usable landscaped areas to easily see plants, vegetation and features. These statement was reported by the respondents represented with a mean score of 2.96 which falls under the poor category from Table 4.9.

(d) **Comfort and Control**

There are no provisions for varieties of artificial lighting patterns that are appropriate for day and night in the PHC buildings from the information on Table 4.9 that shows a mean score of 2.44. This score falls under the poor category. Also, users cannot easily control the artificial lighting and temperature within the PHCs as shown from the means score of 2.70 which is also poor. Although they can easily open the windows / doors and the design of the layout slightly minimize unwanted noise to them as represented with a mean score of 3.25 which falls under the good category.

(e) **Legibility of place**

The entrances and exits of PHC buildings are obvious to medical staff but are not to new users. This is shown by a mean score of 3.19(good) from the medical staff and 2.87(poor) from the patients and visitors respondents as shown in table 4.9. It means therefore that for new users of PHC, it is not easy to understand the way it is laid out, the routes are not pleasantly landscaped and the lobbies, reception and waiting areas are not attractive to look at.

(f) **Facilities**

Table 4.9 reveals that the highest mean score of 2.64 which falls under the poor category was awarded to the statements under facilities of PHC buildings. It means that bathrooms are not properly tiled or provided with non-slip flooring, there are no a shelf for toiletries, handrails, and hangers. There are few spaces where religious observance can take place, no enough furniture for the users and befitting facilities for snacks and drinks.

(g) **Interior Appearance**

A maximum mean score of 2.84 (poor) for this aspect from Table 4.9 shows that the interior of PHC do not have varieties of colours, textures and views. The interiors do not look clean, tidy, care for; with no provision for art, plants and flowers. Additionally, these buildings do not feel homely and covered with suitable tiles, rugs, or other befitting materials.

(h) **Staff and Patients Environment**

Staff respondents informed that the PHC buildings where they work do not respects the dignity of staff and allows for appropriate levels of privacy and convenient places to concentrate on work without being disturbed. There are no enough spaces to put their personal belongings during work hours and rest places that are segregated from patients and visitors. Additionally, they do not have access to basic ICT infrastructure and banking facilities. These statements are confirmed with a mean score of 2.43 from Table 4.9, which falls under the poor category.

## 4.3 INFERENTIAL ANALYSIS (The T-Test)

There was variance between the mean score of two of the groups of the respondents. Therefore, there is the need to determine the statistical significance of the results.

Hypothesis (Ho): There is no significant difference between staff perception of satisfaction of PHC to patients' perception of satisfaction of PHC.

**Table 4.10: Descriptive statistics of staff perception to patient's perception of PHC Buildings**

| Statistics | | | | |
|---|---|---|---|---|
| | N | Mean | Std. Deviation | Std. Error Mean |
| Staff | 114 | 2.72 | 0.54 | 0.05 |
| Patients | 121 | 2.63 | 0.44 | 0.04 |

Source: Field survey (2015)

**Table 4.11: T-test table of staff perception to patient's perception of PHC Buildings**

| Test Value | | | | | | |
|---|---|---|---|---|---|---|
| | t | *df* | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | |
| | | | | | Lower | Upper |
| Patients | 65.75 | 120 | 0.00 | 2.63 | 2.56 | 2.71 |
| Staff | 53.61 | 113 | 0.00 | 2.72 | 2.62 | 2.82 |

Source: Field survey (2015)

An independent-samples t-test was conducted to compare the perception of staff to that of patient's satisfaction of PHC buildings. The mean scores for staff (M=2.72, SD=0.54) and patients (M=2.63, SD=0.44) on the conditions; t(120) =65.75, p = 0.00.

From the Table 4.11 and findings, the null hypothesis which states that there is no significant difference between staff and patients' perception of PHC building is hereby rejected. This

implies that there is a significant difference between the perceptions of the medical staff and patients.

## 4.4 DISCUSSION OF RESULTS

Improved health and well-being are the desired outcomes of patients' visit or stay in a built environment for healthcare. In Nigeria, the design of PHC buildings and provision of facilities follows the statutory requirements of the National Primary Healthcare Development Agency's (NPHCDA) Minimum Standards for Primary Healthcare and the Ward Minimum Healthcare Package. Therefore this study seeks to assess these PHC buildings in the light of global standard criteria that have been identified to enhance or aid healing of patients; and not against whether they complied with that of the NPHCDA or not. Following the study on six PHC buildings in the FCT, the presentation of results and its analysis, there is the need to discuss them in the light of previous findings by other researchers as follows:

The results revealed that 'uses' in the PHC building are generally perceived to be poor. It means that the spaces and layout of the PHC building does not facilitates easy security and supervision and not capable of handling the projected work by the staff. This is contrary to the findings of good attributed to this criterion by Dandajeh (2011) and Abbas and Ghazali (2011). It is also not in line with the recommendations by the Health Building Note 00-01 (2014) and Health Building Note 04-01(2013). Based on the findings of other researches, these health building notes have recommended that departmental workflow should be direct and promote efficiency. Routes travelled by staff during work should be short and clear of all

intrusions. Also, the design of the layout, the lighting and mechanical and electrical (M&E) controls should be versatile and flexible to allow everyday changes of use, activity and spaces.

Access focuses on the way the users of the PHC building can come and go. It asks whether people can easily and efficiently get to and off the site using a variety of means of transport and whether they can logically, easily and safely get into and out of the building. The results shows that this is poor in the PHC buildings studied. This is the same with the findings of Dandajeh (2011) on this criterion and contrary to good attributed to this criterion from the findings of Abbas and Ghazali (2011). Also, this result of poor is contrary to the recommendations on healthcare buildings made by the Health Building Note 00-01 (2014) and Health Building Note 04-01(2013). They require that routes should be clearly marked, roads, widths, turning circles should be safe and convenient. The site design should encourage the use of public transport, having regard to the proximity or otherwise of public transport stops car-parks, access routes, loading docks and entrances should be well-lit.

The ‘spaces’ in the PHC buildings are not well located and people especially the staff cannot move around the building efficiently. The storage spaces are not adequate to accommodate all needs including the beds, waiting spaces, etc. This result is the same with the finding of Dandajeh (2011) on this criterion. But it is contrary to the standards required by Health Building Note 00-01 (2014) and Health Building Note 04-01(2013) and that of Abbas and Ghazali (2011) on this criterion.

Performance and Engineering is concerned with the technical performance of the building during its lifetime. It asks whether the components of the building are of high quality and fit for their purpose. These criteria are generally perceived to be poor. This implies that the building components are not of high quality and the engineering systems do not have back-ups to accommodate workloads during power outages. This is contrary to the findings of Dandajeh (2011) and Abbas and Ghazali (2011).

Character and Innovation deals with the overall feeling of the building. It asks whether the building has clarity of design intention, and whether this is appropriate to its purpose. This is perceived to be generally good from the perspectives of the staff, but poor from those of the patients. The findings of Dandajeh (2011) and Abbas and Ghazali (2011) revealed a score of good for this criterion. The impact of this criterion especially with regards to artworks as reported by Haciric (2008) reveals that arts can help mitigate mental health conditions, such as depression, anxiety and low self-esteem as well as to improve social integration and isolation.

Urban and Social Integration deals with the way the building relates to its surroundings. It asks whether the building plays a positive role in the neighbourhood whether it is urban, suburban or rural. This is perceived to be generally good from the perspectives of the PHC users. This in line with the findings of Dandajeh (2011) and Abbas and Ghazali (2011). This implies that the design of PHC building contributes positively to the communities and provides a sense of belonging to the visitors.

