

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background of the Study**

Generally, computer has played an important role in global economy in various ways. The Computer is used in many different fields such as in education for learning, in entertainment industries, for management, for problem solving and in business, etc.

Due to its importance it has been recognized world-wide. One of its vital roles is in management systems.

Today in health services, management of patient information requires a process and keeping of records from different departments in the hospital. All these records are very vital information needed by the organization for efficient and effective operation.

Online Patient Information Management System (OPIMS) is an extensive, coordinated information system designed to manage patient's data in hospitals with the administrative process. Health care centers depend on patient information, for the efficiency of administrative process and for better management. The principle objective of OPIMS is to streamline the stream of data from the hospital towards decision making for patient planning and management in an enhanced and effective way. Recording of data, be it medical, individual, money related or lawful, or recording of medicinal faculty data on paper is at danger of thieves, fire, mislay by the staff and even altering the content. A Computerized PIMS will be important in light of the fact that, there are a considerable measure of challenges in keeping up a lot of data on paper, particularly as there is usually no backup for the data, access to data can be tedious in the event that requires for the search of a file, and accuracy is required in the recording of key data, and the administrator cannot manage all that is composed on the tremendous measure of paper to be utilized. Hence, it is very important

for health organizations like hospitals and clinics to have a computerized patient information management system.

Mother of Christ Specialist Hospital, Enugu as a case study uses manual process in gathering data and managing their patient information, which in some cases they encounter loss of patients files, the card unit where the patients' files are being stored are not well arranged because of multiple patients' files. Implementation and use of Computerized Patient Information Management System in Mother of Christ Specialist Hospital, Enugu will provide a lot of benefits to the staff and entire management.

## **1.2 Statement of the Problem**

The absence of a Computer-based patient information management system to serve patients and enhance the services of the hospital staff has led to some inconveniences. This has brought about the loss of vital information about patients' medical history. This is basically so because of the weakness of the existing patient information management system in Mother of Christ Specialist Hospital which is over reliance on paper-based work. Paper files consume a lot of the office space and bring slow recording, processing and retrieval of patient details. The existing system of managing patient information does not offer a reliable storage and strong security of patient's health information. Accessing and sharing of information by different departments about patients is difficult due to poor information management.

### **1.3 Aim and Objectives of the Study**

The aim of this study is to develop an online information system for the management of patient information in Mother of Christ Specialist Hospital, Enugu. This will be achieved through the following objectives;

- By reviewing literature on related systems and analyzing the existing manual system.
- By collecting data and identifying the system's requirements
- By creating a database to store patients' data
- By designing an automated Patient Information Management system.
- By implementing the system.
- By testing and validating the system.

### **1.4 Significance of the Study**

Currently the hospital operates a manual patient information management system which is paper-based. With the introduction of a computerized information management system the following will be achieved;

- The system is a land mark in the field of modern technology since it is automated it becomes a quick access to the required information as it is only one click away. It makes patient information readily available for quick access and retrieval, to nurses and doctors.
- The system provides a more reliable and secure storage/backup of patient information
- By generating reports daily, monthly and yearly, it makes information available to the management for effective administration and decision making.

- And electronic security is maintained as the staff and management are able to login and access the system depending on their privileges. They are also able to work on the policies and claims more effectively and efficiently.

### **1.5 Scope of the Study**

The proposed system is designed for Mother of Christ Specialist Hospital, Enugu, primarily for the management of patient information and cannot be used for any other purpose or elsewhere. This information could be the name, residential address, phone number, next of kin, registration/card number, state of origin of the patient, the previous experience of ailment and the treatments/medications given, the reactions of such medications and the entire medical history of the patient. This hospital provides a lot of services to patients which includes; daily treatment of patients, admission of patients, record keeping of in-patients and out-patients, etc.

### **1.6 Limitations of the Study**

The following contributed to limitations of the study;

- Insufficient money
- Difficulty in getting project materials
- Inadequate time given for the research work

### **1.7 Definition of Terms**

- Patient - a person who is receiving medical care, or who is cared for by a particular doctor or health personnel.

- E-card – this is an electronic card with number which represents a file in the computer that contains patients' data
- Hospital - a place where people who are ill or injured are treated and taken care of by doctors and nurses.
- Management - the control and organization of something.
- Information - facts about a situation, person, event, etc.
- Computerize - to use a computer to do something that was done by people or other machines before.
- Systems administrator - a person responsible for systems administration to ensure high uptime of the system and for handling all database back-up and restore activities.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This considers the origin of computer use in medical field as well as the benefits and contributions from different authors on the subject matter.

#### **2.1 . Considerations Regarding Hospital Information Systems**

The use of computers in medicine dates back to the 1950s with studies that attempted to expand the mental capacity of physicians (Stumpf and Freitas, 1997) or dealt with research on electrophysiology (Collen, 1986). With the evolution of this equipment, especially with the capacity to simultaneously execute various tasks beginning in the 1960s, computers began to be used in the processing of information in large hospitals, in both administrative and financial functions for the collection of statistics and the development of research projects (Stead, 2007; Stumpf and Freitas, 1997). The use of microcomputers, beginning in the 1970s, introduced the concept of distributed processing, increasing the number of systems in use in large hospitals (Stumpf and Freitas, 1997).

Because this diffusion did not always occur in an organized or homogeneous manner, the initial diffusion of computers in hospitals led to the emergence of islands of computerization, with isolated systems that lacked any form of interconnection and were developed by different teams. The redundancy and the lack of data integrity deterred health professionals, who saw these systems as developed by systems professionals for systems professionals (Stumpf and Freitas, 1997). This situation was also investigated by McDonald (1997), who analyzed the lack of interconnection of the different systems used by the hospitals, laboratories, and service providers in the healthcare field.

Collen (1986) described the development of approaches in the 1970s that sought to approximate the habitual processes of decision-making with the use of artificial intelligence in differential diagnoses. In the same decade, studies were undertaken in search of a better organization of the healthcare system (Kaihara, 1978). With the help of computer-processed simulations, the author established an ideal relationship between medical centers and population demands.

The distributed processing was expanded during the 1980s with the development and greater availability of microcomputers, and the possibility of network communication of such equipment increased in the 1990s (Stumpf and Freitas, 1997). This allowed for the emergence of hospital information systems (HIS), covering medical, administrative, and hospitality areas, although hospitality may be considered as integrated into the administrative area (Cortes, 2008). These three areas are interlinked by horizontal data and information flows, providing support to the developed activities.

## **2.2 Electronic Records**

A patient's medical record contains fundamental information for incorporation into a hospital information system, yet it is necessary to consider that not all hospitals adopt medical records, even though they may use administrative systems or even hospitality systems. While specific information is not available, professional practice shows that, in general, the administrative area benefits the most from information systems in hospitals. This use includes inventory management systems, accounts payable and receivable, financial services, and accounting services. In these cases, the traditional record (hand-written) should have part of its information inserted into administrative systems so that hospital bills can be processed.

Similarly, hospital pharmacies use information systems to control stocks of prescriptions that are recorded in the medical records of patients.

This generates excess work that, in addition to consuming time and human resources, leaves the process susceptible to errors, delays, and failures, with repercussions that include the scheduling of exams, errors in forwarding requirements, and mistakes in billing that may lead to item disallowances, billing delays, or even missing charges for procedures or exams that have been performed.

Electronic records, when duly integrated with other systems, may reduce the occurrence of these problems, while also expediting the recovery of information for use by health professionals. This information can be used in statistical surveys, help with the analysis of procedures, be applied to preventative medicine, and be utilized for the control of hospital infections.

However, greater agility in the administrative processes and hospital procedures causes controversy, as one of the problems related to the use of Hospital Information System (HIS) is that in order to deal with medical information, many systems end up demanding a change in the work methods of physicians who have always recorded their observations in structured and codified ways. Although some studies have considered this standardization and structuring to be necessary for the organization of and increase in the quality of information (e.g., Setz and D'innocenzo, 2009; Hoff, 2009; Wakamiya and Yamauchib, 2009; Chaudhry et al., 2006; Shekelle, Morton, and Keeler, 2006), other studies concluded that this could harm the transmission of information among medical teams, imposing restrictions on the medical information that is input into the system (e.g., Warwick, 2009; Dawidowski et al., 2007; Stead, 2007; Walsh, 2004; Stumpf and Freitas, 1997).



