# CHAPTER ONE

## 1.0 INTRODUCTION

A pharmacy is a retail shop which provides pharmaceutical drugs, among other products. At the pharmacy, the standard activities and operational model includes the following; Drug designation and classification which consist of the arrangement of drugs according to their uses in order to avoid confusion. Shelves and pallets are setup in the pharmacy for accommodating the goods to be stored at the pharmacy which ensures air circulation and protects the drugs against humidity. A desk is required for the person in charge of the pharmacy for administrative work and keeping of documents. Stocking areas are setup within the pharmacy for receiving medicines from suppliers.

A pharmacist oversees the fulfillment of medical prescriptions and is available to counsel patients about prescription and over-the-counter drugs or about general health issues.

Pharmacists have an in-depth knowledge of the chemistry of various drugs and how they react in humans, and also how drugs interact with each other.

Pharmacy management system is a management system that is designed to improve accuracy and to enhance safety and efficiency in the pharmaceutical store. It is a computer-based system which helps the Pharmacist to improve inventory management, cost, and medical safety.

The system allows the user to enter a manufacturing and expiry date for a particular product or drug during opening stock and sales transaction. It also involves manual entry upon arrival of new batches of drugs and upon drug movement out of the pharmacy for a certain period, e.g. every month, the pharmacist may want to generate report for the movement of drugs in and out of the pharmacy, getting information about the drugs e.g. expiry date, date purchased, number of drug type left, location of a drug in the pharmacy and managing the employees.

At present, manual system is being utilized in the pharmacy. It requires the pharmacist to manually monitor each drug that is available in the pharmacy. This usually leads to mistakes as the workload of the pharmacist increases.

## 1.1 BACKGROUND OF THE STUDY

Management of a pharmacy requires great attention to detail as the slight mistake an individual makes can cause the loss of life of an individual. The pharmacy also requires various works that includes the management of stock, ensuring the drugs in the pharmacy are up to date and managing bills.

Due to the patronage and quality service of the pharmacy these days, Pharmacies with a large number of clients tends to have a lot of workloads which affects the smooth running of the pharmacy as a result of the traditional way of operating the business. At this period, where the number of customers that patronize the pharmacy is on the rise, the workload of the pharmacists becomes more tedious. This makes it difficult for the pharmacist to attend to customers in a short period using the traditional way.

Meanwhile the pharmacist has to ensure satisfaction in services to keep their customers and to ensure they provide the right medicine and quality service.

This pharmacy management system deals with managing the medicine stock and selecting the suitable medicine needed by the customers. The core of pharmacist profession is the maintenance of quality and the subsequent implication for medical monitor and control in the pharmacy activities. This pharmacy management system will help solve the various problems encountered by the pharmacist.

## 1.2 PROBLEM STATEMENT

The current mode of managing a pharmacy involves manual entry upon arrival of new batches of drugs and upon drug movement out of the pharmacy for a certain period. At present, manual system is being utilized in the pharmacy. It requires the pharmacist to manually monitor each drug that is available in the pharmacy. This usually leads to mistakes as the workload of the pharmacist increases.

Meanwhile the pharmacist has to ensure satisfaction in services to keep their customers. The factors mentioned above, results in delay of the services being rendered to the customers, thereby slowing down sales and risk losing valuable customers in the long run. Managing a very large pharmacy with records on papers will be tedious and difficult to keep track of inventories with regards to the drugs in the store, expiry date, quantity of drugs available based on the categories and their functions.

The pharmacist has to order drugs to replenish the already diminishing stock. In addition, ordering of drugs is being carried out manually. Significant amount of time is allocated for writing the order as the pharmacist needs to go through the stock balance and make rough estimate of the quantity to order based on figures.

The application will provide quick access to the records maintained and must reveal the important reviews about the business so that the growth can be easily compared and will provide the various reports showing the related details that the important decisions could be taken easily.

The following are among the problems that lead to the creation and development of Pharmacy Management System Software.

- There is no effective way of managing of information
- It is hard to determine stock balance.
- Preparation of daily, weekly, monthly, and yearly reports is hard and time consuming.

## 1.3 AIMS AND OBJECTIVES

The aim of this project is to develop a software for the effective management of a pharmaceutical store that will be able to achieve the following objectives:

- Ensuring effective policing by providing statistics of the drugs in stock.
- Maintaining correct database by providing an option to update the drugs in stock.
- To provide optimal drug inventory management by monitoring the drug movement in the pharmacy.
- To ensure that there exists a level of restricted access based on functionality and role.
- To ensure that the system is user friendly.

## 1.4 PROJECT SCOPE

The scope of this project is to create a comprehensive web-based pharmacy management system that will streamline the processes and operations of a pharmacy. The system will allow the pharmacy to effectively manage inventory, track sales, process prescriptions, and manage customer information.

The pharmacy management system will be developed using modern web technologies such as HTML, CSS, JavaScript, and PHP. The system will be designed to be user-friendly and intuitive, with a clean and modern interface that makes it easy for pharmacists and other staff to navigate and use.

One of the key features of the system will be inventory management, which will allow the pharmacy to keep track of all medications, supplies, and expiration information in real-time.

Finally, the system will include a sales tracking module, which will allow the pharmacy to track sales and other key metrics. This will enable the pharmacy to make data-driven decisions and optimize its operations for maximum efficiency and profitability.

## 1.5 JUSTIFICATION FOR PROJECT

The development of a pharmacy management system is based on the need to improve the efficiency and accuracy of pharmacy operations. With the increasing demand for healthcare services and the growing complexity of medications, it has become increasingly important for pharmacies to adopt modern technologies to manage their operations.

Manual systems are often prone to errors and can be time-consuming, leading to delays in providing essential services to patients. With a web-based pharmacy management system, pharmacies can automate many of their processes and improve accuracy and efficiency, leading to better patient outcomes.

The system will also provide some essential reports on key metrics such as sales and inventory levels, which will enable pharmacists to make data-driven decisions and optimize their operations for maximum efficiency and profitability.

Overall, the development of a web-based pharmacy management system is a necessary step towards improving the quality and efficiency of pharmacy operations, which will ultimately result in better patient care and outcomes.

## 1.6 MOTIVATION FOR UNDERTAKING PROJECT

The motivation for undertaking the project of developing a pharmacy management system stems from the need to address the inefficiencies and challenges faced by pharmacies in managing their operations. As final year computer science students, the project represents an opportunity to apply our skills and knowledge to create a solution that can make a significant impact in the healthcare industry.

Pharmacies are a critical component of the healthcare system, providing essential services to patients and playing a key role in ensuring the safe and effective use of medications.

The development of a pharmacy management system represents an opportunity to address these challenges by providing pharmacies with a comprehensive tool to manage their operations. The

system will enable pharmacies to operate more efficiently and effectively, ultimately leading to better patient outcomes.

## 1.7 DEVELOPMENT TOOLS

The development tools used for the pharmacy management system project will include the following:

**Integrated Development Environment (IDE)**: An IDE is a software application that provides comprehensive facilities for software development Visual Studio Code will be used for this project.

**Database Management System (DBMS)**: A DBMS is software that is used to manage databases, including creating and managing database schemas, querying data, and managing database users and permissions. Popular DBMSs that may be used for this project include MySQL, Oracle, or PostgreSQL.

**Front-end Technologies**: For the front-end development of the project, technologies like HTML, CSS and JavaScript will be used.

**Back-end Technologies**: PHP will be used for the back-end development of the project.
**Web Server**: Apache web server will be used to deploy the pharmacy management system to a live environment

# CHAPTER 2

## 2.0 LITERATURE REVIEW

This chapter focuses itself with what other researchers have done concerning the topic under study. It reveals theories and concepts that have been generated. It focuses on the various technologies employed in the area under study, related works and their relation to this pharmacy management system.

## 2.1 INTRODUCTION

The pharmacy management system, also known as pharmacy information system, is a system that stores data and enables functionality that organizes and maintains the medication use process within pharmacies.

These systems may be an independent technology for the pharmacy's use only, or in a hospital setting, pharmacies may be integrated within an inpatient hospital computer physician order entry (CPOE) system. What is a pharmacy information system (PIS)[1].