Form and Materials is concern with the nature of the building in terms of its overall form and materials. It is primarily concerned with how the building presents itself to the outside world in terms of its appearance and organisation. This is perceived to be generally poor from the perspectives of the PHC users. This is not in line with the findings of Dandajeh (2011) and Abbas and Ghazali (2011). Their finding on this criterion was good. This implies that the looks of the PHC Building is not welcoming, the external materials in the PHC building is not of high quality and the colours and textures do not seem appropriate and attractive.

The '*Privacy, Company and Dignity'* in the building is poor. This result is contrary to the findings of Dandajeh (2011) and Alalouch (2009). They recognised the importance of patients' privacy and further stated that improving patients' experience by providing a better level of privacy and dignity is one of the major schemes included in Health Building Note 00-01 (2014) and Health Building Note 04-01(2013). This score is similar to the findings of Lawson (2003) where patients complained of noise in the open ward system. In view of this, patients in PHC buildings do not have privacy during their stay for treatment and cannot be alone with others to have private discussions because of the multiple bed system that is run. The toilet, bathrooms and other facilities for the use of staff, patients and visitor are not befitting and dignified enough to attract patronage.

Similarly, there is no agreement between the perception of patients and staff with regard to **'***Views' and Nature* and *Outdoor'* in the PHC. While the staff's perception is good, that of the patient is poor. An inferential test conducted confirms that this variance in perception is representative of these group, hence statistically significant. This result is not in line with the

findings of Dandajeh (2011) and other findings reported by Haciric (2008). These findings confirmed that the extent to which both staff and patients can see out of and around the building has many benefits such as reducing stress, alleviating anxiety and adding recovery. Also, the consequences of lack of enough views as corroborated by Paul, Carr, Symon, and Butchart, (2006) is that the high temperatures combined with the lack of ventilation created an environment where ailments such as the common cold. Finally, positive health outcomes related to the exposure to gardens and other green spaces have been scientifically investigated. Some of outcomes include the reduction of stress and levels of anxiety, increased social interaction, and improved healthcare experience. This indicates that the PHC building is not serene and conducive for healing process.

'*Comfort and Control'* are perceived to be poor by both the staff and the patients. This finding is however contrary to several studies. Findings reported by Haciric (2008) show that light (either natural or artificial) can be associated directly and indirectly with physical, physiological and psychological health outcomes. In excess or lack thereof, light may cause physical damage which is not restricted to the eyes (e.g. the development of skin problems). On the other hand, if provided appropriately, light is considered to have a curative stimulating property that affects our metabolism and our mind. Also, ventilation can be promoted by both natural and artificial routes and its impact on health outcomes are mainly associated with the dissemination of infectious disease (Farhad, 2011).

'*Legibility of Place'* is perceived to be poor in the PHC building assessed. This shows that the buildings do not have clear identities and hierarchy of structure. This is not in line with the findings of Dandajeh (2011). Evidence from many post-occupancy evaluations reported by 04-01(2013) and Haciric (2008) confirmed that people like unambiguous entrances that are logically positioned in relation to the points of arrival and usefully signage should give directions to areas of the building. The assessed PHC routes are not pleasantly landscaped, lobbies, sub reception areas and sub waiting areas are unattractive and not well defined. They do not have clear directional signage to new users. It is difficult for users to locate and find staff and others without aid. The consequence of this is that multiple entrances are confusing and are a source of security concerns which increase stress levels in patients and staff.

*Interior Appearance* and *Facilities* particularly for patients and staff in the building are perceived to be poor. Research findings by Haciric (2008), Lawson and Phiri, (2003) noted that patients experience positive outcomes in an environment that incorporates natural light, elements of nature, soothing colours, meaningful and varying stimuli, peaceful sounds, pleasant views and a sense of beauty. Also, Dalke et al., (2006) findings speculated that that red, orange and yellow in shiny and polished surfaces stimulate appetite and anxiety (these would explain why these colours are very often used by fast-food chains). Grey, purple and red have been associated with depression and are excluded from the palette of colours used by designers' health care buildings and psychiatric hospitals. According to Philipp (2002), the arts can help mitigate mental health conditions, such as depression, anxiety and low self-esteem as well as to improve social integration and isolation.

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1 Summary of Findings

The aim of this study as identified in section 1.4 was to evaluate the perception of the users on the performance of PHC buildings in the FCT with a view to assess how well these healthcare buildings complies with best practices and aid the healing process of patients. To achieve this aim, four specific objectives were identified also in section 1.4. And to achieve the aim and objectives, this study utilized adapted version of AEDET Evolution toolkit to assess the performance of six PHC buildings in the FCT. A summary of the findings are provided as follows:

1. Ten criterion which were summarized into three criteria of Functionality, Build quality and Impact were identified from literature as standard healthcare performance parameters that aids patients outcome and positively influence other users towards PHC services. These criterion are: *Use, Access, Space, Performance, Engineering, Construction, Character and Innovation, Form and Materials, Urban and Social Integration,* and *Staff and Patient Environment.* The first objective which is to identify those standard building performance criteria that aids healing of patients and positively influence users of PHC buildings is achieved by these findings.

2. The second and third objectives of this study which is to evaluate users perception of the performance of selected PHC buildings and compare them with identified standards was achieved by the following findings:

   *i.* The functionality of the assessed PHC buildings which was addressed by the criteria of *use, access,* and *space* was generally perceived to be poor**.** It means that the way the PHC buildings are designed do not provide enough space for the medical staff to perform their duties and operate the healthcare systems and facilities housed in them. Users of the PHC buildings have difficulties in moving around the premises and its surroundings do not provide variety of means of transport. The rooms and space sizes provided in the building are not enough to handle the projected workloads (beds, waiting spaces, storage, etc). Parking areas for visitors are not adequate and well sign-posted, and the routes are not well lit at night. The consequences are that medical staff are hindered from performing their duties of effective and efficient services to patients and will be stressed with workloads among other problems. Also, this will cause difficulties for patients, especially those with disabilities to have access to the premises which in turn causes stress and affects their satisfaction of the building. Visitors will be stressed and there are tendencies for accidents around the PHC premises.

   *ii.* The build quality of the assessed PHC buildings which was addressed by the criteria of *performance* and *engineering,* was generally perceived to be poor**.** It means that the PHC buildings are not easy to move around by staff and carry out activities in their departments, it is difficult to clean because of the way it is

designed and they do not have durable finishes. The medical staff respondents specifically do not agree that the PHC are fit for their purpose and that the components of the building are of high quality. Also, there are no emergency backup systems to minimize disruptions during work operations. The consequences are that patients will not receive the appropriate attention, services and treatments required from the medical staff. This is because the morale of these medical staff are low due to limited spaces to carry out their activities and lack of enough equipment to work with.

*iii.* The Impact of the assessed PHC buildings to users was addressed by the criteria of *Character and Innovation, Form and Materials,* and *Urban and Social Integration.* It was generally perceived that the locations of the PHC buildings was good and are sensitive to neighbors and passers-by. But the PHC buildings are not interesting to look at and without artworks; they do not raise patient's hope to be cared for and reassuring atmosphere. The consequences are that these buildings are not serene and conducive for the healing process of patients.

iv. The staff and patient environment of the assessed PHC buildings was generally perceived to be poor. Patients in PHC buildings cannot choose to have visual privacy, do not have private place to be with others, cannot be alone and the toilets / bathrooms are not located logically and convenient to use. The spaces where patients spend time do not have enough windows for clear views and the premises are not calming and interesting to them. Patients and staff do not have access to

usable landscaped areas to easily see plants, vegetation and other features. There are no provisions for varieties of artificial lighting patterns that are appropriate for day and night in the PHC buildings and users cannot easily control the artificial lighting and temperature even though they can easily open the windows / doors.

## 5.2 Conclusions

Healthcare buildings are said to aid healing and improve the outcomes of patients when they provide facilities that supports healing process such as provision of privacy, well positioned adequate windows, plants, landscape, sound insulation between rooms, durable finishes, art work, well defined and attractive lobbies, reception and sub waiting areas. These will create serene and conducive environment for the hospital building users.