Adler-Milstein (2009) stated that the potential benefits of using IT in the healthcare field, including efficiency and quality gains, will only be possible if the hospitals and clinics promote organizational changes, including greater autonomy for the individuals in the decision-making process and an increase in training programs. This situation is similar to that recommended by Goldzweig (2008), who concluded that the impact of the implementation of HIS depends on the context of the implementation and applications, as well as on the clinical problems and the patient population.

Another possibility presented by electronic records within HIS is the electronic prescription. Balfour III et al. (2009) concluded that this improves the level of care given to patients by eliminating the need to interpret handwritten prescriptions, reducing the possibility of errors regarding dosages and increasing communication speeds with hospital pharmacies. The presentation of the available drugs facilitates the indication of generic medications, potentially decreasing the costs for the patients (BALFOUR III et al., 2009), reducing the dosages prescribed when associating the support systems with clinical decisions (Shekelle, Morton and Keeler, 2006) and permitting a more rapid renewal of prescriptions and dosage changes (Weingart et al., 2009).

Despite the abovementioned benefits, some problems were identified in studies focusing on electronic prescriptions. Physicians did not always check the prescription before its transmission (Hellström et al., 2009) and also did not pay attention to the warnings regarding interactions among medications because many warnings referred to drugs that were no longer used (Weingart et al., 2009).

Another general benefit provided by HIS and especially by electronic records is the medical and nursing audits of the accounts presented to health insurance carriers. This analysis constitutes one of the main resources used by the carriers to better manage their costs with

hospital care (Ribeiro et al., 2008; FARIAS and Melamed, 2003). As a result, the auditor ends up adopting a financial approach and a vision of controllership, seeking the economic viability of the business and analyzing unauthorized charges for hospital costs. In this process, medical records will be able to reduce the number of errors, as they can set rules for the performance of procedures in addition to facilitating the investigation of conduct, inputs, and medical-hospital costs for the patients (Scarparo and Ferraz, 2008).

This action ends up impacting the price charged by the health insurance carrier, which is one of the items contemplated by consumers when choosing a health insurance plan. Along with medical care, structure of the operator, medical staff, communication, and convenience, price was one of the seven constructs identified in the research conducted by Milan and Trez (2005) that influenced the satisfaction levels of health insurance members.

### **2.3 Necessity of Information system in Hospitals**

The following are the advantages of implementing a Hospital Information System (HIS) and the changes the hospital processes undergo as a result.

#### **1. Easy Access to Patient Data**

A well-implemented Hospital Information System means readily available patient data to the care providers. It is only a matter of few clicks and all the requisite information about a patient, from various departments in the hospital, can be available on the screen. If the treating doctor needs to re-check the test reports of a patient, she need not go looking for the IPD file; logging into the HIS will give her instant access to those reports and timely treatment decisions ensue.

## **2. Cost Effective**

HIS, when implemented well, cuts out on a lot of manual work that are essentially performed in hospitals, especially the ones where documentation and record keeping is required. It helps in cutting down manpower because a lot of work gets automated and does not require manual intervention to store or analyze the information. It also saves much on storage and the related costs.

## **3. Improved Efficiency**

Processes automated using software would mean that the processes will be taken care of mechanically without any human intervention and this will instantly ensure improved efficiency. The software will not face human problems like fatigue, miscommunication or lack of focus; it will perform every task assigned to it with the same accuracy day in and day out.

## **4. Reduces Scope of Error**

Because processes on HIS are automated and a lot of tasks are assigned to the software to perform with utmost accuracy with minimum human intervention, the scope of error is reduced dramatically. For instance, while billing an IDP patient for the drugs used with HIS, the bill can hardly go wrong because the drug the nurse indents is what is billed for until and unless there is a shortage in stock or change in drug order after the indent has been sent. Per unit rate of the drug is saved in the software as part of standard operating procedure of automation. Just selecting the drug name and the quantity will enable the software to calculate the amount due accurately.

## **5. Increased Data Security & Retrieve-ability**

Record keeping in hospitals is a mandatory bane with two challenges: keeping the data safe with only authorized personnel getting access to it and retrieving it in the minimum possible time. Add to these the perennial problems of space shortage, protection from natural elements and protection from pest damage etc.

HIS is the perfect solution for these problems. All the data is stored on the server or cloud, keeping it safe. Since HIS works on logins, data security is becomes a non-issue offering data access based on the role of the person – Receptionist, doctor, nurse, radiologist etc. Retrieve-ability of data stored on a server or cloud is only a matter of few clicks and the data will appear on the screen within seconds.

## **6. Improved Patient Care**

Improved access to patient data and improved work efficiency means better and faster clinical decisions. In this age of evidence based medicine, the faster the clinician gets the diagnostic reports and the quicker her orders are implemented the faster is the patient recovery and the better it is on the patient care index. With automation, all departments in the hospitals are inter-connected and the faster information access further improves the quality of patient care and the resultant bed turnover in the hospital.

HIS is more than an IT solution, it helps you offer clear information, rapidly for better patient care while ensuring that the hospital operates efficiently and improved profitability by plugging revenue leakage. [Click here to see what HIS can do for your hospital.](#)

## **2.4 Cultural Influence on Adoption of HIS in Nigeria**

Culture by common understanding refers to a people's way of life. Nigeria has a large demographic setting represented by more than 250 ethnic groups and presents diversity of cultural practices and norms in minute detail (Okeke, 2008). Certain peculiarities are becoming a way of life in Nigeria; notable within the emergent common culture are materialism and individualism. Whereas the political grandfathers of the nation of Nigeria fought for independence based on the common good of all, the new political elite have introduced a culture of materialism and individualism to the detriment of a common goal. Eckersley (2005) asserted that the impact of societal cultures on health is often underestimated, explaining that culture could influence the levels of inequalities. For instance, materialism and individualism accentuate the rich-poor divide, thereby breeding social vices because of the perceived dictum of survival of the fittest.

Materialism leading to social inequality has become a hindrance to development in Nigeria. A recent minister of health and officials of the ministry embezzled 300 Million Naira, an equivalent of about two million United States dollars meant for the pilot study of telemedicine in the country. Although, the government official was fired from office but as of 2010, telemedicine practices are nonexistent in any form in Nigeria. The culture of corruption in Nigeria and mismanagement of economic resources by government office-holders borne out of the need to satisfy materialistic and individualistic aspirations has led to the impoverishment of the nation. The prevalence of poverty rose sharply from 28.1% in the 1980s to 65.6% in 1996 (Onwujekwe, 2005). The yearning for quick wealth among Nigerians has led to massive corruption in the national frontier and fraudulent practices internationally.

The new face of Nigeria has become an impediment to the free flow of goods and services in Nigeria. Foreign companies' trade cautiously with Nigerian business entities and this will no doubt impact any major initiative to implement hospital information technology in Nigeria on a large scale. The culture of institutional corruption by government officials does not encourage the delivery of the best products into the country because of the kick-backs (bribes) they receive from product vendors who, in turn, supply substandard products in a bid to achieve desired profit margins. In the view of Aripko, et al. (2007) because Nigerians allow these practices to continue unabated, the citizenry are in ambivalent complicity.

Analysts surmise that this culture is here to stay, except the nation seeks the only way out which may require a total re-orientation of value systems. The need exists to replace individualism and materialism with aspirations that promote the common good of all. Ghana, a close West African neighbor of Nigeria, has transformed successfully in the past two decades from similar circumstances of corruption and poverty to becoming a rallying point in the region.