Necessary actions for a basic, functioning pharmacy management system include a user interface, data entry and retention, and security limits to protect patient health information(Speciality pharmacy times)[2]. Various pharmacy software operating systems are used throughout the many practice settings of pharmacy across the world. The Pharmacy Technician. Perspective Press 2016 [3]

The pharmacy management system serves many purposes, including the safe and effective dispensing of pharmaceutical drugs. During the dispensing process, the system will prompt the pharmacist to verify if the medication they have filled is for the correct patient, contains the right quantity and dosage, and displays accurate information on the prescription label. Advanced pharmacy management systems offer clinical decision support and may be configured to alert the pharmacist to perform clinical interventions, such as an opportunity to offer verbal counselling if the patient's prescription requires additional education.

The pharmacy management system approach consist of two different dimensions. The first is an **inpatient pharmacy management system** which operates within hospitals and dispense medications to admitted patients receiving treatment. Inpatient pharmacists manage patient health alongside doctors and nurses, and the pharmacy management system must integrate with the various

systems operating throughout the hospital to maintain accurate Electronic Medical or Health Records (EMR, EHR) and the second is an **outpatient pharmacy management system** which are used by retail pharmacies that offer patient care services outside of hospitals and hospital treatment facilities.

## 2.2 TERMINOLOGIES USED IN PHARMACY

**Dose/dosage** – The specified amount and quantity of the drug to be taken at one time.
**Inventory** – A comprehensive list of the assets and items currently and physically in stock.
**Label** – An informational tag that specifies ingredients, doses, warnings, and potential drug interactions.
**Symptom** – A sign or characteristic that may serve as a clue to determine an illness or disease.
**Stocks** - All items or materials stored within the organization.
**Item** - One of the products kept in stock, is an input in inventory.
**Unit** - Standard size or quantity of the items in the catalog.
**Control Inventory** - Activities or procedures used to ensure that the correct amount should be kept in stock.

## 2.3 REVIEW OF RELATED WORKS

Notable researchers have carried out studies into the management of pharmacy and drug distribution with particular reference to gainful application of pharmaceutical data. Onuiri *et al* carried a research work aimed at rectifying the problems of the pharmacy providing a platform for the online management of the ever-growing pharmaceutical industry in the country, and region as a whole.
The tremendous growth recorded with the use of the internet and the growing popularity of computers and gadgets in general has in no way slowed down the birth of new innovative ways in the pharmaceutical management system. These days, computers have become an essential part of many people's lives due to the versatility of the devices, and how much they can do with so little effort. Performing tasks which would have taken hours and maybe days in the past, have become possible in seconds. The invention of the Internet and other utilities such as search engines (Google being a prime example), have made searching for the most remote things possible in very little time. Onuiri E. et al (2016) [4]
Also, the portability of the computer systems has helped the cause in making information more portable than it was in the past. In the same vein, the management of inventory and taking stock of

goods and services in different pharmaceutical organizations have become so much easier with the growth of the computer system. Goldberg et al (1991) [5]. These days, even phones and tablets have faster processing power than the early generation computers, which has made it easier to perform tasks.

In China, a text message system was developed to help in general patient pharmaceutical care, and promote mobile systems. Mao et al (2008) [6]. Onuiri *et al* in their work reviewed some of the existing related systems such as the management of inventory in the pharmacy which has taken various shapes and forms, one of which is called a Vendor-Managed Inventory (VMI) system. According to Onuiri *et al* the VMI gives a supplier full discretion to deliver goods and services, as long as the customer can fully optimize these goods and services and this method or level under the VMI system is called the Maximum Level; the other level in the system is called Order-up-to policy which allows the supplier to get the inventory of the customer to its maximum capacity at every delivery. Onuiri E. et al (2016) [4]

Various computerized management systems have been useful in helping to save lives around the world. The earthquake in Haiti in 2010 brought about a need for medicines for the injured, and also aid for them. Due to the high influx of medicines into the country at the time, an inventory management system was developed to help the cause. The hospitals in the country did not at the time have the means to provide medicines to the needy without losing track of what has been given to who, and what has not been given. Also, the management systems that were proposed and later implemented helped in tackling shortage problems, thereby saving countless lives in the process. The Pharmacy Computerized Inventory Program (PCIP) had four processes which include: needs assessment, the development of the PCIP, implementation of the PCIP, and outcomes and data analysis with the program proving to be a success and greatly reduced the turmoil going on in the land at the time of the earthquake. Holm et al (2015) [8]. Other parts of the world such as the Middle East have not been left out of the trend. A group of individuals in King Saud Bin Abdulaziz University for Health Sciences in Saudi Arabia came together to study and report findings on a pharmacy management system in a hospital in Saudi Arabia and the software controlled and monitored existing stock levels, which allowed them to decide how much quantity of drugs to order in other to be at full capacity. The application was installed on all computers of the staff in the hospital which was used and information was directly updated to the database. These various systems have allowed ease of work at the hospitals and pharmacies, and reduction of errors in drug related practices. Muallem et al (2015) [9]. Also, with the introduction of these practices, the

prescription drug abuse trend has been curbed to a considerable extent. These days, applications make use of large databases and verification processes. Holm et al (2015) [8].

### 2.3.1 eCount Pharmacy Management System

**eCount is** a pharmacy management system used by Panacea for managing their Pharmacy and it is a robust system for managing any modern pharmacy. It is designed to handle the pharmacy operations of retail chains and independent stores.

The software includes prescription processing workflows, which allow users to maintain all necessary prescription information, such as the respective doctor, drugs and quantities prescribed.

**eCount** Pharmacy Management System tracks changes in inventory and actively replenishes quantities to match prescription demand.

The pharmacy management system point of sale system (POS) can accept patients' flexible spending account (FSA) cards. The POS system also provides users with all details of products picked, dispatched and then delivered.

The dashboard provides a real-time overview of all prescription activities. Users are able to identify stocks through color coding. The stocks that are critically low are coded red, while those that remain but in smaller quantities are coded yellow.

**Advantages of eCount Pharmacy Management System are as follows;**

- Very easy to use. You can customize the system to suit your exact needs.
- **eCount** Pharmacy Management System can quickly process prescriptions and retains important information such as drug quantities.

**The limitations are as follows:**

- The application can sometimes close without warning the user to save their active work.
- **eCount** Pharmacy Management System does not prompt the user about drug expiry which affects the workflow of the pharmacist.

### 2.3.2 BestRx Pharmacy Management System

**BestRx** is a complete pharmacy management solution designed for small and midsize pharmacies that can transform the way pharmacies does their business. **BestRx** pharmacy management system is a Windows-based software program that can help you manage your independent pharmacy more efficiently.

The BestRx system allows users to search quickly for patients and prescriptions, process refill requests, access drug-allergy warnings, check weekly drug price updates, scan patient IDs, view claims, manage inventory, and inspect reporting. Main features of BestRx Pharmacy Management System includes;

1. **Patient Profile**
    - Prescriptions due for refill as well as expired prescriptions are highly visible allowing for quick action by the user
    - Specialty drugs are highly visible on the profile
2. **Workflow**
    - Integrated workflow for increased tracking and auditing of your prescriptions
    - User activity log to track certain employee actions
3. **Reporting**
    - Create custom groups for patients, prescribers, drugs and plans for easier reporting
    - Daily log report
4. **Inventory**
    - Create and send purchase orders directly from within BestRx pharmacy management system.
    - Track when inventory is transferred to another pharmacy.

**Advantages of BestRx pharmacy management system includes the following;**

- It can provide real-time monitoring for the prescriptions and medical orders and warn the irrational use of drugs timely, which thus greatly improve the qualified rates of prescriptions.
- The SMS and notification feature of the BestRx pharmacy management system allows the pharmacist to schedule messages for the patients to remind them to take their medications.

**The limitations are as follows:**

- Ocassionally,BestRx pharmacy management system experience down-time, which affect stocking inventory.
- The BestRx pharmacy management System crashes most of the time and also it sometimes takes longer period to print reports.

### 2.4 Advantages of Pharmacy Management System

The pharmacy management system allows the pharmacy to carry out daily operations. Available features vary across different systems, but all pharmacies require core functions and capabilities to perform their duties.

**1. Dispensing Workflow Management**:

The action most associated with pharmacy is the dispensing of medication. Dispensing occurs from receiving the prescription from the patient or prescriber to finalizing the prescription before it is picked up by the patient. This includes operations like Intake, Pre-Check, Fill and Check.