Findings from this study reveals that the design of PHC buildings in the FCT is such that the provided spaces, use and access are inadequate. These deficiencies constrains and restrict the activities of the medical staff who carry out healthcare functions inside and around the building. In turn, health services to patients are hindered and visitors are dissatisfied with PHC services and its environment. Discoveries from this study concludes that the PHC building components are not of high quality, do not have durable finishing and the engineering systems do not have back-ups to accommodate workloads during power outages. These in turn lowers the morale of medical staff due to limited spaces to carry out their activities and lack of enough equipment to work with.

Evidences from the findings in this study confirms that although the locations of the PHC buildings are sensitive to neighbors and passers-by, they are not interesting to look at and without artworks. They do not raise patient's hope to be cared for, multiple occupancy rooms, poor bathroom, toilets facilities and lack of access to usable landscaped areas to easily see plants, vegetation and other features are among the common problems associated with these PHC studied. The consequences are that these healthcare buildings are not serene and conducive for the healing process of patients.

This research study has contributed to knowledge by providing a record of the performance of PHC buildings towards the healing of patients. In addition, it has also provided a toolkit for PHC building performance evaluation in Nigeria and shown that the provisions for PHC facilities by the National Primary Healthcare Development Agency's (NPHCDA) Minimum Standards for Primary Healthcare is not sufficient to attract patronage from users.

## 5.3 Recommendations

Based on the findings and conclusions from this study, the following recommendations are made:

i. The main recommendation is that the National Primary Healthcare Development Agency's (NPHCDA) Minimum Standards for Primary Healthcare and the Ward Minimum Healthcare Package upon which the design of PHC in Nigeria is based should be updated and reviewed to reflect modern trends in healthcare architecture.

ii. The Minimum Standards for Primary Healthcare document should integrate the following specific recommendations in future designs of PHC buildings in the FCT:

a. Separate parking for disabled people should be provided close to the entrances of the building. This will assist them in having full access to the hospital

b. Pedestrian access routes in the PHC buildings should be constructed to be attractive and suitable for wheelchair users and people with other disabilities.

c. The number of PHC users have increased and as such, adequate number of equipment storage spaces should be provided for the use of the medical staff.

d. Toilets/bathrooms should be located logically, conveniently and discretely in the building to avoid bad odour from human waste.

e. Adequate sized windows for clear views should be provided in the staff and patient's areas because it is established fact that people prefer places with proper ventilations.

f. Lobbies, sub reception areas and sub waiting areas should be designed to be attractive and well defined particularly in staff and patients areas.

g. Provision for art, plants and flowers in the building should be encouraged and this will make the building serene and conducive for healing process.

h. The engineering equipment provided in the PHC buildings should have back-up systems and provision of alternative sources of power to enhance the services rendered to patient by the medical staff.

iii. As a recommendation for further studies, an energy measurement performance evaluation of PHC buildings using NHS Environmental Assessment toolkit (NEAT) should be done.

## REFERENCES


Abbas, M. Y., & Ghazali, R. (2011). Physical Environment: The major determinant towards the creation of a healing environment. *ELSEVIER: SciVerse, Procedia - Social and Behavioral Sciences 30 (2011).*

Abbas, Y. M., & Ghazali, R. (2012). Quality Physical Environment in Paediatric Wards:Designer's Creation Versus Users' Satisfaction. *SciVerse ScienceDirect: Procedia - Social and Behavioral Sciences 35 ( 2012 ), 221 – 229.*

Abbaszadeh, S., Zagreus, L., Lehrer, D., & Huizenga, C. (2006). Occupant satisfaction with indoor environmental quality in green buildings. *Proceedings of Healthy Buildings , 365-370.*

Abdulraheem, I. S., Olapipo, A. R., & Amodu, M. O. (2012). Primary health care services in Nigeria: Critical issues and strategies for enhancing the use by the rural communities. *Journal of Public Health and Epidemiology Vol. 4(1), 5-13.*

Adeyemo, D. O. (2005). Local Government and Health Care Delivery in Nigeria A Case Study. *J. Hum. Ecol., 18(2):, 149-160.*

Alalouch, C. R. (2009). Hospital Ward Design: Implications for Space and Privacy.

Ananth, S. (2011). Hospitals Creating Optimal Healing Environments. Exlore: *Journal of Science and Healing.*

Ananth, S., & Smith, K. (2008). Hospital Initiatives: A Pilot Survey Of Healing Programs. *Exlore: Journal of Science and Healing, 333-334.*

Anjali , J. (2006). The Impact of Light on Outcomes in Healthcare Settings. The Centre for Health Designs.

Asika, N. (2010). Research Methodology in the Behavioural Sciences. *Longman Nigeria Plc.*

Asuzu, M. C. (2004). The necessity for a health systems reform in Nigeria. Journal of Community Medicine & Primary Health Care. 16 (1), 1-3.

Atata, R. F., Ibrahim, Y. K., Akanbi, A. A., Olurinola, P. F., & Sani, A. (2006). Prevelence of Nosocomial Infections in a tertiary Healthcare Institutions in Nigeria: A Retrospective Study. *Journal of Applied and Environmental Sciences, 22 - 215.*

Choi , J.-H., Beltran, L., & Kim, H.-S. (2012). Impacts of indoor daylight environments on patient average length of stay (ALOS) in a healthcare facility. *Building and Environment 50 , 65-75.*

Codinhoto, R., Tzortzopoulos, P., Kagioglou, M., Aouad, G., & Cooper, R. (2008). The Effects of The Built Environment On Health Outcomes: *Research Report. HaCIRIC: Health and Care Infrastructure Research and Innovation.*

Dandajeh, M. A. (2011). An Appraisal of Therapeutic Performance of Teaching Hospital Buildings In North-Western Nigeria.

David, O. M., & Famurewa, O. (2010). Towards Effective Management of Nosocomial Infections in Nigerian Hospitals- *A Review. Academic Arena, 1-7.*

Department of Health. (2013). Health Building Note 04-01 – Adult in-patient facilities.

Department of Health. (2013). *In-patient care Health Building Note 04-01:Adult in-patient facilities.*

Department of Health. (2014). *Health Building Note 00-01 General design guidance for healthcare buildings.*

Department of Health. (2014). *Health Building Note 00-01.*

Department of Health. (2014). Health Technical Memorandum 00 Policies and principles of healthcare engineering.

Design Quality Indicator for Health Guidance. (2014). DQI for Health Guidance. DQI.

Design Quality Indicator. (2014). *DQI / DQI for Health Guidance*.

Egbewale, B. E., & Odu, O. O. (2013). Perception and Utilization of Primary Health Care Services in a Semi-Urban Community in South-Western Nigeria. *Journal of Community Medicine and Primary Health Care. 24 (1&2), 11-20.*

Emelumadu, O. F., Onyeonoro, U. U., Ukegbu, A. U., Ezeama, N. N., Ifeadike, C. O., & Okezie, O. K. (2014). Perception of quality of maternal healthcare services among women utilizing antenatal services in selected primary health facilities in Anambra State, Southeast Nigeria. *Nigerian Medical Journal | Vol. 55 | Issue 2, 148-155.*

Emuakpor, A. S. (2010). The Evolution of Health Care Systems in Nigeria: Which Way Forward in the Twenty-First Century. *Nigeria Medical Journal, Vol. 51, No. 2, 53-65.*

Firth, K., & Smith, K. (2010). 2010 Survey of Healing Environments in American Hospitals: Nature and Prevalence.

Ghazali, R., & Abbas, Y. M. (2011). Quality Physical Environment in Pediatric Wards:.