Therefore, there is hope for Nigeria if the leadership will simply provide the new orientation. Wren (2005), described leadership as the process by which an individual or a team induces followership to pursue objectives set by the leader not necessarily by persuasion but through examples set by the conduct of the leader. The change in Ghana implies that a new culture of accountability, honesty, pursuit of a common goal, and nation building is possible for Nigeria through cultural reformation spearheaded by the right type of leadership. As a benefit of socio-cultural reformation, Ghana's industries currently attract capital once targeted for Nigeria in areas of education, health care, tourism, and several other investments because of Ghana's stable socio-political climate, stable electrical power supply, and low corruption-rate.

## **2.5 Limitations of Hospital Information System**

Management of electronic health record systems is constantly evolving with about 17 different systems currently available to service various clinical applications, facilitate strategic decision making, and improve administrative workflow. Although aimed at constant quality improvement, the rapid evolution of these information technologies is a major limitation. The short shelflife compels users to upgrade frequently or lose the ability to interface with newer innovations (Brailer, 2005). The upgrade and running cost burden is remarkable and outside the reach of small hospitals and health care trusts. Physician health care administrators and boards understand the benefits of hospital information technologies, but they do not find easy justification for the cost.

Compounding the cost issues, the lack of interoperability of information systems marketed by different vendors is a significant concern (Brailer, 2005). Problems with Interoperability do not allow seamless retrieval of patient information across different operating systems. Patient clinical data may be accessed only in hospitals with compatible information systems, thereby hampering the key benefit of easy and universal access to patient data that the technology is meant to support.

Other key concerns constituting major limitations of hospital information technologies include wrong identifications, wrong or incomplete information documented in hospital systems, the possibility of making changes to patient information by unauthorized persons; an event that carries considerable safety implications.

Researchers recognized the cost curtailment capabilities, improved quality of care, and prompt delivery of acute care associated with telemedicine. However, telemedicine, as a type of hospital information technology, has some obvious barriers. According to Ashley (2002), notable among the drawbacks are some legal requirements of multiple

licenses and credentials. Because practices in telemedicine sometimes require clinicians to provide consultation across interstate boundaries, clinicians with limited licensure may have legal problems delivering service in certain locations. Whereas credentialing stipulates minimum standards of training, education, and qualifications needed by professionals to provide care, each state may require different benchmarks for its practitioners according to state law. These specific statutes may affect the ability of a clinician to offer telemedicine services.

Another drawback with telemedicine is the physical separation between the health professional and the patient. In the 1990s, Wootton (1996) called this drawback the depersonalization of health care. Wootton further opined that bureaucracy is another drawback of telemedicine. The use of telemedicine may require a radical change in the way that services are provided and paid for. Concerns about how services are billed and reimbursement obtained abound. Patient privacy is impinged upon by practices of telemedicine. According to Ashley (2002), in a survey conducted in 1999, 20% of participants believed that medical information was not properly used and 16.7% of participants admitted to providing inaccurate data to conceal what they considered private information. Barjaktarevic (2008) expressed similar concerns of inadequate confidentiality for patient records because of possibility of data mismanagement electronically. Georgiou, Westbrook, Braithwaite, and Iedema (2005) asserted that the extent of organizational impact of adoption of hospital information systems is often underestimated; stressing that a major incident of patient risk exposure emanating from the system is capable of causing far-reaching organizational consequences. Callens and Cierkens (2008), commenting on legal concerns with the use of EHRs, concur that new e-health applications, including electronic health records, e-health platforms, health grids, and



further use of genetic data, come with fresh legal challenges and undeniable legal consequences in case of information mismanagement or identity theft.

According to Benham-Hutchins (2009) because of challenges involved in integrating new hospital information systems with old paper documentation and record systems, clinicians, and other health care practitioners may become encumbered with multiple and conflicting sources of patient information.

Multiples of paper and electronic documentation may disrupt a seamless workflow and influence the quality and efficiency of service delivery. These circumstances also have the potential to cause new types of medical errors resulting from poor harmonization of patient information. Understanding these concerns requires examination of human factors in the design of technology that is able to adapt to the way health care providers do their job. The delivery of patient-friendly services demands that health care providers continue to work toward improvement in the method of care pathways and processes.

Georgiou, et al. (2005) asserted that hospital information technologies eliminate some aspects of human interaction among staffs, thereby hindering workplace collaboration and cohesion. Keenan, et al. (2006) concurred that the human element is still very important in health care delivery and technology is just a tool in the hands of trained personnel. Other economic limitations of hospital information technologies include (a) the inability to ascertain an accurate return on investment, (b) problems with appropriate reimbursement for technology use, and (c) focus on technological issues at the expense of health care services and business concerns. In their pilot study of the implementation of an electronic medical record, Samoutis, et al. (2007) found that the physician's perceptions of the system's effect on their workflow, legal concerns, transition issues, and lack of familiarity with electronic equipment were among the impediments of implementation.

Samoutis, et al. (2007) observed that computerized systems increased work efficiency and improved the quality of care to the patients served. Recent health care debates reinforced the demands for reimbursement that are associated with quality of care outcomes. Implementing the right systems to incorporate the appropriate components is a necessity. Benham-Hutchins (2009) suggested adequate input of unique and valuable nursing perspectives at all stages of the hospital information technology (HIT) system life cycle.

## **CHAPTER THREE**

### **SYSTEM ANALYSIS AND METHODOLOGY**

#### **3.0 Introduction**

The chapter discusses the analysis of the present system as well as the analysis and design of the proposed system with its components.

#### **3.1 Research Methodology**

Research methodology here refers to the procedures and techniques used to reach a study's goal. In computer science and engineering, there are some methodologies in existence such as Object oriented analysis and design methodology (OOADM), Structured system analysis and design methodology (SSADM), Prototyping, Usability engineering methodology, etc. For the purpose of this work, Structured System Analysis and Design Methodology (SSADM) was used to analyze the system. Structured System Analysis and Design Methodology (SSADM) is a systematic approach to the analysis and design of information systems that uses a combination of text and diagrams throughout the life cycle of a system design beginning from the initial design idea to the actual physical design of the application.

Structured system analysis and design methodology (SSADM) was chosen for this work because it divides an application development project into modules, stages, tasks and provides a framework for describing project in a way suited for managing the project for each stage.

### **3.2 Analysis of the Existing System**

In Mother of Christ Specialist Hospital, Enugu, which is the case study of this research work, the current system of managing patients' information is manual where data is written on different papers and transferred to different departments; human errors are vulnerable since it is paper based and retrieval of files is time consuming as they had to manually locate files some of which were even lost and thus finding such information was hard.

When a new patient visits this hospital for treatment, he will be issued a paper-card (patient card contains a file number) and a file is opened for him which will contain all the information about that patient (i.e. information like the name, age, phone number, place of origin, residence of the patient, past treatments done with reports if any, etc). Each time the patient visits the hospital he must go with that patient card. On presenting this card, manually his file will be searched for, which takes time and it's cumbersome. The old patients on visiting the hospital as well must present their cards and wait for their files to be located before they are attended to. What of, if their files are misplaced or lost? The patients will not be attended to, or may have to obtain another file at their cost. This is really stressful and costly. Hence, the present system of managing patients' information in this hospital is really inefficient.

The requirement analysis discovered necessity of having automation and computerization of their patients' information management system that would result in reduction of paper work, faster access to patients' information, easy and durable storage of patients' information, compliance with the current trend of technology in the world, etc.

### **3.2.1 Strength of the Existing System**

As stated above the existing system is paper-based. At least, from the inception of the Mother of Christ Specialist Hospital, Enugu, the present system has been serving the purpose of recording information about patients in the hospital. It makes patients' information available to nurses and doctors (though not as when due), and they make use of such information for their day-to-day attendance to patients in the hospital. And at the same time, it makes information available to the management for decision making after a long time of gathering it.

### **3.2.2 Weakness of the Existing system**

The existing system has some loopholes. Being paper-based, the staff have to go through a lot of files in order to get patients' information before attending to the patients. At times they have to subject the patients to series of questions in order to know about their past ailments, treatments given and the reactions or the entire patients' health history. This indeed is tiresome and time consuming. This is what should have been done with just a click in the automated system.