**2. Inventory Management:**

Various systems provide inventory management tools that allow pharmacists to reorder items, return unused stock, and organize shelf labels. Ideally, pharmacies keep a lean inventory to avoid spending money on products that remain undispensed on their shelves. Pharmacy management systems also support the electronic data exchange (EDI) between pharmacies and wholesalers, which digitizes shipping and receiving orders, catalog updates, and pricing changes.

**3. Pricing and Billing:**

Within a pharmacy, financial intelligence is crucial for maintaining the store's business. Pharmacy management systems are capable of identifying profit and losses from direct and indirect remuneration (DIR) fees, rebilling third parties for claims resubmissions, and tracking market changes so the pharmacy can continually offer competitive prices.

**4. Reporting:**

Because pharmacies interact with patients and multiple facets of healthcare (payers, prescribers, facilities, etc.), they gather and store data within their pharmacy management systems. This data may

be utilized for implementing business intelligence practices, documenting patient responses to new care strategies, or supplied to an auditor during an inspection or certification process.

## 2.5 TOOLS USED

### 2.5.1 Visual Studio Code 2020

Visual Studio Code 2020 Integrated Development Environment (IDE) was used in the development of the pharmacy management system. Visual Studio IDE provides a collection of tools and services that aids in the development of robust computer systems. The Tools menu enables you to connect to a specific database or server, manage all the available library packages, as well as import or export predefined settings. Visual Studio IDE was used in the development of the pharmacy management system due to the following;

- **Feature Availability**

Based on the requirement of the pharmacy management system, Visual Studio IDE was the best IDE because it included all the tools and features which was essential for developing the system without having to install a new IDE.

- **Continued Usability Support**

Visual Studio IDE was used to develop the pharmacy management system because of its focus on continued usability. There is the need to choose an IDE which focuses on improving its efficiency and that of the systems developed using it by providing updates that solves any errors in their previous releases. Therefore using Visual Studio IDE was a great return on investment.

- **High performance**

The pharmacy management system was developed using the Visual Studio IDE because of it's support for high performance systems. The IDE uses a technique which encourages best practices in system development which results in improving how the pharmacy management system will perform

## 2.6 THE LANGUAGES USED

PHP programming language was utilized in the development of the pharmacy management system. PHP is an object oriented programming language used for web based system application product development that works on the internet. It is known for many of its beneficial features, that includes PHP being a structured object and component oriented general purpose language, it works on the

apache web server which is a platform independent, for constructing highly efficient and high performance application programs. PHP is one of the top programming languages with simple structural syntax for programming the code blocks.

### 2.6.1 WHY PHP WAS USED

- **Performance**

Systems developed using PHP has proven to have high performance compared to other languages. Developing the pharmacy management system with PHP will help the system quickly respond to the users input without delaying much time which can impact the delivery of service in the pharmacy.

- **Security**

The security of the pharmacy management system is one of the essential factors that lead to the use of PHP for the system. A pharmacy management system requires a high level of security to prevent unauthorized access to the system to alter the information in the system as a slight change of data can cause harm to the customers. PHP has great security mechanism in place that will help in securing the pharmacy management system.

- **Maintainability**

The ability to maintain the pharmacy management system after it has been developed is one of the reasons why PHP was utilized in developing the system. As the requirements of the pharmacy shop increases, there will be the need to modify the pharmacy management system to suit the current requirement of the pharmacy. PHP has great support for system maintenance which is the reason why it was used in the development.

## 2.7 MYSQL DATABASE

MySQL was utilized in building the database of the pharmacy management system. MySQL is a relational database management system that organizes data into one or more data tables in which data types may be related to each other; these relations help structure the data. MySQL is a language used to create, modify and extract data from the relational database, as well as control user access to the database.

### 2.7.1 WHY MYSQL WAS USED

- MySQL uses very fast B-tree tables with index compression, a very fast thread-based memory allocation system, and executes very fast joins using optimized nested-loop join. As one of the purpose of this pharmacy management system is to speed the work in the pharmacy, there was the need to use MySQL because it will make the system process faster which will reduce the time the pharmacist spends in attending to a customer in the pharmacy.

- MySQL has mechanism in place that checks whether the data in the pharmacy management system has no duplicates which will ensure there is consistency in the data provided in the pharmacy management system to avoid making wrong decisions. Again, the backup and restore feature of MySQL allows the data in the pharmacy management system to backed up in a safer place and later restored in case of any damage to the pharmacy management system.

- Pharmacy management system deals with customer's sensitive data, therefore it requires database system that has proper security features in place to help it achieve the maximum security it requires. MySQL has security features that include user account management and access control which manages who can have access to certain features in the pharmacy management system. Also, MySQL also has password-validation component that protects sensitive data from intruders and ensures that a user requires the authenticated password alone to be able to access the pharmacy management system. These are some of the reasons why MySQL is the best choice for the pharmacy management system.

# CHAPTER THREE

# SYSTEM DESIGN AND METHODOLOGY

## 3.0 DESIGN METHODOLOGY

Software development methodology is the process of dividing software development work into distinct phases to improve design, product management, and project management. It is also known as a software development life cycle. The methodology may include the pre-definition of specific deliverables and artifacts that are created and completed by a project team to develop or maintain an application. Other methodologies include waterfall, prototyping, iterative and incremental development, spiral development, rapid application development, and extreme programming.

## 3.1 PROTOTYPE METHODOLOGY

Prototyping is known to be a product design and development method that is used nowadays in various fields such as in mechanical engineering and software development. The software engineering principle or methodology that has been used to design this pharmacy management system is prototyping. Basically, it involves the creation of a partial model to test a concept or process of an object. Reasons why we made use of the prototype model for the pharmacy management system are as follows:

i. Get feedback quickly and resolve early product issues:

Close communication between product design team and customer is the key to an effective prototype model; user and designer's involvement in the product development process allows them to configure and enhance a model and then provide valuable feedback. Whenever you have customers or stakeholders, feedback will be vital to your projects success. The sooner you can provide them with the prototype, quicker the feedback you can acquire and the process can be shortened.

ii. Build better product through many iteration:

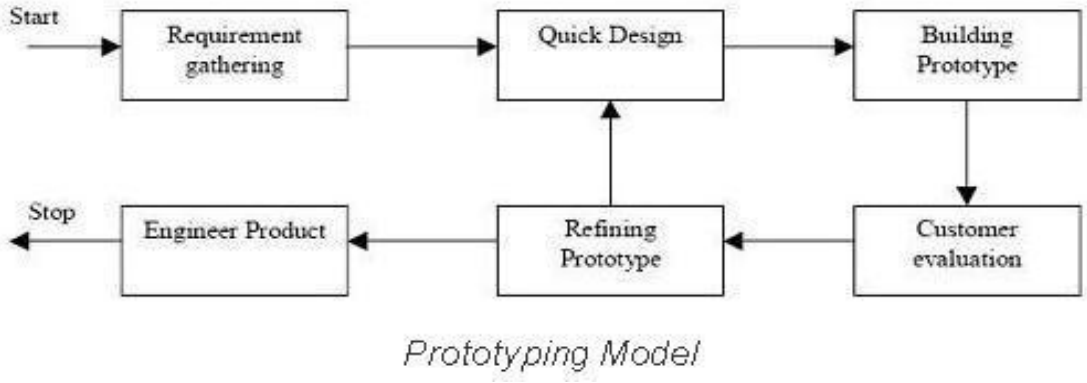
For product designers, the goal is to test the product thoroughly and ensure that it all works as intended. In the prototyping process, you need to repeat a series of steps until the idea and design are

validated. In other to produce a high-quality product, you should run through build-measure-learn loop as many times as you can. The more changes you get to improve the products features and functionality using the prototypes, the final product will definitely be better.

iii. The developer gains experience and insight by developing a prototype thereby resulting in better implementation of requirements. The model serves to clarify requirements, which are not clear, hence reducing ambiguity and improving communication between the developers and users.

iv. The model serves to clarify requirements, which are not clear, hence reducing ambiguity and improving communication between the developers and users. There is a great involvement of users in software development. Hence, the requirements of the users are met to the greatest extent and helps in reducing risks associated with the software.

Prototype model diagram.