Giese, J., & Cote, J. (2002). Defining Consumer Satisfaction. *Academy of Marketing Science Review Volume 2000 No. 1.*

HACIRIC. (2008). Haciric Research Report: *The Effects of the Built Environment on Health Outcomes. Haciric* .

HaCIRIC. (2011). Design and Decision Making to Improve Healthcare Infrastructure.

Hashim, A. E., Aksah, H., & Said, S. Y. (2012). Functional Assessment through Post Occupancy Review on Refurbished Historical Public Building in Kuala Lumpur. *Procedia - Social and Behavioral Sciences, 330 – 340.*

Hinde, D. (2012). *PRINCE2 Study Guide*. Sybex.

Huisman , E., Morales , E., Hoof, B. J., & Kort , H. S. (2012). Healing environment: A review of the impact of physical environmental factors on users. *Building and Environment, 70-80.*

Ibema, E. O., Opoko, A., Adeboye, A., & Amole, D. (2013). Performance evaluation of residential buildings in public housing estates in Ogun State, Nigeria: Users 'satisfaction perspective. *Frontiers of Architectural Research(2013) 2, 178–190, 178 - 190.*

Ibrahim, A. D. (2011). Development of Procurement Strategy for Infrastructure in Nigeria: Case of Primary Healthcare Facilities. *Malaysian construction Research Journal vol. 8, No 1, 71-84.*

Ibrahim, A. D., & Price, A. D. (2006). Public Private Partnership and Sustainable Primary healthcare Facilities in Nigeria. *The built environment, Innovation, Policy and Sustainable Development, 211-217.*

Ibrahim, A. D., Price, A. D., & Dainty, A. R. (2007). An Evaluation of the Practices of, and barriers to, Continuous Improvement through learning on NHS LIFT Projects. *Journal of Construction Procurement, 88-96.*

Ilesanmi, A. O. (2010). Post-occupancy evaluation and residents' satisfaction with public housing in Lagos, *Nigeria. Journal of Building Appraisal, 153 – 169.*

Jiang, S. (2014). Therapeutic landscapes and healing gardens A review of Chinese literature in relation to the studies in western countries. *Frontiers of Architectural Research, 141-153.*

Jiboye, A. D. (2012). Post-occupancy evaluation of residential satisfaction in Lagos, Nigeria: Feedback for residential improvement. *Frontiers of Architectural Research, 236–243.*

Kacholi, G. (2012). Assessment Of Factors Influencing Identification Of The Most Vulnerable Children In Tanzania: Experiences From Morogoro Rural District.

Khalila, N., Kamaruzzamanb,, S. N., Baharumb, M. R., & Husina, H. N. (2015). Benchmarking Users' Feedback as Risk Mitigation in Building Performance for Higher Education Buildings (HEB). *Procedia - Social and Behavioral Sciences, 171 – 180.*

Khan , S., & Kotharkar, R. (2012). Performance Evaluation of School Environs: Evolving an Appropriate Methodology Building. Procedia - Social and Behavioral Sciences , 479 – 491.

Lawson, B., & Phiri, M. (2003). The Architectural Healthcare Environment and its effect on Patient Health Outcomes.

Marcus, C. C. (2007.). *Healing Gardens in Hospitals. Interdisciplinary Design and Research e-Journal (IDRP).*

Natasha, K., & Abdul Hadi, N. (2008). Performance Analysis of Government and Public Buildings via Post Occupancy Evaluation. *Asian Social Science, 103 - 112.*

National Health Bill. (2014).

Nawawi, A. H. (2008). Post-occupancy evaluation correlated with building occupants' satisfaction: An approach to performance evaluation of government and public buildings. *Journal of Building Appraisal, 59 – 69.*

NHS Estates and Facilities Policy. (2012). BREEAM for Healthcare. School of the Built and Natural Environment Northumbria University Newcastle upon Tyne.

NHS Estates. (2005). Ward layouts with single room and space for flexibility. UK, TSO.

NHS. (2007). NHS Sustainable Development Policy.

Nnebue, C. N., Ebenebe, U. E., Adogu, P. 0., Adinma, E. D., Ifeadike, C. O., & Nwabueze, A. S. (2014). Adequacy of resources for provision of maternal health services at the primary health care level in Nnewi, Nigeria. *Nigerian Medical Journal | Vol. 55 | Issue 3, 235-241.*

NPHCDA. (2007). Ward Minimum Health Care Package.

NPHCDA. (2010). Minimum Standards for Primary Health Care in Nigeria.

NPHDA ACT. (1992). National Primary Health Care Development Agency Act.

Osuala, E. C. (2005). Introduction to Research Methodology. Africana-First Publishers Limited.

R & D Report. (2007). Disseminating good practice (DGP): developing an exemplar layer for AEDET Evolution and ASPECT design evaluation tools. *University of Sheffield School of Architecture.*

Salami, K. K., & Brieger, W. R. (2014). Service delivery and coverage in primary healthcare in a community-health project in Ibadan, *Nigeria. Afr J Prm Health Care Fam Med.*

Salonen, H., Lahtinen, M., Lappalainen, S., Nevala, N., Knibbs, L., Morawska, L., & Reijula, K. (2012). Positive impacts of environmental characteristics on health and wellbeing in health-care facilities: A review. *Queensland University of Technology*.

Samuel, S. O., Kayode, O. O., Musa, O. I., Nwigwe, G. C., & Aboderin, O. A. (2010). Nosocomial Infections and The Challenges Of Control In Developing Countries. *African Journal of Clinical and Experimental Microbiology, 102-110.*

Sarhan, A., Gomaa, B., & Elcharkawi, M. (2014). Daylight Quality in Healthcare Architecture: Developing a Framework. Proceeding of 8th Windsor Conference: Counting the cost of comfort in a Changing World.

Scottish Government. (2012). Project Evaluation Guide.

Shikder, S., & Price, A. (2011). Design and Decision Making to Improve Healthcare Infrastructure. HaCIRIC: *Health and Care Infrastructure Research and Innovation Centre*.

Shrestha, J. (2010, February). Evalauation of Access to Primary Health Care: A case study of Yogyakarta, Indonesia.

Siegelaub, J. (2010). An Enhanced Model for Project Control. *PMI Global Congress Proceedings.*

Smith, K., Firth, K., Ananth, S., & Reece, B. F. (2009). Environmental Scan. Samueli Institute Nursing Forum on Optimal Healing Environments, 1-26.

Swansan, K., & Wojnar, D. (2004). Optimal Healing Environments in Nursing. *The Journal Of Alternative And Complementary Medicine Volume 10, Supplement 1, 43-48.*

The Scottish Government. (2010). A Policy on design Quality for NHS Scotland 2010.

Ulrich, R. (2008). Health Benefits of Gardens in Hospitals. International Exhibition Floriade.

Visagie, S., & Schneider, M. (2014). Implementation of the principles of primary health care in a rural area of South Africa. *Afr J Prm Health Care Fam Med 6(1).*

World Health Organization . (2008). *The world health report 2008*: primary health care now more than ever. WHO.

World Health Organization. (2010). *The world health report*: health systems financing: the path to universal coverage. WHO.

World Health Organization. (2013). *The world health report 2013*: Research for universal health coverage. WHO.