As the hospital Administration currently uses health record files for storing patients' information. This system of information storage is susceptible to security problems such as illegal modification and update of records as well as misplacement of those files.

### **3.3 Analysis of the Proposed System**

The proposed system (Online Patient Information Management System (OPIMS)) is both computerized and web-based. The data or files used in this system are digitalized, that is, all

the necessary information about the patients is stored in the computer systems and accessible online (only to the authorized users) both within and outside the hospital. The usefulness of the proposed system goes beyond the premises of Mother of Christ Specialist hospital, Enugu.

In the Proposed system, when a new patient visits the hospital, he is assigned an electronic card (e-card) number which he will use to manage his information system. This e-card is like a file in a computer system that contains all the information about the patient. The old patients after their files have been digitalized are issued e-card numbers as well.

E-card relieves the patients from carrying their details with them by providing online access. It may happen that the patient faces some problem when he is out of city and has no treatment reports with him. In that case, if he has the card number, he can visit any doctor in that city and show his treatment history by accessing the online card by just entering his card number and password. He is thus saved from undergoing all the tests again and can have immediate treatment. Online access to the software allows the doctors to view reports and visit details of patients even by sitting at home. Thus the E-card system can be beneficial for both the patients and doctors.

The system is secure as a user can modify the information only after proper authentication. It provides a big leap forward over the existing laborious and inefficient system of patient information management. Chances of errors are also eliminated to a large extent. Computerization and automation of the whole system helps in easy and fast access to the required information. The system is highly user friendly as appropriate messages are provided to guide the user logged in.

### **3.3.1 Advantages of the Proposed system**

The proposed system which is automated in nature is introduced to solve problems with the existing manual system. The Online Patient Information Management System (OPIMS) has many advantages over the manual system. This system presents the following benefits over the existing arduous and ineffective system of manual operations:

- Reduction of Paper Work: No need of voluminous files.
- Speed: The machine can retrieve and modify data far faster than a human can.
- Redundancy: Redundancy of data entry can be eradicated.
- Cost Saving: Money spent on papers and files can be saved.
- Easy and Durable Storage
- Proper Authorization and Security
- Online Access

### **3.4 Justification of the proposed system**

The importance of the proposed system cannot be over-emphasized. The proposed system will enhance the efficiency and effectiveness of work in the hospital. Patients' records are digitalized for long time storage, for future use or for research purpose. The adoption of an Online Patient Information Management System (OPIMS) will give significant contributions in this epoch of information technology.

## **CHAPTER FOUR**

### **SYSTEM DESIGN AND IMPLEMENTATION**

#### **4.0 Introduction**

This chapter discusses the entire system design; its components and implementation strategies.

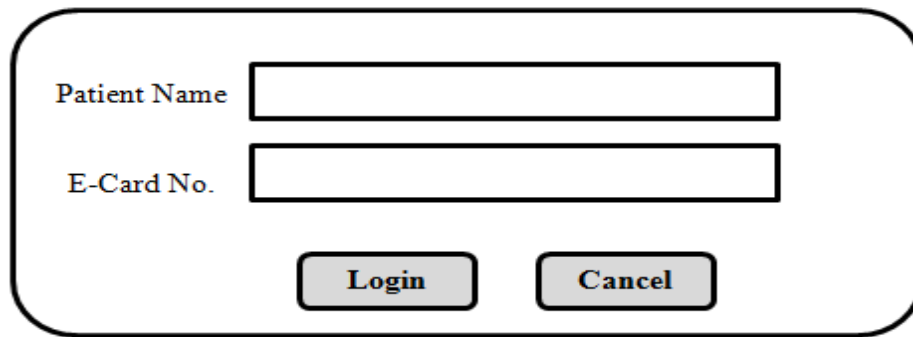
#### **4.1 Design and Specification of the Proposed System**

Here the important processes of the system such as inputs, outputs, security, interface design, system flowchart, etc. are discussed.

##### **4.1.1 Input design/specification**

The users of the system are the patients, doctors and system administrator. The patient can access the system to view and add his data. The doctor can access the system as the patient presents him his name and e-card number to view the medical history/information about the patient. And the system administrator will access the system in order to add new patient or delete the old one that has died and carry out other administrative activities. The inputs to the system could be login data, new patient, patient's personal information, etc. The input designs are given in figures 4.1 and 4.2 below;

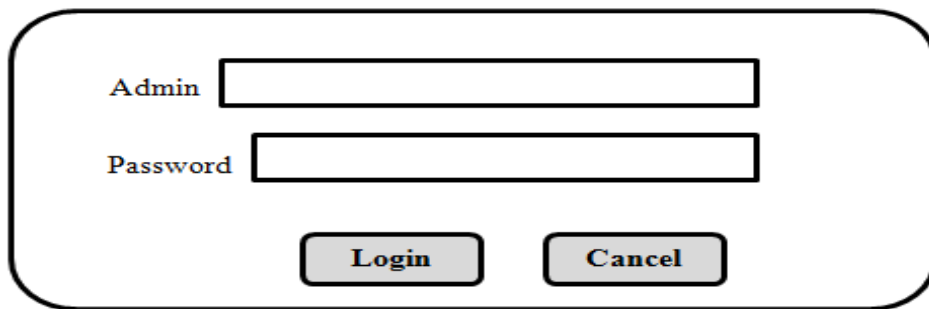




Patient Name

E-Card No.

Fig. 4.1: Patient login design



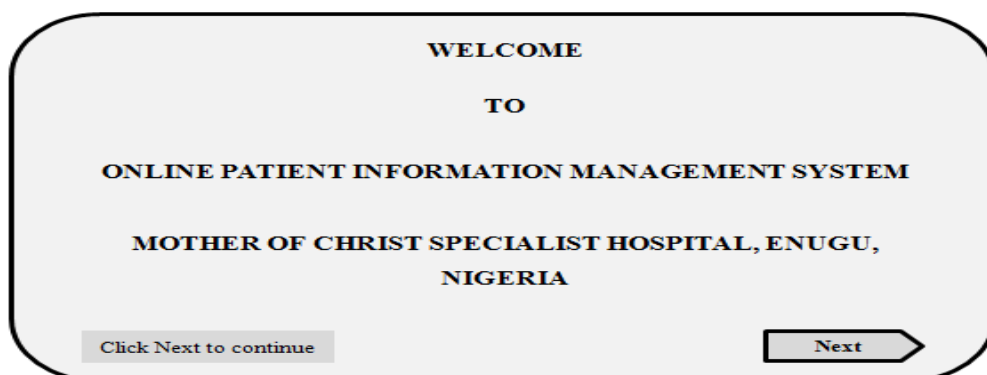
Admin

Password

Fig. 4.2: Administrator login design

#### 4.1.2 Output design/specification

The output of the system would be a “Welcome Screen” on a successful logging in to the system, patient’s information, etc. The output design is shown fig. 4.3 below;



**WELCOME**

**TO**

**ONLINE PATIENT INFORMATION MANAGEMENT SYSTEM**

**MOTHER OF CHRIST SPECIALIST HOSPITAL, ENUGU,**

**NIGERIA**

Fig. 4.3: Output design

### 4.1.3 Security design/specification

The proposed system is highly secure as only authorized users with proper login data can access it (see fig. 4.1 and fig. 4.2), compared to the unsecure existing system with patients files/data exposed carelessly. The patient can only view and add information to his e-file/e-folder but cannot modify or delete any data from it without exclusive permission of the system administrator.

### 4.1.4 Database design and specifications

The database name is dbregister. It contains two tables namely admin table and register table.