In conclusion as prototyping technology and techniques have been improved dramatically nowadays, designers and engineers have more changes to produce a quality and well-designed product before mass production. Prototyping help shorten the entire production process and provides a competitive advantage to the development team. These are the main reasons why prototyping model was chosen as the best fit for the pharmacy management system.

## 3.2 REQUIREMENT ANALYSIS AND SPECIFICATION

Analyzing the system requirement is the act of getting and gathering information from various sources in order to be able to develop the pharmacy management system. Data used for developing the pharmacy management system were gathered through several means. Therefore the method used in the design and collections of information from various sources are as follows:

- Collecting, reviewing and analyzing existing materials on pharmacy management system, written by different expert.
- Studying the present system in detail and the organizational style.
- Knowing and understanding the input and output processes of the existing system.
- Interviews: A qualitative form of interview was conducted in the pharmacy to know the features needed in the pharmacy management system, and the mode of operation of the old system.

## 3.3 SYSTEM DESIGN

System design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements through system modeling. One could see it as the application of systems theory to produce development. The design of this pharmacy management system will be user friendly. It shall be designed in such a way that employees will be able to navigate easily through the information supplied on the system.
In other words, system design consists of design activities that produce system specifications satisfying the requirements that were developed in the system analysis process. System design specifies how the system will accomplish. System design is the structural implementation of the system analysis.

## 3.4 DATABASE DESIGN

Database design is an organization of data according to a database model. The database design was determined based on the analysis of the requirement of the pharmacy management system and it outlines what data must be stored and how the data elements interrelate, with this information, they can begin to fit the data to the database model.

### 3.3. ENTITY INFORMATION

**Entity: Administrator**

**Admin_ID (PK)**

Name

Email

Password

Image

**Entity: Staff**

**Staff_ID (PK)**

Name

Email

Password

Image

**Entity: Drug**

**Drug ID (PK)**

Category

Drug_Name

Size

Price

Quantity

Location

Manufacturer

Production_Date

Expiry_Date

**Entity: Sales**

Sales_ID (PK)

Category

Name

Price

Quantity

Total Price

Discount

Sale Price

Manufacturer

Production_Date

Expiry_Date

Sales Date

**Entity: Inventory**

ID_No.

Category

Name

Size

Price

Quantity

Location

Manufacturer

Production_date

Expiry Date

### 3.5 QUERIES USED TO DESIGN VARIOUS TABLES

#### 3.5.1 Database Queries for Administrator

CREATE TABLE '**Admin'**
('Admin_ID' int (50) NOT NULL,
'Name' varchar (50) NOT NULL,
'Email' varchar (20) NOT NULL,
'Password' varchar (20) NOT NULL,
'Image' varchar (20) NOT NULL,
PRIMARY KEY('Admin_ID'));

#### 3.5.2 Database Queries for Staff

CREATE TABLE **'Staff'**
('Staff_ID' int (50) NOT NULL,
'Name' varchar (50) NOT NULL,
'Email' varchar (20) NOT NULL,
'Password' varchar (20) NOT NULL,
'Image' varchar (20) NOT NULL,
PRIMARY KEY('Staff_ID'));

#### 3.5.3 Database Queries for Drug

CREATE TABLE '**Drug'**
**(** 'Drug_ID' int (50) NOT NULL,
'Category' varchar (50) NOT NULL,
'Drug_Name' varchar (50) NOT NULL,
'Size' int (50) NOT NULL,
'Price' int (50) NOT NULL,
'Quantity' int (50) NOT NULL,
'Location' Varchar (50) NOT NULL,
'Manufacturer' Varchar (50) NOT NULL,
'Production_Date' int (50) NOT NULL,
'Expiry_Date' int (50) NOT NULL,

PRIMARY KEY(‘Drug_ID’));

### 3.5.4 Database Queries for Sales

CREATE TABLE **‘Sales’**
(‘Sales_ID’ int (50) NOT NULL,
‘Category’ Varchar (50) NOT NULL,
‘Name’ varchar (50) NOT NULL,
‘Price’ int (50) NOT NULL,
‘Quantity’ int (50) NOT NULL,
‘Total_Price’ int (50) NOT NULL,
‘Discount’ int (50) NOT NULL,
‘Sale_Price’ int (50) NOT NULL,
‘Manufacturer’ varchar (50) NOT NULL,
‘Production_Date’ int (50) NOT NULL,
‘Expiry_Date’ int (50) NOT NULL,
‘Sales_Date’ int (50) NOT NULL,
PRIMARY KEY (‘Sales_ID’));

### 3.5.5 Database Queries for Seller

CREATE TABLE **‘Seller’**
(‘Seller_ID’ int (50) NOT NULL,
‘Image’ varchar (50) NOT NULL,
‘Name’ varchar (50) NOT NULL,
‘Email’ varchar (50) NOT NULL,
‘Mobile_Number’ int (20) NOT NULL,
‘Address’ varchar (20) NOT NULL,
PRIMARY KEY (‘Seller_ID’));

### 3.5.6 Database Queries for Inventory

CREATE TABLE **'Inventory'**

( 'ID_No.' int (50) NOT NULL,

'Category' Varchar (50) NOT NULL,

'Name' varchar (50) NOT NULL,

'Size' int (50) NOT NULL,

'Price' int (20) NOT NULL,

'Quantity' int (20) NOT NULL,

'Location' varchar (50) NOT NULL,

'Manufacturer' varchar (50) NOT NULL,

'Production_Date' int (50) NOT NULL,

'Expiry_Date' int (50) NOT NULL,

PRIMARY KEY ('Serial_No.'));

### 3.6 DATABASE TABLES

***Table 3.1 Administrator***

| Field Name | Field Type | Field Length | Description |
|---|---|---|---|
| **Admin_ID(PK)** | Int | (50) | Administrator's unique number which is the primary key |
| Name | Varchar | (50) | Administrator's full name |
| Email | Varchar | ( 20) | Administrator's email address which will be used to login |
| Password | Varchar | (20 ) | Administrator's login password |
| Image | Varchar | ( 50) | Administrator's personal picture |

*Table 3.1*

The Administrator table (Table 3.1): This table is named **Admin** and it stores information about the administrator in the pharmacy management system. The system verifies from the table to retrieve the administrator's data. All information about the administrator is stored in this table and it is available to the administrator alone. The **Admin_ID** is the primary key and has a unique identity.

***Table 3.2 Staff***

| Field Name | Field Type | Field Length | Description |
|---|---|---|---|
| **Staff_ID(PK)** | Int | (50) | Staff's unique number which is the primary key |
| Name | Varchar | (50) | Staff's full name |
| Email | Varchar | ( 20) | Staff's email address which will be used to login |
| Password | Varchar | (20 ) | Staff's login password |
| Image | Varchar | ( 50) | Staff's personal picture |

*Table 3.2*

The Staff table (Table 3.2): This table is named **Staff** and it stores information about the Staff in the pharmacy management system. The system verifies from the table to retrieve the staff's data. All information about the staff is stored in this table .The **Staff_ID** is the primary key and has a unique identity.

***Table 3.3 Drug***

| Field Name | Field Type | Field Length | Description |
|---|---|---|---|
| **Drug_ID(PK)** | Int | (50) | Drug's unique number which is the primary key |
| Category | Varchar | (50) | The type of category the drug belong to. |
| Drug_Name | Varchar | ( 50) | Drug Name |
| Size | Int | (50 ) | The size of the specific drug |
| Price | Int | ( 50) | The cost of the drug |
| Quantity | Int | ( 50) | The number of the specific drug in stock |
| Location | Varchar | (50 ) | The location where the drug is in stock |
| Manufacturer | Varchar | ( 50) | The brand that produced the drug |
| Production_Date | Int | (50 ) | The date the drug was produced |
| Expiry_Date | Int | (50 ) | The date the drug will expire |

*Table 3.3*

The Drug table (Table 3.3) : This table is named **Drug**, it depicts the information of the drugs in the pharmacy. The table shows information about the drugs in the pharmacy and is being queried from the database on the drug registration page to show all the drugs for user to select. **Drug_ID** is the primary key and has a unique identity.