**APPENDIX 1**

# PRIMARY HEALTH CARE CENTRE

**5.0 Nomenclature of Health Facility:** **Primary Health Care Centre (Ward Health Centre)**

**Service Delivery Area:** **Political Ward**

**Estimated Coverage Population:** **10,000 to 20,000**

## 5.1 Infrastructure:

**Building and Premises**

- A detached building of at least 10 rooms
- Walls and roof must be in good condition with functional doors and netted windows
- Functional separate Male and Female toilet facilities with water supply within the premises
- Have a clean water source from a borehole
- Be connected to the national grid and other regular alternative power source
- Have a sanitary waste collection point
- Have a waste disposal site
- Be clearly signposted – visible from both entry and exit points
- Be fenced
- Staff accommodation provided within the premises or the community

The building should have sufficient rooms and space to accommodate;

- Waiting/Reception areas for Child Welfare, ANC, Health Education and ORT corner
- Staff station
- 2 consulting rooms
- Adolescent health service room
- Pharmacy & Dispensing unit
- 2 delivery room
- Maternity/lying-in section
- In-patient ward section
- Laboratory
- Medical records area
- Injection/Dressing area
- Minor procedures room
- Food demonstration area
- Kitchen
- Store
- Toilet facilities (Male and Female)

The premises should;

- Have a waste disposal site

**APPENDIX II**

**QUESTIONNAIRE ADDRESSED TO MEDICAL STAFF.**

**DEPARTMENT OF QUANTITY SURVEYING**

**AHMADU BELLO UNIVERSITY ZARIA.**

**M.SC. SURVEY QUESTIONNAIRE**

**Dear Respondent,**

This questionnaire is specifically designed for the purpose of **ASSESSING USERS' SATISFACTION OF PHC BUILDINGS IN NIGERIA.** The findings will be used strictly for research purposes, and your confidentiality will be highly guaranteed and protected.

Please kindly fill in the correct information and tick where appropriate.

**QUESTIONNAIRE**

**MEDICAL STAFF**

**SECTION A**

**RESPONDENTS DATA**

1. What is your profession/discipline in the PHC?

   (a). Doctor ☐ (b). Nurse ☐ (c) Pharmacist ☐ (d) laboratory Scientist

   (f) Others ☐ (indicate please).

2. Years of working experience in the hospital.

   (a). 1-5 yrs ☐ (b). 6-10 yrs ☐ (c). 11-15yrs ☐ (d). 16-20yrs ☐

   (d). Above 20yrs ☐

3. How old are you:

   15-19 ☐ 20 – 24 ☐ 25 – 29 ☐ 30 - 34 ☐ 35 - 39 ☐ 40-44 ☐ 45-49 ☐

   Above 50 ☐

4. Sex: M ☐ F ☐

## SECTION B

**Rate the following criteria to the overall success of the PHC building where you work on a scale of 1 to 5. Where**:

1 = STRONGLY DISAGREE

2 = DISAGREE

3 = FAIRLY AGREE

4 = AGREE

5 = STRONGLY AGREE

**IMPACT – CHARACTER & INNOVATION**

1. ***Character and Innovation*** – deals with overall feeling of the building. It asks whether the building has clarity of design intention, and whether this is appropriate to its purpose.

| S/N | *Character and Innovation* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | The building is interesting to look at and move around in. Especially with **Art** works. | | | | | |
| **2.** | The building raises staff morale. | | | | | |
| **3.** | The building design is a reflection of modern day design and can serve to influence future PHC designs. | | | | | |
| **4** | The building projects a caring and reassuring atmosphere | | | | | |

**IMPACT – FORM & MATERIALS**

*2.* ***Form and Materials*** – deals with the nature of the building in terms of its overall form and materials. It is primarily concerned with how the building presents itself to the outside world in terms of its appearance and organisation. Although it deals with the materials from which the building is constructed, it is not concerned with these in a technical sense but rather the way they will appear and feel throughout the life of the building.

| S/N | *Form and Materials* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | The building is welcoming. | | | | | |
| **3.** | Entrances are obvious and logically positioned in relation to likely points of arrival on site. | | | | | |
| **4** | The external materials in the hospital building are of high quality. | | | | | |
| **5** | External colours and textures seem appropriate and attractive. | | | | | |

**IMPACT – STAFF AND PATIENT ENVIRONMENT**

3. **Views** - deal with the extent to which staff can see out of and around the building. It asks what they can see and relates this to their current activity and condition.

| S/N | **Views** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | Spaces where staff spend time have windows for clear views. | | | | | |
| **2.** | The PHC view outside is calming and interesting | | | | | |

4. ***Nature and Outdoors*** – deals with the extent to which staff have contact with the natural world. It asks whether they can see and access nature both around and inside the building.

| S/N | *Nature and Outdoors* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | Staff can go outside the premises easily. | | | | | |
| **2.** | Staff have access to usable landscaped areas. | | | | | |
| **3.** | Staff can easily see plants, vegetation and features. | | | | | |

5. **Comfort and control** - deals with the comfort levels of the staff in PHC buildings and the extent to which they can control those levels. Research shows that not only comfortable conditions but also the ability to control levels of comfort for it may be very important in reducing stress.

| S/N | **Comfort and control** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | There is a variety of artificial lighting patterns appropriate for day and night. | | | | | |
| **2.** | Staff can easily control the artificial lighting. | | | | | |
| **3.** | Staff can easily control the temperature. | | | | | |
| **4.** | Staff can easily open windows/doors. | | | | | |
| **5.** | The design layout minimizes unwanted noise in staff area. | | | | | |
| **6.** | Sound levels are comfortable | | | | | |

6. ***Legibility of Place*** – deals with how understandable PHC buildings are to the staff, patients and visitors who use them. Buildings departments and rooms should have clear identities and to be differentiated and have a hierarchy of structure.

| S/N | *Legibility of Place* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | The building entrance & exits are obvious. | | | | | |
| **2.** | It is easy to understand the way the building is laid out. | | | | | |
| **3.** | Different parts of the building have different characters. | | | | | |
| **4.** | It is obvious where to go to find a member of staff. | | | | | |
| **5.** | There is a logical hierarchy of places in the building. | | | | | |
| **6.** | The routes are pleasantly landscaped. | | | | | |
| **7.** | Lobbies, sub reception areas and sub waiting areas are attractive and well defined. | | | | | |

7. **Facilities** - deals with a number of facilities that have been found to be important for the users of hospital buildings.

| S/N | Facilities | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | Bathrooms are provided with non-slip flooring, a shelf for toiletries, handrails and hangers for clothing | | | | | |
| **2.** | There is a space where religious observances can take place. | | | | | |
| **3.** | There are easy chairs, tables and desks in the patients' spaces. | | | | | |
| **4.** | Staff have facilities to take drinks. | | | | | |
| **5.** | There are Facilities for patients' relatives or friends to stay overnight. | | | | | |

*8.* ***Staff Environment*** – deals with how well an environment complies with best practice as indicated by the research evidence. Also, concerned with those aspects of PHC building provision that relate specifically to staff.

| S/N | *Staff Environment* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | The building respects the dignity of staff and allows for appropriate levels of privacy and convenient places to concentrate on work without being disturbed | | | | | |
| **2.** | Staff have a convenient place to change and securely store belongings and clothes. | | | | | |
| **3.** | There are convenient places where staff can speedily get snacks and meals. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **4.** | Staff can rest and relax in places segregated from patient and visitor areas. | | | | | |
| **5.** | There is access to IT (information Technology) for Staff. | | | | | |
| **6.** | There is access to Basic Banking facilities. E.g Bank, ATM etc | | | | | |

**BUILD QUALITY – PERFORMANCE**

9. ***Performance*** – is concerned with the technical performance of the building during its lifetime. It asks whether the components of the building are of high quality and fit for their purpose.

| **S/N** | ***Performance*** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | The building is easy to move by staff and carry out activities in their departments. | | | | | |
| **2.** | The building will make your work easy | | | | | |
| **3.** | The building is easy to clean. | | | | | |
| **4** | The building has appropriate durable finishes. | | | | | |

**BUILD QUALITY – ENGINEERING**

10. ***Engineering*** – is concerned with those parts of the building that are engineering systems as opposed to the main architectural features. It asks whether the engineering systems are of high quality and fit for their purpose, will be easy to operate and if they are efficient and sustainable.