The tables are shown below;

**Table 4.1: Admin table**

Column	Type	Null	Default	Comments
ID	Int(10)	No		
Username	Varchar(100)	No		
Password	Varchar(255)	No		

**Table 4.2: Register table**

Column	Type	Null	Default	Comments
E_card	Varchar(50)	No		
Name	Varchar(80)	No		
Phone	Varchar(20)	No		
Address	Varchar(50)	No		
Gender	Varchar(20)	No		
Birth date	Varchar(20)	No		
Treatment	Text	No		

## 4.2 System flowchart

Figure 4.4 below is a system flowchart displaying how data flows in the system and how decisions are made to control events.

## 4.3 Block diagram of the Proposed system

The block diagram which shows the major components of the system is shown in figure 4.5 below.

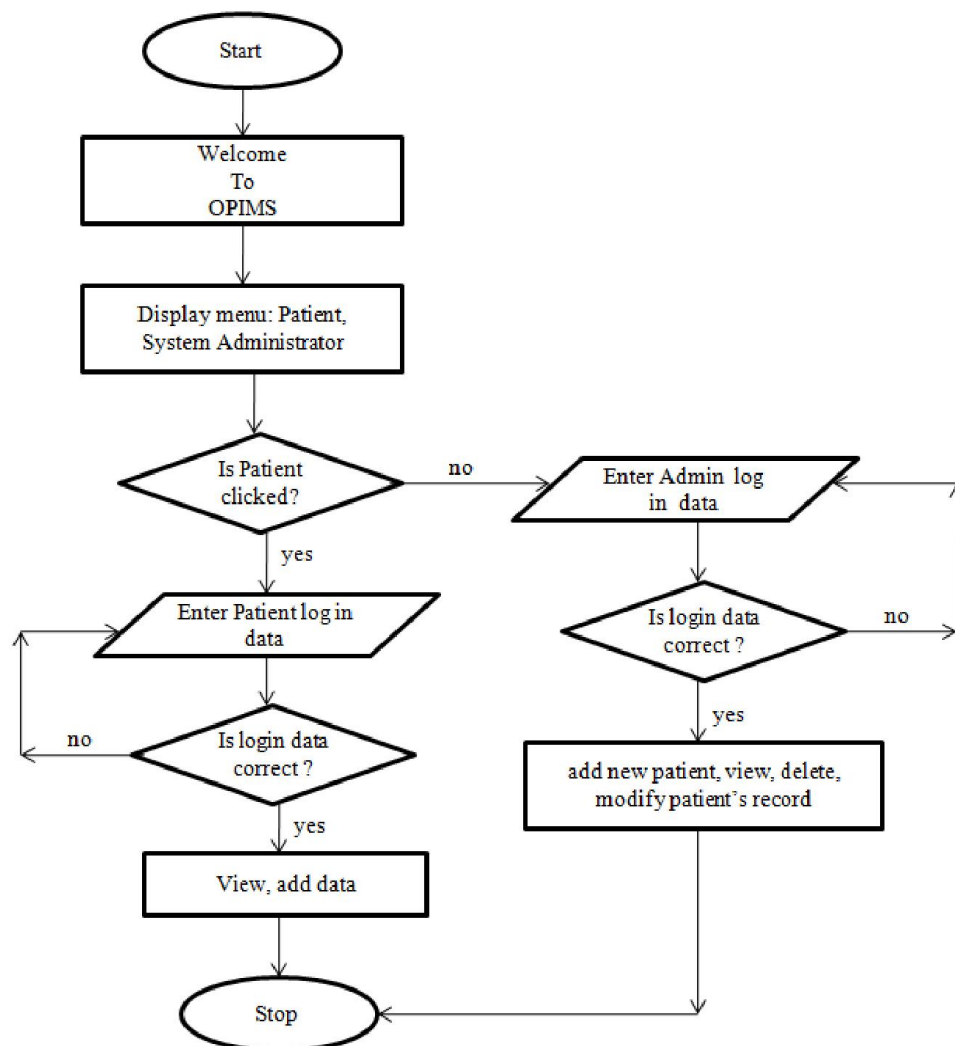
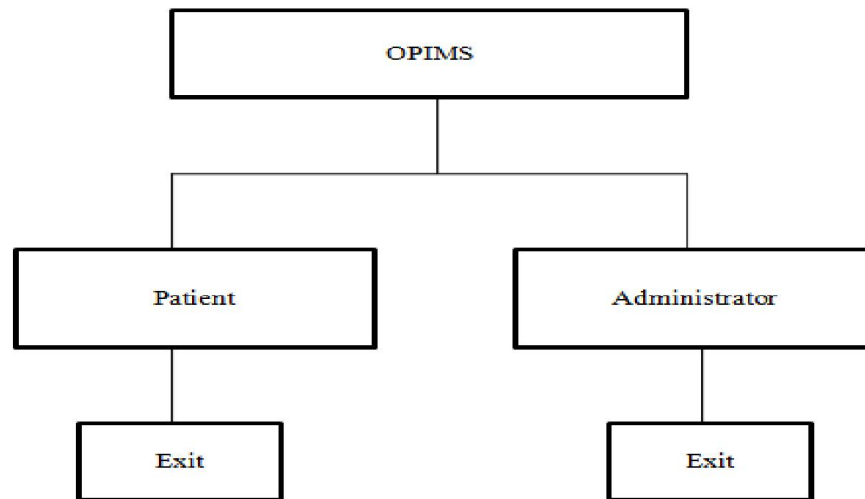


Fig. 4.4: System flowchart



**Fig. 4.5: Block diagram of the Proposed System**

#### **4.4 System Development tools and Justification**

The platform chosen for the proposed system is Microsoft Windows 7; higher version could also be used. The development environment is Microsoft Visual Studio 2012 Professional. The development environment is so chosen because of its ability to use with ease Microsoft software development platforms such as Windows API, Windows Forms, etc as well as its support for different programming languages.

So many programming languages were considered in the cause of designing this software. A lot of factors were put into consideration which includes online database access, data transmission via networks, database security, database retrieval online, multi-user access, online data capture, etc. Eventually, PHP programming language was chosen.

The choice for PHP was made to enable us achieve the aforementioned objectives. Moreover, PHP is very user-friendly and enables the design of an interface that can be modified programmatically. And MYSQL was chosen for database design. This is because MYSQL

can create a robust database which guarantees database integrity, database protection and accommodate large database.

#### **4.5 System Requirements**

We shall consider system requirements under hardware and software requirements as follows;

As the system is web-based, it should be Internet connected. We look at the system from the hardware, and software application used for effective implementation of the new design.

**4.5.1 Hardware Requirements:** For effective use of the new system, the minimum requirements for the hardware components are:

- Processor speed: 1.0 GHZ
- RAM: 256MB
- Hard Disk Drive: 40GB
- Display Unit: 14" Monitor (VGA)
- CD ROM drive: X54
- Keyboard: Windows enhanced
- Mouse: Optical
- Modem

#### **4.5.2 Software Requirements**

The least operating system that must be used is Windows XP Professional, although Windows 7 or higher one is preferable. Web browser like Mozilla Firefox, Internet Explorer, Opera Mini, etc should also be in the system.

### **4.5.3 People Requirement**

The users of this new system must be computer literate and also should be capable of using the Internet.

## **4.6 System Testing – modular/unit testing and integration testing**

Testing was done after the system was put in place. This was done in two ways namely unit Testing and integration testing.

### **4.6.1 Unit Testing**

Unit testing was carried out on individual modules of the system to ensure that they are fully functional units. We did this by examining each unit, for example the login page was tested with login data to ensure that it functions as required, that is, it allows the authorized users access to the system and restricts access from unauthorized users as expected. The success of each individual unit gave us the go-ahead to carryout integration testing. All identified errors were dealt with.

### **4.6.2 Integration Testing**

We carried out integration testing after different modules had been put together to make a complete system. Integration was aimed at ensuring that modules are compatible and they can be integrated to form a complete working system. For example we tested to ensure that when a user is logged in, he/she is linked to the appropriate page, and also could access the database.