***Table 3.5 Sales***

| Field Name | Field Type | Field Length | Description |
|---|---|---|---|
| **Sales_ID (PK)** | Int | (50) | Sales unique number which is the primary key |
| Category | Varchar | (50) | The category of drug sold |
| Name | Varchar | ( 50) | The name of drug sold |
| Price | Int | (50 ) | The cost of the drug |
| Quantity | Int | ( 50) | The quantity of drug sold |
| Total Price | Int | ( 50) | The total cost of the drug |
| Discount | Int | ( 50) | The discount of the drug |
| Sale Price | Int | ( 50) | The amount the drug was sold for. |
| Manufacturer | Varchar | ( 50) | The name of the drug manufacturer |
| Production_Date | Int | ( 50) | The date the drug was produced |
| Expiry_Date | Int | ( 50) | The date the drug will expire |
| Sales Date | Int | ( 50) | The date the drug was sold |

*Table 3.5*

The Sales table (Table 3.5): This table is named **Sales** and it stores information about the Sales in the pharmacy management system. The system verifies from the table to retrieve all the sales data. All information about the sales in the pharmacy is stored in this table .The **Sales_ID** is the primary key and has a unique identity.

***Table 3.6 Inventory***

| Field Name | Field Type | Field Length | Description |
|---|---|---|---|
| **ID No (PK)** | Int | (50) | The unique number which identifies the drugs in the inventory and it is the primary key |
| Category | Varchar | (50) | The category each drug belongs to. |
| Name | Varchar | ( 50) | The name of each drug |
| Size | Int | (50 ) | The size of the individual drugs |
| Price | Int | ( 20) | The price of each drug |
| Quantity | Int | (20) | The quantity of each drug in stock |
| Location | Varchar | (50) | The location where the drug is in stock |
| Manufacturer | Varchar | (50) | The brand that produced each drug |
| Production Date | Int | (50) | The date each drug was produced |
| Expiry Date | Int | (50) | The date each drug will expiry |

*Table 3.6*

The Inventory table (Table 3.6): This table is named **Inventory** and it stores all information concerning the drugs in the pharmacy. The system verifies from the table to retrieve the inventories data upon request. All information about the Inventory is stored in this table .The **ID_No** is the primary key and has a unique identity.

### 3.6 DATABASE TABLES RELATIONSHIP

In order to show the relationships among the entity sets that are stored in the database, we generally use the Entity-Relationship Diagram, often abbreviated as ER Diagram. Entity is an object, a component of data whereas an entity set is a collection of multiple similar entities. These entities have attributes that delineate its properties. An ER diagram elucidates the logical structure of databases by defining the entities, their attributes and the relationship between them.