| **S/N** | ***Engineering*** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | The engineering systems are well designed, flexible and efficient to use | | | | | |
| **2.** | The engineering systems are energy efficient | | | | | |
| **3.** | There are emergency backup systems that are designed to minimize disruptions. | | | | | |

**FUNCTIONALITY – USE**

11. ***Use*** – is concerned with the way the building enables the users to perform their duties and operate the healthcare systems and facilities housed in the building. To get a good score, under this heading the building will be highly functional and efficient, enabling people to have enough space for their activities and to move around economically.

| S/N | ***Use*** | ***1*** | ***2*** | ***3*** | ***4*** | ***5*** |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | The building is capable of handling the projected work. | | | | | |
| 2 | The building is adaptable to change and enable expansion. | | | | | |
| 3 | Spaces are standardized and flexible in use patterns. | | | | | |
| 4 | The layout of the building facilitates easy security and supervision. | | | | | |

**FUNCTIONALITY – SPACE**

12. ***Space*** – concentrates on the amount of space in the building in relation to its purpose. It asks if the space is well located and efficient and whether people can move around in it efficiently and with dignity.

| **S/N** | ***Space*** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | The design achieves appropriate space standards. | | | | | |
| **2.** | The ratio of usable space in the building to the total area of the PHC is good. | | | | | |
| **3.** | The circulation distances travelled by staff, patients and visitors are minimized in the building | | | | | |
| **4.** | Isolation and segregation of spaces is achieved in the PHC building | | | | | |
| **5.** | The design makes appropriate provision for gender segregation. | | | | | |
| **6.** | Storage spaces in the hospital building are adequate. | | | | | |
| **7.** | There are floor spaces in the building that are under-sized. | | | | | |
| **8.** | There are floor spaces in the building that are overprovided. | | | | | |
| **9.** | Storage spaces are adequate in number and size to accommodate all needs. | | | | | |
| **10** | The rooms and spaces size provided in the building are enough to handle the projected workloads (Beds, waiting spaces, storage, etc.) | | | | | |

Thank you very much for your valuable cooperation.

**APPENDIX III**

**QUESTIONNAIRE ADDRESSED TO PATIENTS.**

**DEPARTMENT OF QUANTITY SURVEYING**

**AHMADU BELLO UNIVERSITY ZARIA.**

**M.SC. SURVEY QUESTIONNAIRE**

**Dear Respondent,**

This questionnaire is specifically designed for the purpose of **ASSESSING USERS' SATISFACTION OF PHC BUILDINGS IN NIGERIA.** The findings will be used strictly for research purposes, and your confidentiality will be highly guaranteed and protected.

Please kindly fill in the correct information and tick where appropriate.

**QUESTIONNAIRE**

**PATIENT ONLY**

**SECTION A**

1. **How old are you**:

   15-19 ☐ 20 – 24 ☐ 25 – 29 ☐ 30 - 34 ☐ 35 - 39 ☐ 40-44 ☐ 45-49 ☐

   Above 50 ☐

2. **Sex: M** ☐ **F** ☐

3. **Occupation** : Student ☐ Artesian ☐ Trading ☐ Farming ☐ Civil Servant ☐

   Others – Specify----------

4. **Religion**: Christian ☐ Mos ☐ None ☐

5. **How long were you on admission**: 24hours ☐ 48hours ☐ 72hours ☐

## SECTION B

**Rate the following criteria to the overall success of the PHC Building where you are admitted on a scale of 1 to 5. Where**:

1 = STRONGLY DISAGREE

2 = DISAGREE

3 = FAIRLY AGREE

4 = AGREE

5 = STRONGLY AGREE

| S/N | ***Character and Innovation*** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | The building is interesting to look at and move around in. Especially with **Art** works. | | | | | |
| **2.** | The building raises Patient's hope to be cared for and reassuring atmosphere. | | | | | |
| **3.** | The building design is likely to influence future PHC designs | | | | | |

| S/N | ***Form and Materials*** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | The building is welcoming. | | | | | |
| **2.** | Entrances are obvious and logically positioned in relation to likely points of arrival on site. | | | | | |
| **3.** | The external materials in the hospital building are of high quality. | | | | | |
| **4.** | External colours and textures seem appropriate and attractive. | | | | | |

| S/N | **Privacy, Company and Dignity** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | Patients can choose to have visual privacy. | | | | | |
| **2.** | Patients have place to be with others and have private conversation. | | | | | |
| **3.** | Patients can be alone. | | | | | |
| **4.** | Toilets/bathrooms are located logically, conveniently and discretely. | | | | | |

| S/N | **Views** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | Spaces where patients spend time have windows for clear views. | | | | | |
| **2.** | PHC premises are calming and interesting. | | | | | |

| S/N | ***Nature and Outdoors*** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | Patients can go outside the premises easily. | | | | | |
| **2.** | Patients have access to usable landscaped areas. | | | | | |
| **3.** | Patients can easily see plants, vegetation and features. | | | | | |

| S/N | **Comfort and control** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | There is a variety of artificial lighting patterns appropriate for day and night. | | | | | |
| **2.** | Patients can easily control the artificial lighting. | | | | | |
| **3.** | Patients can easily control the temperature. | | | | | |
| **4.** | Patients can easily open windows/doors. | | | | | |
| **5.** | The design layout minimizes unwanted noise in staff area. | | | | | |
| **6.** | Sound levels are comfortable | | | | | |

| S/N | ***Legibility of Place*** | **1** | **2** | **3** | **4** | **5** |
|---|---|---|---|---|---|---|
| **1.** | The building entrance & exits are obvious. | | | | | |
| **2.** | It is easy to understand the way the building is laid out. | | | | | |
| **3.** | Different parts of the building have different characters. | | | | | |
| **4.** | It is obvious where to go to find a member of staff. | | | | | |
| **5.** | There is a logical hierarchy of places in the building. | | | | | |
| **6.** | The routes are pleasantly landscaped. | | | | | |
| **7.** | Lobbies, sub reception areas and sub waiting areas are attractive and well defined. | | | | | |

| S/N | *Interior Appearance* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | The interior has a variety of colours, textures and views. | | | | | |
| **2.** | The interior looks clean, tidy and care for. | | | | | |
| **3.** | The interior has provision for art, plants and flowers. | | | | | |
| **4.** | Ceilings are designed to look interesting. | | | | | |
| **5.** | Patients can have and display personal items in their own Space. | | | | | |
| **6.** | Floors are covered with suitable material e.g tiles, carpet or properly floored. | | | | | |
| **7.** | Patient's spaces feel homely | | | | | |

| S/N | **Facilities** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | Bathrooms are provided with non-slip flooring, a shelf for toiletries, handrails and hangers | | | | | |
| **2.** | There is a space where religious observances can take place. | | | | | |
| **3.** | There are easy chairs, tables and desks in the patients' spaces. | | | | | |
| **4.** | Patients have facilities to make drinks. | | | | | |
| **5.** | There are Facilities for patients' relatives or friends to stay overnight. | | | | | |
| **6** | Patients can have a choice of bath/shower and assisted/unassisted | | | | | |

Thank you very much for your valuable cooperation.

**APPENDIX IV**

**QUESTIONNAIRE ADDRESSED TO VISITORS.**

**DEPARTMENT OF QUANTITY SURVEYING**

**AHMADU BELLO UNIVERSITY ZARIA.**

**M.SC. SURVEY QUESTIONNAIRE**

**VISITORS QUESTIONNAIRE**

**Dear Respondent,**

This questionnaire is specifically designed for the purpose of **ASSESSING USERS' SATISFACTION OF PHC BUILDINGS IN NIGERIA.** The findings will be used strictly for research purposes, and your confidentiality will be highly guaranteed and protected.

Please kindly fill in the correct information and tick where appropriate.