## **4.7 Implementation Details**

In implementing the system, the computer device used must be connected to the Internet and the user must obtain the uniform resource locator (url) of the system, [www.opims.org](http://www.opims.org). After keying in the url on the address bar of the browser and pressing “enter key” on keyboard or clicking “Go” on the screen, the “Welcome” will display. The users are expected to supply the correct login data and log in to the system. There are two major users to the system; the system administrator and the patient. The authorized hospital officials who may have to use the system are given Administrator Password to use while the Patients are assigned Patient e-card numbers with which to access the system along with their names. After a successful logging in, the user will follow the on-screen instructions to use the system.

### **4.7.1 Coding (see Appendix ....)**

### **4.7.2 End user training**

In section 4.5.3: People Requirements, the users of the system are expected to have the ability to use computer and the Internet as the system is not meant to teach them these, the system users would be give orientation on how to use the system. Additionally, help module will be provided to guide the user as well.

### **4.7.3 File Conversion**

Since “Mother of Christ Specialist hospital” was used to manual system of patient information management which was paper-based, the old files of patients will be converted to

digital formats to be compatible with the proposed system which is computer-based. The old patients would be assigned e-card numbers in order to use the new system.

#### **4.7.4 Changeover Procedure**

The changeover procedure recommended for this type of system changeover from manual system to automated system is **Pilot approach**. In this approach, the old system and new system of Patient information management will be running together for some time until the users are familiar with the new system. The advantage of this approach is that if anything goes wrong with the new system, the organization will have a system to fall on without losing their old files.

#### **4.7.5 System Maintenance**

In order to make sure that the new system functions properly, system maintenance must be duly observed. The following must be considered in the maintenance activities;

- (i) Ensure that an appropriate windows firewall is configured to prevent “damaging programs” from the system.
- (ii) Ensure that an anti-virus program is installed, and the system is scanned when necessary.
- (iii) Delete unnecessary files from time to time to ensure disk space
- (iv) Ensure enough backup files and keep them away from magnetic area and dusty environment.



## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.0 SUMMARY**

The Proposed System, Online Patient Information Management System (OPIMS) has been successfully analyzed and designed.

Chapter one is Introduction which discusses what the project is all about, the reason for the research work as well as its importance to the parties concerned.

Chapter two is the Literature Review which discusses the opinions of different people on the subject matter.

Chapter three is Systems analysis and Design which analyzes the existing system and its weakness and draws out the designs of the proposed system and their features.

Chapter four is System Development. It discusses the development environment, tools and the maintenance activities of the entire system and chapter five which is Summary, Conclusion and Recommendations which summarizes the entire work.

#### **5.1 Conclusion**

As we have seen that the aim and objectives of the study have been met, the researcher therefore strongly believes that if the system is adopted for use, it will be of great help to the staff of Mother of Christ Specialist Hospital, Enugu in performing their duties with ease as well as their patients for online access to their medical information. Other interested users like future researchers are not left out, it can still be of immense use to them in furthering their research.

## **5.2 Recommendation**

Having successfully analyzed, designed and developed this system, the researcher strongly recommends it for use by the management of Mother of Christ Specialist Hospital, Enugu and its beneficiaries.

It is also recommended that the system requirements must be strictly adhered to, and the maintenance details properly observed for a continuous and proper functioning of the system.

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## Appendix A

### Program Source Code Listing

#### Admin codes

```
<?php

    session_start();

    //Get values from login form

    $username = $_POST['username'];

    $password = $_POST['password'];


    // Set session variables

    $_SESSION["USERNAME"] = $username;


    define('DB_SERVER', 'localhost');
    define('DB_USERNAME', 'root');
    define('DB_PASSWORD', '');
    define('DB_NAME', 'dbregister');


    /* Attempt to connect to MySQL database */

    $link = mysqli_connect(DB_SERVER, DB_USERNAME, DB_PASSWORD,
DB_NAME);

    // Check connection

    if($link === false){
        die("ERROR: Could not connect. " . mysqli_connect_error());
    }

    // Prepare a select statement

    $sql = "SELECT * FROM admintable WHERE USERNAME='$username' AND
PASSWORD='$password' ";

    $result= mysqli_query($link,$sql) or die(mysqli_erro());

    $trws= mysqli_num_rows($result);
```

```

if($trws==1){
    $rws= mysqli_fetch_array($result);
    $_SESSION['USERNAME']=$rws['USERNAME'];
    $_SESSION['PASSWORD']=$rws['PASSWORD'];
    header("location: staff_home.php");
}
else {
    $errmsg_arr[] = 'user name and password not found';
    $errflag = true;
    if($errflag) {
        $_SESSION['ERRMSG_ARR'] = $errmsg_arr;
        session_write_close();
        header("location: admin_error.php");
        exit();
    }
}

?>

```

### **Patient codes**

```

<!DOCTYPE html>

<html lang="zxx" class="no-js">

<head>

    <!-- Mobile Specific Meta -->

    <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">

    <!-- Favicon-->

    <link rel="shortcut icon" href="img/fav.png">

    <!-- meta character set -->

    <meta charset="UTF-8">

```

```

<!-- Site Title -->

<title>Patient login</title>

<link
href="https://fonts.googleapis.com/css?family=Poppins:100,200,400,300,500,600,700"
rel="stylesheet">

<!--
CSS
===== -->

<link rel="stylesheet" href="css/linearicons.css">
<link rel="stylesheet" href="css/font-awesome.min.css">
<link rel="stylesheet" href="css/bootstrap.css">
<link rel="stylesheet" href="css/magnific-popup.css">
<link rel="stylesheet" href="css/nice-select.css">
<link rel="stylesheet" href="css/animate.min.css">
<link rel="stylesheet" href="css/jquery-ui.css">
<link rel="stylesheet" href="css/main.css">
</head>
<body>
  <header id="header">
    <div class="header-top">
      </div>
      <div class="container main-menu">
        <div class="row align-items-center justify-content-between d-flex">
          <a href="index.php"></a>
        </div>
      </div>
    </header><!-- #header -->

    <!-- start banner Area -->
    <section class="banner-area relative" id="home">

```

```

<div class="overlay overlay-bg"></div>
<div class="container">
  <div class="row fullscreen d-flex align-items-center justify-content-between">
    <div class="banner-content col-lg-6 col-md-6 ">
      <h4 class="text-white">WELCOME TO OUR </h4>
      <h2 style="color: Orange" class="pb-30"> <br> ONLINE PATIENT
INFORMATION MANAGEMENT SYSTEM </h2>

      <h6 class="text-white ">Are you
      a new Patient? </h6>
      <h1 class="text-uppercase">
        GET AN E-CARD IMMEDIATELY
      </h1>
      <p class="pt-10 pb-10 text-white">
        Please meet our staff in order to get registered and you will be given an
E-card number.
      </p>
    </div>
    <div class="col-lg-4 col-md-6 header-right">
      <h4 class="pb-30">Already a Patient? Then login!</h4>
      <form class="form" action="login.php" method="post">
        <div class="form-group">
          <div>
            <input class="form-control txt-field " type="text" name="E_CARD"
placeholder="E-CARD NUMBER" onfocus="this.placeholder = ''" onblur="this.placeholder =
'E-CARD NUMBER'">
          </div>

          <div>
            <input class="form-control txt-field " type="text" name="Name"
placeholder="YOUR NAME" onfocus="this.placeholder = ''" onblur="this.placeholder =
'YOUR NAME'"

```



</div>

<button class="btn btn-default btn-lg btn-block text-center text-uppercase" type="submit" value="login">Patient Login</button>

</div>

</form>

</div>

</div>

</div>

</section>

<!-- End banner Area -->

<!-- start footer Area -->

<footer class="footer-area section-gap">

<div class="container">

<div class="row">

<p class="mt-80 mx-auto footer-text col-lg-12">

Copyright &copy;<script>document.write(new Date().getFullYear());</script> All rights reserved | Designed by Umeh Paschal