**Interrelationship among the Entities (*fig 3.1*)**

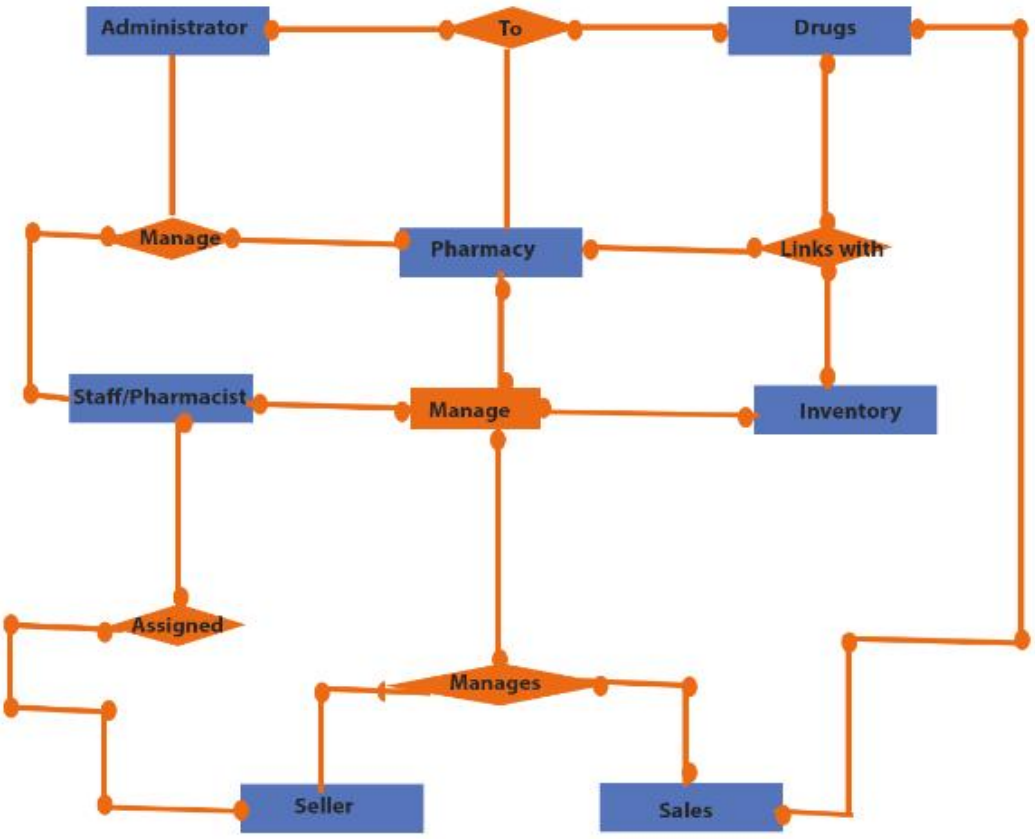



**Fig 3.1**

### 3.7 SYSTEM FLOW CHART

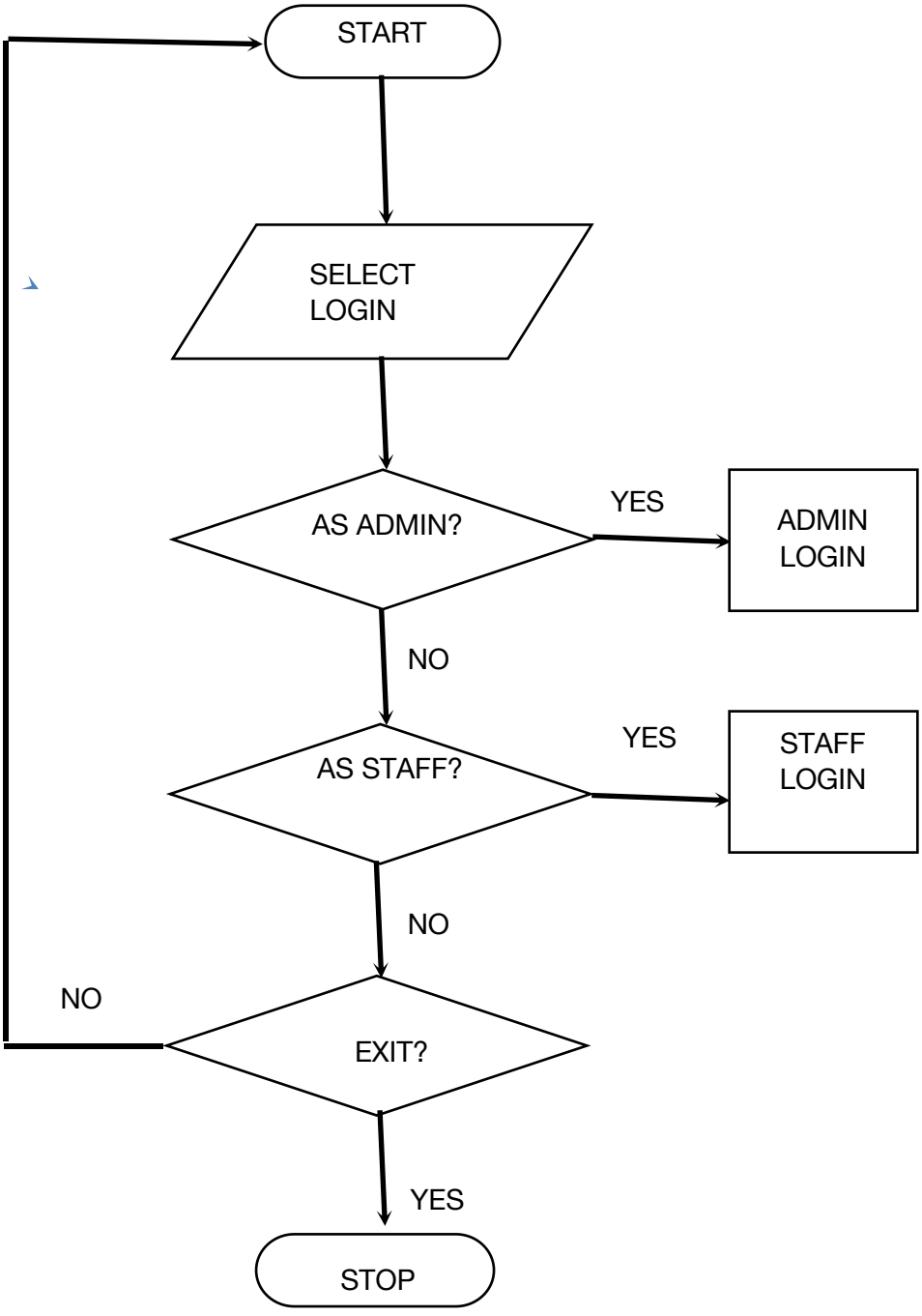



**Fig 3.2**

# CHAPTER 4

## 4.1 SYSTEM IMPLEMENTATION

## 4.2 ANALYSIS OF THE IMPLEMENTED SYSTEM

After the implementation of the pharmacy management system, a study and analysis of the system was made, where key features of the system, thus; creating an account, logging into the system, and accessing various modules of the system was made. A registered user of the system can get access to the dashboard to manage it accordingly. The stuff or administrator could view all the modules associated to the pharmacy. The administrator can fully access all features of the pharmacy management system. MySQL was used to create and connect relational tables to the database, HTML and CSS was used to develop the graphical user interface of the pharmacy management system whiles PHP was used to develop the backend of the system.

## 4.3 DESCRIPTION OF THE SYSTEM INTERFACES

The system has produced numerous interfaces and efforts were made to explain the functions of all the interfaces, including what they ought to achieve and what they have to offer to the end user. The system was carefully designed in order to make it user friendly. The layout and colors of the interfaces were chosen based on application of human computer interaction (HCI) principles.

### 4.3.1 ADD ADMIN INTERFACE

The add admin interface (figure 4.1), is the form within the system where the main administrator can use to add a new administrator to the pharmacy management system. This interface provides text fields that requires some personal information about the new administrator to enable him/her to log into and gain access into the system.

***Add admin interface (fig 4.1)***

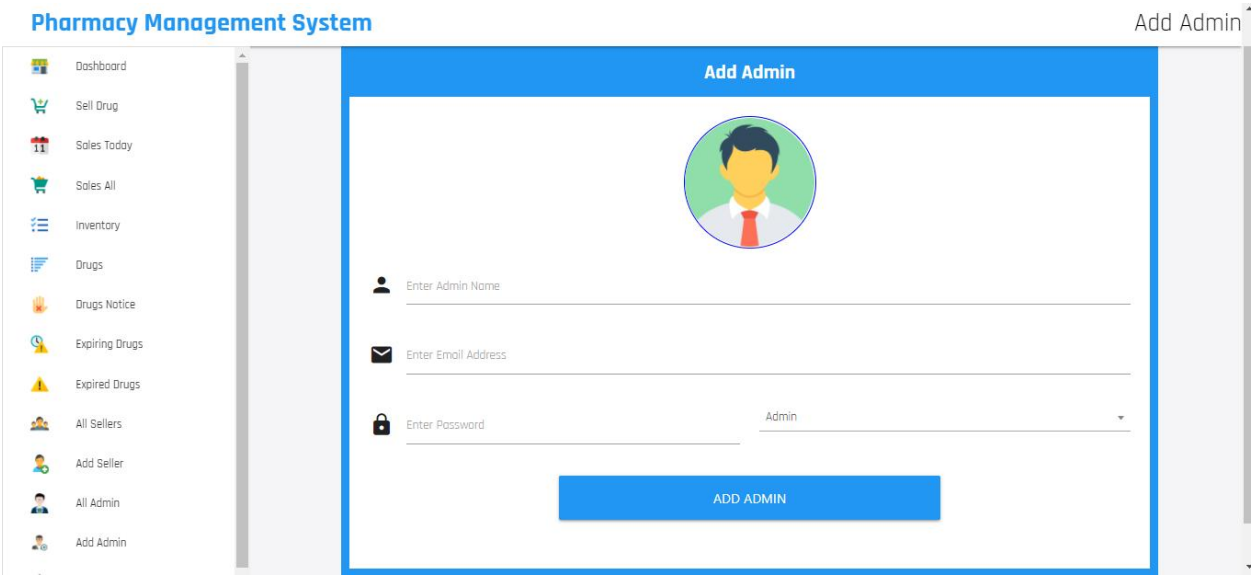



***Fig. 4.1***

### 4.3.2 ADD STAFF INTERFACE

The staff interface (figure 4.2), is the form within the system where the main administrator can use to add a staff to the pharmacy management system. This interface provides text fields that requires some personal information about the staff to enable him/her to log into and gain access into the system.

***Add Staff Interface ( fig 4.2)***

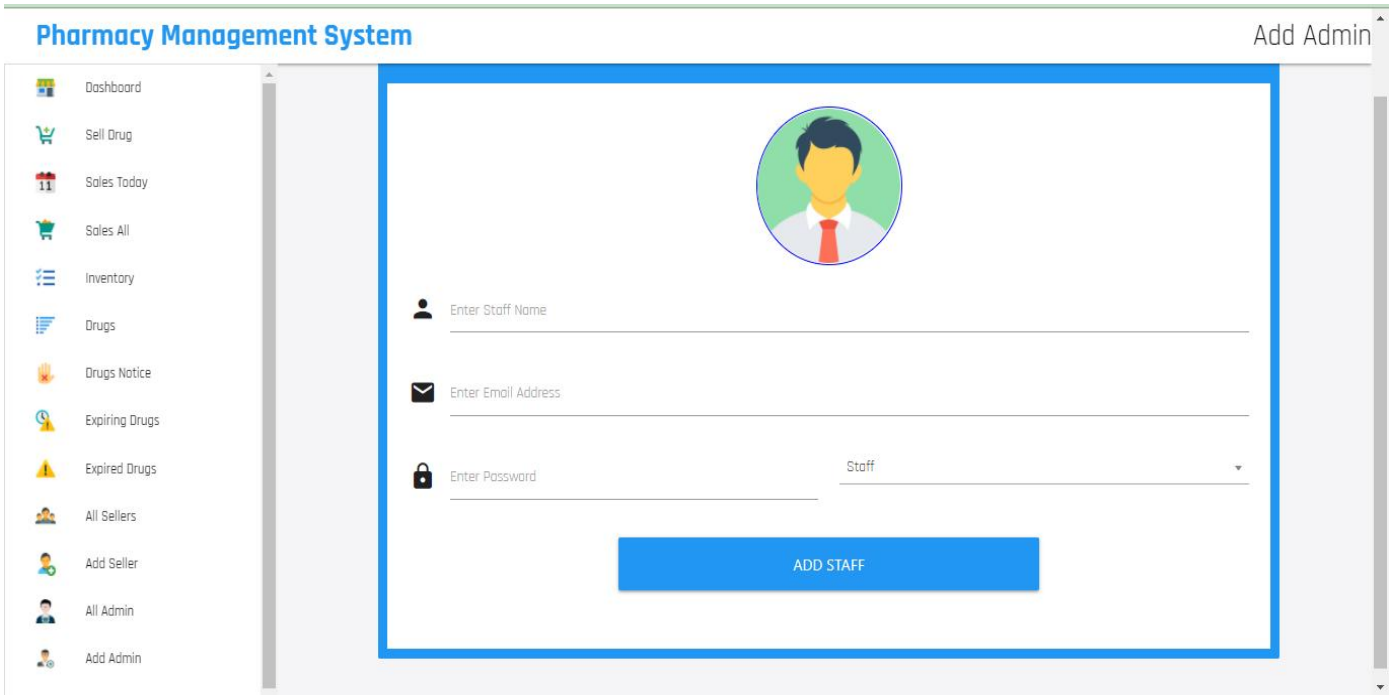



***Fig. 4.2***

### 4.3.3 THE LOGIN INTERFACE

The login interface (figure 4.3), is the first to appear at runtime of the pharmacy management system. It has an input box for accepting the user email and password for logging into the system. The user can then click on the login button to get access to the system once the credentials are verified.