**SECTION A**

1. **Qualification of the Respondent;**

   Primary school certificate ☐ S.S.C.E ☐ OND ☐ B.sc/HND ☐ PG ☐ certificate(s)

   Others specify----------

2. **How old are you**:

   15-19 ☐ 20 – 24 ☐ 25 – 29 ☐ 30 - 34 ☐ 35 - 39 ☐ 40-44 ☐ 45-49 ☐

   Above 50 ☐

3. **Sex: M** ☐ **F** ☐

4. **Occupation** : Student ☐ Artesian ☐ Trading ☐ Farming ☐ Civil Servant ☐

   Others – Specify----------

5. **Religion**: Christian ☐ ☐oslem None ☐

## SECTION B

**Rate the following criteria to the overall success of the PHC building where you visited on a scale of 1 to 5. Where**:

1 = STRONGLY DISAGREE

2 = DISAGREE

3 = FAIRLY AGREE

4 = AGREE

5 = STRONGLY AGREE

| S/N | *Form and Materials* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | The building is welcoming. | | | | | |
| **2.** | Entrances are obvious and logically positioned in relation to likely points of arrival on site. | | | | | |
| **3** | The external materials in the hospital building are of high quality. | | | | | |
| **4** | External colours and textures seem appropriate and attractive. | | | | | |

| S/N | *Legibility of Place* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | The building entrance & exits are obvious. | | | | | |
| **2.** | It is easy to understand the way the building is laid out. | | | | | |
| **3.** | Different parts of the building have different characters. | | | | | |
| **4.** | It is obvious where to go to find a member of staff. | | | | | |
| **5.** | There is a logical hierarchy of places in the building. | | | | | |
| **6.** | The routes are pleasantly landscaped. | | | | | |
| **7.** | Lobbies, sub reception areas and sub waiting areas are attractive and well defined. | | | | | |

| S/N | *Urban and Social Integration* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | The building contributes positively to its locality. | | | | | |
| **2.** | The hard and soft landscapes around the building contribute positively to the locality. | | | | | |
| **3.** | The building is sensitive to neighbors and passers-by. | | | | | |

| S/N | *Access* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| **1.** | Roads, widths, turning circles etc, in the PHC building are safe and convenient. | | | | | |
| **2.** | PHC building is designed to accommodate public transport. | | | | | |
| **3.** | Entrance is good and big enough for all vehicles. | | | | | |
| **4.** | Parking areas for visitors are adequate and well sign-posted. | | | | | |
| **5.** | Separate parking for disabled people is provided close to entrances. | | | | | |
| **6.** | Pedestrian routes are free from obstacles, suitable for wheelchair users and people with other disabilities | | | | | |
| **7.** | Routes are well lit at night | | | | | |
| **8.** | Outdoor spaces are provided with appropriate and safe lighting indicating paths, ramps and steps. | | | | | |
| | | | | | | |

Thank you very much for your valuable cooperation.

**Appendix V, Table 1: Functionality (use) of PHC building**

| | | Count | Percentage % |
|---|---|---|---|
| The layout of the building facilitates easy security and supervision. | STRONGLY DISAGREE | 20 | 17.5% |
| | DISAGREE | 25 | 21.9% |
| | FAIRLY AGREE | 29 | 25.4% |
| | AGREE | 38 | 33.3% |
| | STRONGLY AGREE | 2 | 1.8% |
| Spaces are standardized and flexible in use patterns. | STRONGLY DISAGREE | 15 | 13.2% |
| | DISAGREE | 34 | 29.8% |
| | FAIRLY AGREE | 31 | 27.2% |
| | AGREE | 34 | 29.8% |
| | STRONGLY AGREE | 0 | 0.0% |
| The building is adaptable to change and enable expansion. | STRONGLY DISAGREE | 18 | 15.8% |
| | DISAGREE | 25 | 21.9% |
| | FAIRLY AGREE | 38 | 33.3% |
| | AGREE | 30 | 26.3% |
| | STRONGLY AGREE | 3 | 2.6% |
| The building is capable of handling the projected work. | STRONGLY DISAGREE | 26 | 22.8% |
| | DISAGREE | 22 | 19.3% |
| | FAIRLY AGREE | 28 | 24.6% |
| | AGREE | 34 | 29.8% |
| | STRONGLY AGREE | 4 | 3.5% |

**Appendix VI, Table 2: Functionality (access) of PHC building**

| | | Count | Percentage % |
|---|---|---|---|
| Outdoor spaces are provided with appropriate and safe lighting indicating paths, ramps and steps. | STRONGLY DISAGREE | 17 | 17.5% |
| | DISAGREE | 33 | 34.0% |
| | FAIRLY AGREE | 22 | 22.7% |
| | AGREE | 16 | 16.5% |
| | STRONGLY AGREE | 9 | 9.3% |
| Routes are well lit at night | STRONGLY DISAGREE | 14 | 14.3% |
| | DISAGREE | 24 | 24.5% |
| | FAIRLY AGREE | 26 | 26.5% |
| | AGREE | 21 | 21.4% |
| | STRONGLY AGREE | 13 | 13.3% |
| Pedestrian routes are free from obstacles, suitable for wheelchair users and people with other disabilities | STRONGLY DISAGREE | 17 | 17.3% |
| | DISAGREE | 23 | 23.5% |
| | FAIRLY AGREE | 25 | 25.5% |
| | AGREE | 24 | 24.5% |
| | STRONGLY AGREE | 9 | 9.2% |
| Separate parking for disabled people is provided close to entrances. | STRONGLY DISAGREE | 15 | 15.3% |
| | DISAGREE | 20 | 20.4% |
| | FAIRLY AGREE | 34 | 34.7% |
| | AGREE | 27 | 27.6% |
| | STRONGLY AGREE | 2 | 2.0% |
| Parking areas for visitors are adequate and well sign-posted. | STRONGLY DISAGREE | 11 | 11.2% |
| | DISAGREE | 32 | 32.7% |
| | FAIRLY AGREE | 26 | 26.5% |
| | AGREE | 22 | 22.4% |
| | STRONGLY AGREE | 7 | 7.1% |
| Entrance is good and big enough for all vehicles. | STRONGLY DISAGREE | 13 | 13.3% |
| | DISAGREE | 29 | 29.6% |
| | FAIRLY AGREE | 27 | 27.6% |
| | AGREE | 27 | 27.6% |
| | STRONGLY AGREE | 2 | 2.0% |
| PHC building is designed to accommodate public transport. | STRONGLY DISAGREE | 10 | 10.2% |
| | DISAGREE | 29 | 29.6% |
| | FAIRLY AGREE | 31 | 31.6% |
| | AGREE | 23 | 23.5% |
| | STRONGLY AGREE | 5 | 5.1% |

| | | | |
|---|---|---|---|
| Roads, widths, turning circles etc, in the PHC building are safe and convenient. | STRONGLY DISAGREE | 33 | 33.7% |
| | DISAGREE | 12 | 12.2% |
| | FAIRLY AGREE | 32 | 32.7% |
| | AGREE | 17 | 17.3% |
| | STRONGLY AGREE | 4 | 4.1% |