</p>

</div>

</div>

</footer>

<!-- End footer Area -->

<script src="js/vendor/jquery-2.2.4.min.js"></script>

<script  
src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/popper.min.js"  
integrity="sha384-

```

ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>

<script src="js/vendor/bootstrap.min.js"></script>

<script
src="https://maps.googleapis.com/maps/api/js?key=AIzaSyBhOdIF3Y9382fqJYt5I_sswSrE
w5eihAA"></script>

<script src="js/easing.min.js"></script>

<script src="js/hoverIntent.js"></script>

<script src="js/superfish.min.js"></script>

<script src="js/jquery.ajaxchimp.min.js"></script>

<script src="js/jquery.magnific-popup.min.js"></script>

<script src="js/jquery-ui.js"></script>

<script src="js/jquery.nice-select.min.js"></script>

<script src="js/mail-script.js"></script>

<script src="js/main.js"></script>

</body>

</html>

```

## Register codes

```

<!DOCTYPE html>

<html lang="zxx" class="no-js">

<head>

<!-- Mobile Specific Meta -->

<meta name="viewport" content="width=device-width, initial-scale=1,
shrink-to-fit=no">

<!-- Favicon-->

<link rel="shortcut icon" href="img/fav.png">

<!-- meta character set -->

<meta charset="UTF-8">

<!-- Site Title -->

<title>Register</title>

```

```

        <link
href="https://fonts.googleapis.com/css?family=Poppins:100,200,400,300,500,600,700"
rel="stylesheet">

        <!--

        CSS

        =====>

        <link rel="stylesheet" href="css/linearicons.css">
        <link rel="stylesheet" href="css/font-awesome.min.css">
        <link rel="stylesheet" href="css/bootstrap.css">
        <link rel="stylesheet" href="css/magnific-popup.css">
        <link rel="stylesheet" href="css/nice-select.css">

        <link rel="stylesheet" href="css/animate.min.css">
        <link rel="stylesheet" href="css/jquery-ui.css">
        <link rel="stylesheet" href="css/main.css">

    </head>
    <body>

        <header id="header">

            <div class="header-top">

                </div>

            <div class="container main-menu">

                <div class="row align-items-center justify-content-between d-
flex">

                    <a href="index.php"></a>

                </div>

            </div>

        </header><!-- #header -->

        <!-- start banner Area -->
        <section class="banner-area relative" id="home">

```

```

        <div class="overlay overlay-bg"></div>

        <div class="container">

            <div class="row fullscreen d-flex align-items-center
justify-content-between">

                <div class="col-lg-4 col-md-6 header-right">

                    <h4 class="pb-30">Patient Registration
Form</h4>

                    <p style="color: red">
INSTRUCTIONS: PLEASE FILL THE FORM IN CAPITAL LETTERS</p>

                    <form class="form" method="post"
action="DbRegister.php">

                        <!--display validation errors here -->

                        <div class="form-group">

                            <input class="form-control txt-
field" type="text" required="Name is required" name="Name" placeholder="Your name"
onfocus="this.placeholder = ''" onblur="this.placeholder = 'Your name'">

                            <input class="form-control txt-
field" type="text" required="Phone is required" name="Phone" placeholder="Phone number"
onfocus="this.placeholder = ''" onblur="this.placeholder = 'Phone number'">

                            <input class="form-control txt-
field" type="text" required="address is required" name="Address" placeholder="Your
Address" onfocus="this.placeholder = ''" onblur="this.placeholder = 'Your Address'">

                            <input class="form-control txt-
field" type="text" required="address is required" name="Gender" placeholder="Gender"
onfocus="this.placeholder = ''" onblur="this.placeholder = 'Gender'">

                            <input class="form-control txt-
field" type="text" required="address is required" name="BirthDate" placeholder="Date of
Birth" onfocus="this.placeholder = ''" onblur="this.placeholder = 'Date of Birth'">

                        </div>

                        <div class="form-group">

```

```
class="btn btn-default btn-lg btn-block text-center text-uppercase"
name="Register">Register</button>
```

```
</div>
```

```
</form>
```

```
</div>
```

```
</div>
```

```
</div>
```

```
</section>
```

```
<!-- End banner Area -->
```

```
<!-- start footer Area -->
```

```
<footer class="footer-area section-gap">
```

```
<div class="container">
```

```
<div class="row">
```

```
<p class="mt-80 mx-auto footer-text col-lg-12">
```

```
Copyright &copy;<script>document.write(new Date().getFullYear());</script> All rights
reserved | Designed by Umeh Paschal
```

```
</p>
```

```
</div>
```

```
</div>
```

```
</footer>
```

```
<!-- End footer Area -->
```

```

<script src="js/vendor/jquery-2.2.4.min.js"></script>

<script
src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>

<script src="js/vendor/bootstrap.min.js"></script>

<script
src="https://maps.googleapis.com/maps/api/js?key=AIzaSyBhOdIF3Y9382fqJYt5I_sswSrE
w5eihAA"></script>

<script src="js/easing.min.js"></script>
<script src="js/hoverIntent.js"></script>
<script src="js/superfish.min.js"></script>
<script src="js/jquery.ajaxchimp.min.js"></script>
<script src="js/jquery.magnific-popup.min.js"></script>
<script src="js/jquery-ui.js"></script>

<script src="js/jquery.nice-select.min.js"></script>

<script src="js/mail-script.js"></script>
<script src="js/main.js"></script>
</body>
</html>

```

## Staff codes

```

<?php
    session_start();

?>

<!DOCTYPE html>

<html lang="zxx" class="no-js">

<head>

    <!-- Mobile Specific Meta -->

```

```
<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
```

```
<!-- Favicon-->
```

```
<link rel="shortcut icon" href="img/fav.png">
```

```
<!-- meta character set -->
```

```
<meta charset="UTF-8">
```

```
<!-- Site Title -->
```

```
<title>Add info</title>
```

```
<link href="https://fonts.googleapis.com/css?family=Poppins:100,200,400,300,500,600,700" rel="stylesheet">
```

```
<!--
```

```
CSS
```

```
===== -->
```

```
<link rel="stylesheet" href="css/linearicons.css">
```

```
<link rel="stylesheet" href="css/font-awesome.min.css">
```

```
<link rel="stylesheet" href="css/bootstrap.css">
```

```
<link rel="stylesheet" href="css/magnific-popup.css">
```

```
<link rel="stylesheet" href="css/nice-select.css">
```

```
<link rel="stylesheet" href="css/animate.min.css">
```

```
<link rel="stylesheet" href="css/jquery-ui.css">
```

```
<link rel="stylesheet" href="css/main.css">
```

```
</head>
```

```
<body>
```

```
<header id="header">
```

```
<div class="header-top">
```

```
</div>
```

```
<div class="container main-menu">
```

```

flex">
    <div class="row align-items-center justify-content-between d-
    <a href="index.php"></a>

    </div>
</div>
</header><!-- #header -->

<!-- Start address Area -->
    <section class="latest-blog-area section-gap">
        <div class="container">
            <div class="row section-title">
                <h1>Welcome to Mother of Christ specialist
hospital</h1>
                <h4>This is the staff portal for entering Patient
information into the system.</h4>
            </div>

            <div>

                <form class="form" action="update.php"
method="post">
                    <div class="form-group">

                        <div>
                            <input class="form-control txt-field " type="text" name="E_CARD"
placeholder="E-CARD NUMBER" onfocus="this.placeholder = ''" onblur="this.placeholder
= 'E-CARD NUMBER'">
                        </div>

```



```

        <div class=" pb-10" >

            <textarea class="form-control txt-field " name="Treatment"
placeholder="Enter patient treatment information.." style="height:200px"></textarea>

            </div>

            <button class="btn btn-default btn-lg btn-block text-center text-
uppercase" type="submit">Enter information</button>

        </div>

    </form>

</div>

        <p class="pt-30 text-right"> <?php session_unset();
session_destroy(); ?> <a href="index.php" style="color: red" <p> Logout</a> </p>

    </div>

</section>

<!-- End address Area -->


<!-- start footer Area -->

<footer class="footer-area section-gap">

    <div class="container">

        <div class="row">

            <p class="mt-80 mx-auto footer-text col-lg-12">