***Login interface ( fig. 4.3)***

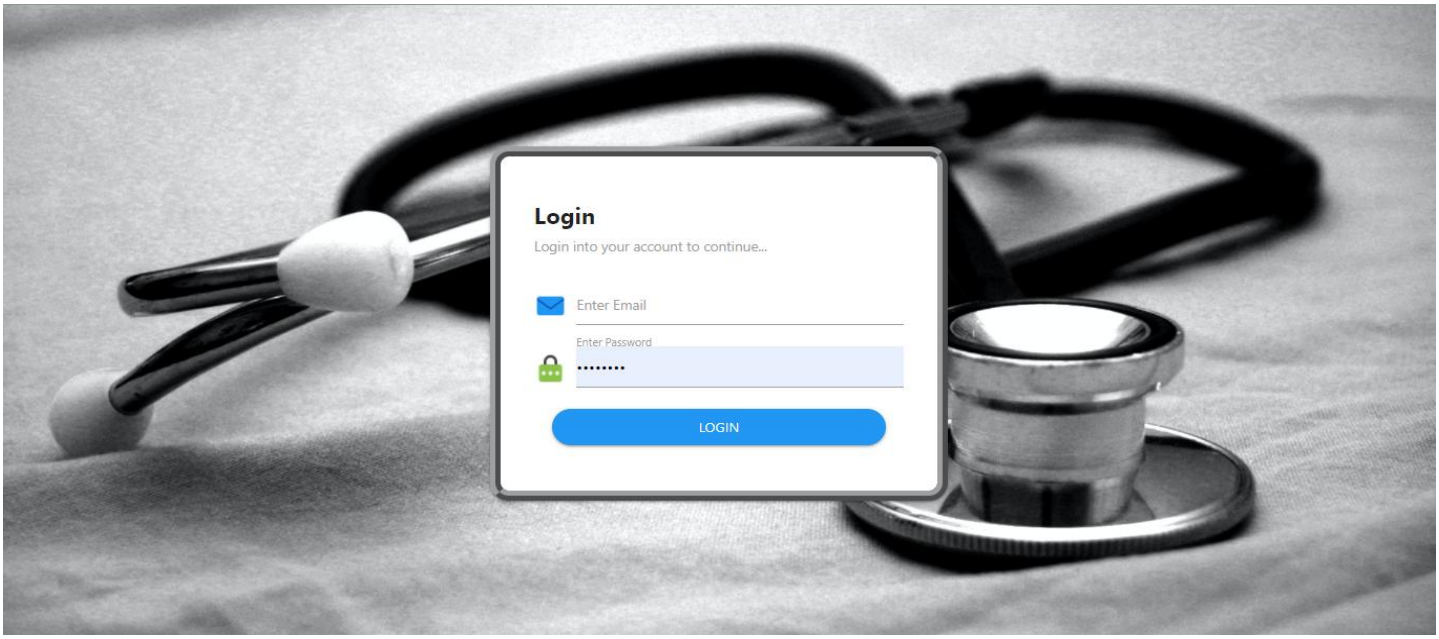



***Fig 4.3***

### 4.3.4 DASHBOARD INTERFACE

The dashboard interface (figure 4.4), is the main interface that shows after a user has successfully logged into the system. This interface provides a brief overview of the essential parts of the pharmacy. The pharmacist can easily observe the total drugs in stock, the expired drugs, total sales for the day, top selling drugs for the day and other important metrics about the pharmacy.

**Dashboard interface (fig. 4.4)**

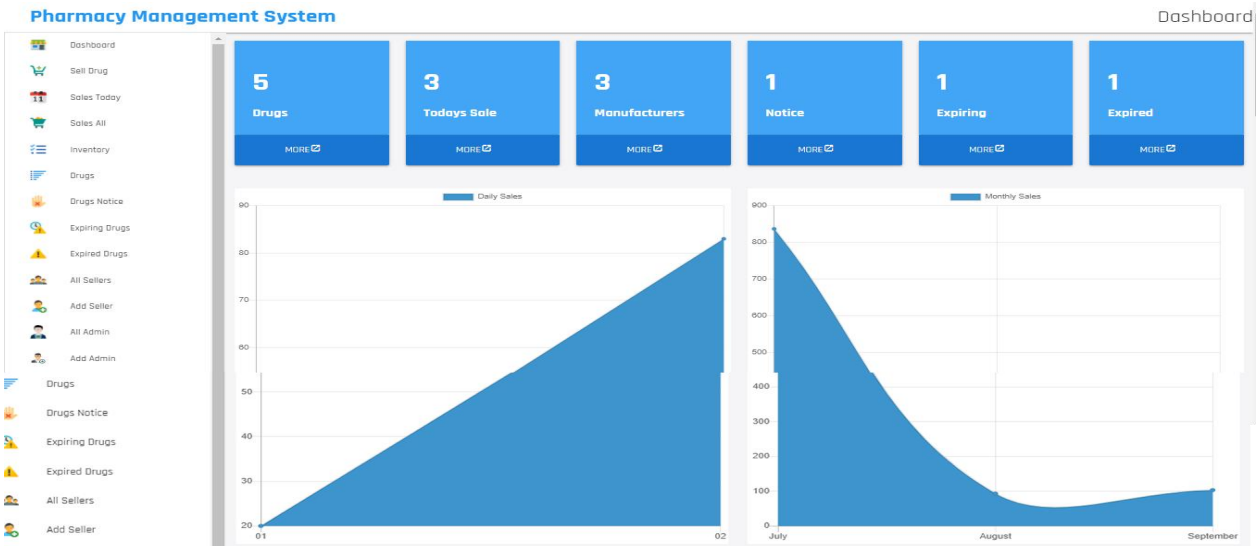



***Fig 4.4***

### 4.3.5 ADD DRUG INTERFACE

The add drug interface (figure 4.5), allows the pharmacist to add new drugs in the pharmacy management system. The pharmacist can add drugs by selecting the manufacturer of the drug, the type of category the drug belongs to, the location of the drugs, the name of the drug, the drug price, its quantity and details about the production and expiry dates of the drug.

***Add Drug Interface ( fig 4.5)***

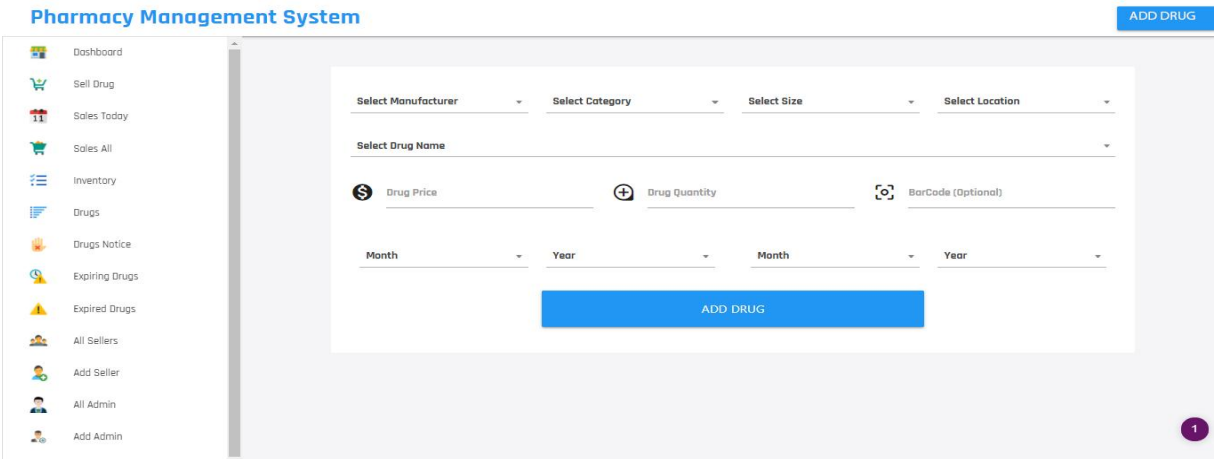



***Fig. 4.5***

### 4.3.6 SELL DRUG INTERFACE

The sell drug interface (figure 4.6), enables the pharmacist to sell a drug in the pharmacy management system. You can sell a particular drug by entering the name of the specific drug in the input box provided and then selecting the drug you want to sell. You can then specify the quantity of drugs you are selling and then it will automatically calculate the amount of money the customer is supposed to pay. At any point in time a drug is sold, it reduces the number of the specific drug quantity in stock.