**Appendix VII, Table 3: Functionality (space) of PHC building**

| | | Count | Percentage % |
|---|---|---|---|
| The rooms and spaces size provided in the building are enough to handle the projected workloads (Beds, waiting spaces, storage, etc.) | STRONGLY DISAGREE | 44 | 38.9% |
| | DISAGREE | 22 | 19.5% |
| | FAIRLY AGREE | 19 | 16.8% |
| | AGREE | 20 | 17.7% |
| | STRONGLY AGREE | 8 | 7.1% |
| Storage spaces are adequate in number and size to accommodate all needs. | STRONGLY DISAGREE | 31 | 27.2% |
| | DISAGREE | 33 | 28.9% |
| | FAIRLY AGREE | 33 | 28.9% |
| | AGREE | 14 | 12.3% |
| | STRONGLY AGREE | 3 | 2.6% |
| There are floor spaces in the building that are overprovided. | STRONGLY DISAGREE | 31 | 27.2% |
| | DISAGREE | 45 | 39.5% |
| | FAIRLY AGREE | 23 | 20.2% |
| | AGREE | 12 | 10.5% |
| | STRONGLY AGREE | 3 | 2.6% |
| There are floor spaces in the building that are under-sized. | STRONGLY DISAGREE | 26 | 22.8% |
| | DISAGREE | 34 | 29.8% |
| | FAIRLY AGREE | 37 | 32.5% |
| | AGREE | 12 | 10.5% |
| | STRONGLY AGREE | 5 | 4.4% |
| Storage spaces in the hospital building are adequate. | STRONGLY DISAGREE | 27 | 23.7% |
| | DISAGREE | 25 | 21.9% |
| | FAIRLY AGREE | 36 | 31.6% |
| | AGREE | 23 | 20.2% |
| | STRONGLY AGREE | 3 | 2.6% |
| The design makes appropriate provision for gender segregation. | STRONGLY DISAGREE | 26 | 22.8% |
| | DISAGREE | 41 | 36.0% |
| | FAIRLY AGREE | 25 | 21.9% |
| | AGREE | 19 | 16.7% |
| | STRONGLY AGREE | 3 | 2.6% |
| Isolation and segregation of spaces is achieved in the PHC building | STRONGLY DISAGREE | 19 | 16.7% |
| | DISAGREE | 34 | 29.8% |
| | FAIRLY AGREE | 37 | 32.5% |
| | AGREE | 21 | 18.4% |
| | STRONGLY AGREE | 3 | 2.6% |

| | | | |
|---|---|---|---|
| The circulation distances travelled by staff, patients and visitors are minimized in the building | STRONGLY DISAGREE | 15 | 13.2% |
| | DISAGREE | 24 | 21.1% |
| | FAIRLY AGREE | 39 | 34.2% |
| | AGREE | 33 | 28.9% |
| | STRONGLY AGREE | 3 | 2.6% |
| The ratio of usable space in the building to the total area of the PHC is good. | STRONGLY DISAGREE | 23 | 20.2% |
| | DISAGREE | 25 | 21.9% |
| | FAIRLY AGREE | 33 | 28.9% |
| | AGREE | 29 | 25.4% |
| | STRONGLY AGREE | 4 | 3.5% |
| The design achieves appropriate space standards. | STRONGLY DISAGREE | 29 | 25.4% |
| | DISAGREE | 26 | 22.8% |
| | FAIRLY AGREE | 30 | 26.3% |
| | AGREE | 27 | 23.7% |
| | STRONGLY AGREE | 2 | 1.8% |

**Appendix VIII, Table 4: Build Quality (performance) of PHC building**

| | | Count | Percentage % |
|---|---|---|---|
| The building has appropriate durable finishes. | STRONGLY DISAGREE | 19 | 16.7% |
| | DISAGREE | 34 | 29.8% |
| | FAIRLY AGREE | 37 | 32.5% |
| | AGREE | 22 | 19.3% |
| | STRONGLY AGREE | 2 | 1.8% |
| The building is easy to clean. | STRONGLY DISAGREE | 20 | 17.5% |
| | DISAGREE | 14 | 12.3% |
| | FAIRLY AGREE | 36 | 31.6% |
| | AGREE | 37 | 32.5% |
| | STRONGLY AGREE | 7 | 6.1% |
| The building will make your work easy | STRONGLY DISAGREE | 20 | 17.5% |
| | DISAGREE | 18 | 15.8% |
| | FAIRLY AGREE | 36 | 31.6% |
| | AGREE | 36 | 31.6% |
| | STRONGLY AGREE | 4 | 3.5% |
| The building is easy to move by staff and carry out activities in their departments. | STRONGLY DISAGREE | 25 | 21.9% |
| | DISAGREE | 21 | 18.4% |
| | FAIRLY AGREE | 21 | 18.4% |
| | AGREE | 43 | 37.7% |
| | STRONGLY AGREE | 4 | 3.5% |

**Appendix IX, Table 5: Build Quality (engineering) of PHC building**

| | | Count | Percentage % |
|---|---|---|---|
| There are emergency backup systems that are designed to minimize disruptions. | STRONGLY DISAGREE | 24 | 21.1% |
| | DISAGREE | 39 | 34.2% |
| | FAIRLY AGREE | 29 | 25.4% |
| | AGREE | 20 | 17.5% |
| | STRONGLY AGREE | 2 | 1.8% |
| The engineering systems are energy efficient | STRONGLY DISAGREE | 22 | 19.3% |
| | DISAGREE | 35 | 30.7% |
| | FAIRLY AGREE | 41 | 36.0% |
| | AGREE | 15 | 13.2% |
| | STRONGLY AGREE | 1 | 0.9% |
| The engineering systems are well designed, flexible and efficient to use | STRONGLY DISAGREE | 27 | 23.7% |
| | DISAGREE | 33 | 28.9% |
| | FAIRLY AGREE | 35 | 30.7% |
| | AGREE | 17 | 14.9% |
| | STRONGLY AGREE | 2 | 1.8% |

**Appendix X, Table 6: Impact (Character and Innovation) of PHC building**

| | | Count | Percentage % |
|---|---|---|---|
| The building projects a caring and reassuring atmosphere | STRONGLY DISAGREE | 12 | 10.5% |
| | DISAGREE | 11 | 9.6% |
| | FAIRLY AGREE | 36 | 31.6% |
| | AGREE | 41 | 36.0% |
| | STRONGLY AGREE | 14 | 12.3% |
| The building design is a reflection of modern day design and can serve to influence future PHC designs. | STRONGLY DISAGREE | 9 | 7.9% |
| | DISAGREE | 26 | 22.8% |
| | FAIRLY AGREE | 35 | 30.7% |
| | AGREE | 29 | 25.4% |
| | STRONGLY AGREE | 15 | 13.2% |
| The building raises staff morale. | STRONGLY DISAGREE | 10 | 8.8% |
| | DISAGREE | 21 | 18.4% |
| | FAIRLY AGREE | 28 | 24.6% |
| | AGREE | 47 | 41.2% |
| | STRONGLY AGREE | 8 | 7.0% |
| The building is interesting to look at and move around in. Especially with Art works. | STRONGLY DISAGREE | 20 | 17.7% |
| | DISAGREE | 11 | 9.7% |
| | FAIRLY AGREE | 23 | 20.4% |
| | AGREE | 44 | 38.9% |
| | STRONGLY AGREE | 15 | 13.3% |

**Appendix XI, Table 7: Impact (Urban and Social Integration) of PHC building**

| | | Count | Percentage % |
|---|---|---|---|
| The building is sensitive to neighbors and passers-by. | STRONGLY DISAGREE | 9 | 9.2% |
| | DISAGREE | 16 | 16.3% |
| | FAIRLY AGREE | 34 | 34.7% |
| | AGREE | 26 | 26.5% |
| | STRONGLY AGREE | 13 | 13.3% |
| The hard and soft landscapes around the building contribute positively to the locality. | STRONGLY DISAGREE | 5 | 5.1% |
| | DISAGREE | 25 | 25.5% |
| | FAIRLY AGREE | 36 | 36.7% |
| | AGREE | 16 | 16.3% |
| | STRONGLY AGREE | 16 | 16.3% |
| The building contributes positively to its locality. | STRONGLY DISAGREE | 27 | 27.6% |
| | DISAGREE | 19 | 19.4% |
| | FAIRLY AGREE | 19 | 19.4% |
| | AGREE | 22 | 22.4% |
| | STRONGLY AGREE | 11 | 11.2% |