```

Copyright &copy;<script>document.write(new Date().getFullYear());</script> All rights reserved | Designed by Umeh Paschal

```

        </p>

    </div>

</div>

</footer>

<!-- End footer Area -->


<script src="js/vendor/jquery-2.2.4.min.js"></script>

<script
src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.12.9/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>

<script src="js/vendor/bootstrap.min.js"></script>

<script
src="https://maps.googleapis.com/maps/api/js?key=AIzaSyBhOdIF3Y9382fqJYt5I_sswSrE
w5eihAA"></script>

<script src="js/easing.min.js"></script>

<script src="js/hoverIntent.js"></script>

<script src="js/superfish.min.js"></script>

<script src="js/jquery.ajaxchimp.min.js"></script>

<script src="js/jquery.magnific-popup.min.js"></script>

<script src="js/jquery-ui.js"></script>


<script src="js/jquery.nice-select.min.js"></script>

<script src="js/mail-script.js"></script>

<script src="js/main.js"></script>

</body>

</html>

```

## Appendix B

### Program Sample Output (screenshots)



The screenshot shows a web form titled "MOTHER OF CHRIST SPECIALIST HOSPITAL" with a logo on the left. The form is set against a blue background and contains the following fields: "Your name", "Phone number", "Your Address", "Gender", and "Date of Birth". Below these fields is a "REGISTER" button. Above the form, there is a red instruction: "ENTER INFORMATION CAREFULLY IN CAPITAL LETTERS".

Fig. 4.6: Registration Page for a new Patient

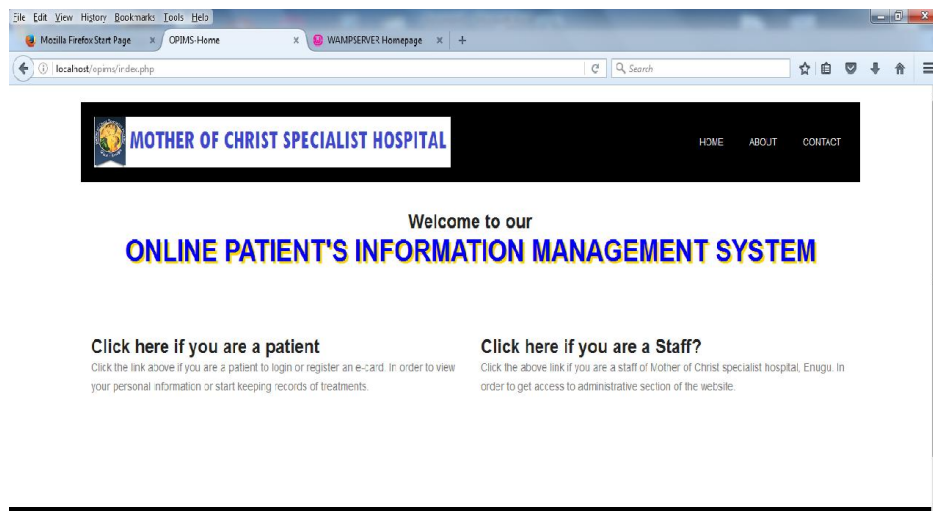


Fig. 4.7: Welcome Page of OPIMS

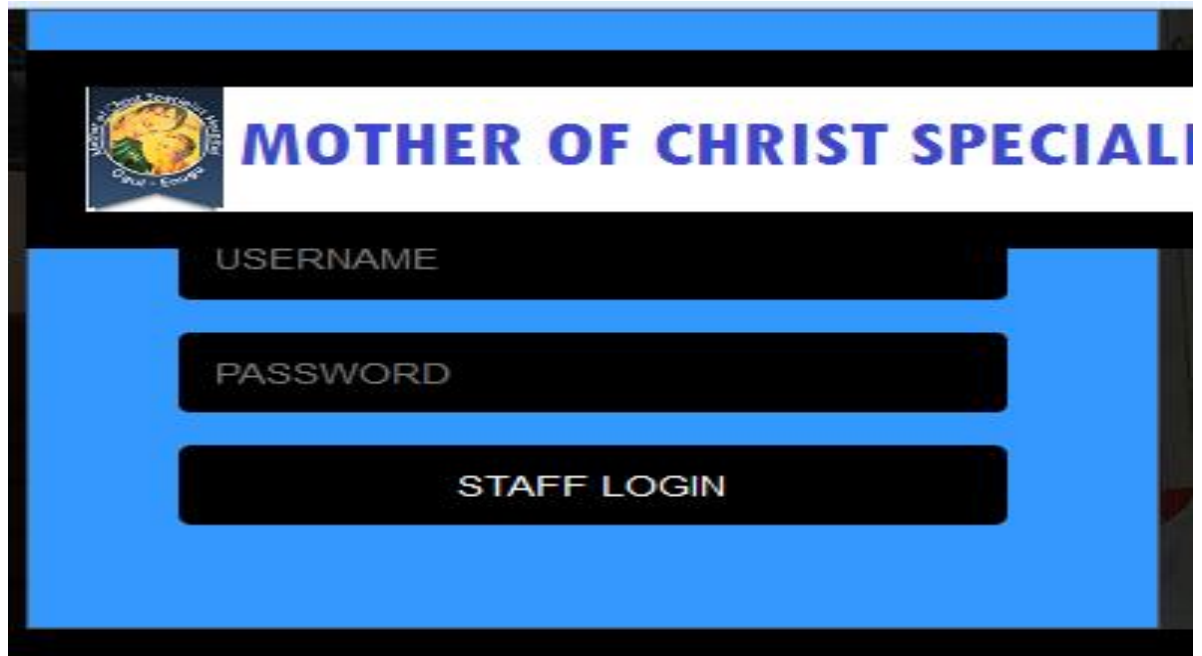


Fig. 4.8: Sample of Staff log in Page

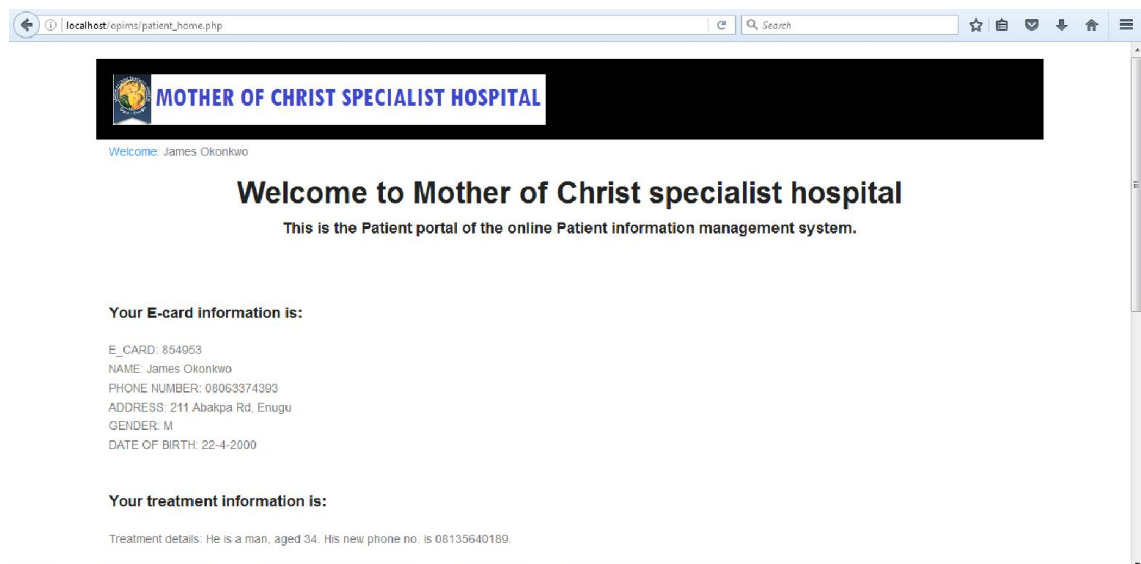


Fig.4.9: A page displaying information of Patient