***Sell Drug Interface ( fig 4.6)***

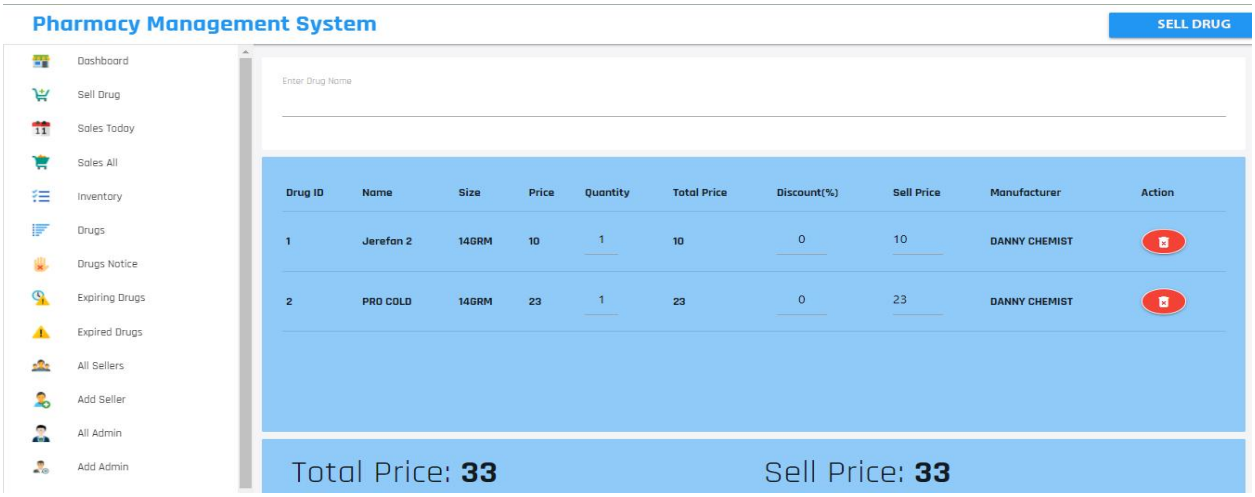



***Fig. 4.6***

### 4.3.7 THE SALES INTERFACE

This section contains an interface for the sales records (figure 4.7).It contains information about the details of the type of drug that was sold, the price it was sold for, the production and expiry date of the drugs, the time and date the specific drug was sold in the pharmacy management system.

***Sales interface ( fig 4.7)***

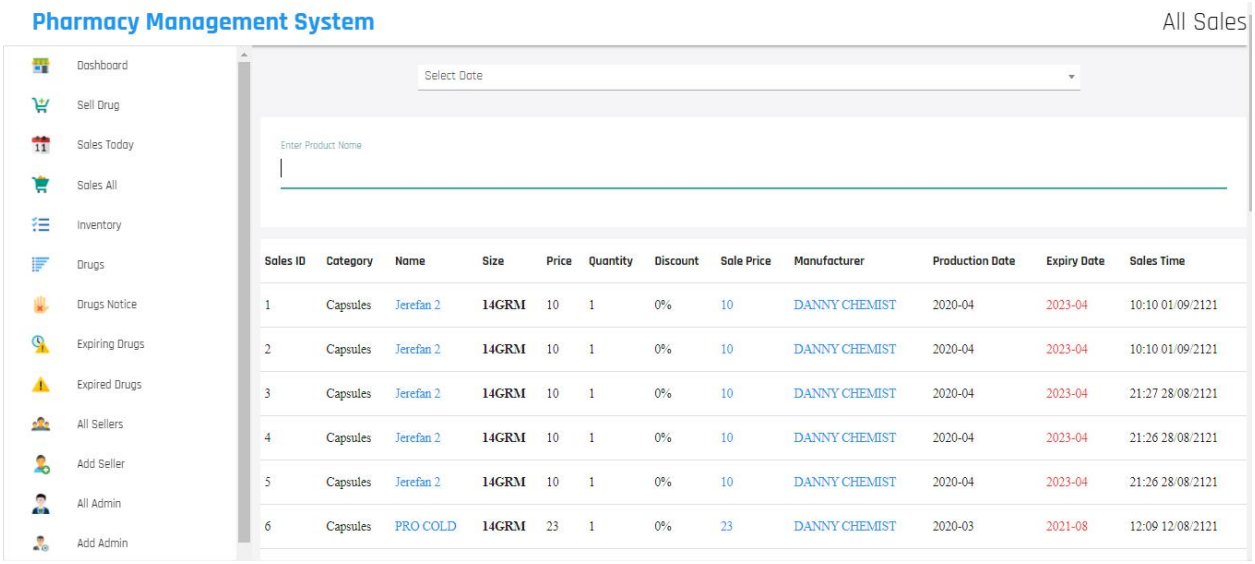



***Fig 4.7***

### 4.3.8 EXPIRING AND EXPIRED DRUGS INTERFACE

The expiring drugs interface (figure 4.8).The interface provides the pharmacist information about drugs that are about to expire for him/her to be aware. The pharmacist will have information about the specific drug name, quantity, date of drug expiration and other essential data about the drugs that are about to expire.

The **expired drugs interface.** This section of the pharmacy management system provides information about the drugs in the pharmacy that have expired. Any drug in the inventory that have expired will automatically move to this interface of the system which will make the drug unavailable to be sold.

***Expiring and Expired Drugs Interface (fig 4.8)***

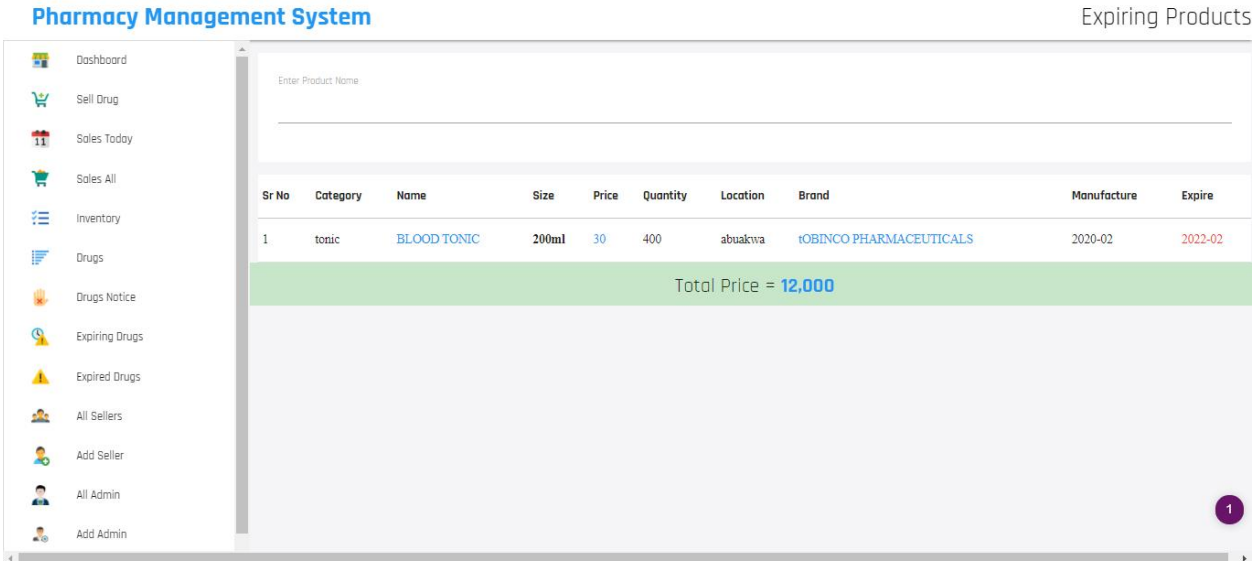



***Fig 4.8***

### 4.3.9 DRUG NOTICE AND INVENTORY INTERFACE

The drugs notice interface (figure 4.9).At this interface, all the drugs that are almost out of stock are shown to prompt the pharmacist to avoid running out of stock. At any point in time, the pharmacist can have access to this information in the pharmacy management system by viewing the drug notice section.

The **inventory interface** displays information about all the drugs in the pharmacy. The pharmacist can have all information relating to the inventory such as the drugs name, the quantity available per each drug, the production date of the drugs and its respective expiry dates.

***Inventory and Drug notice interface (fig 4.9)***

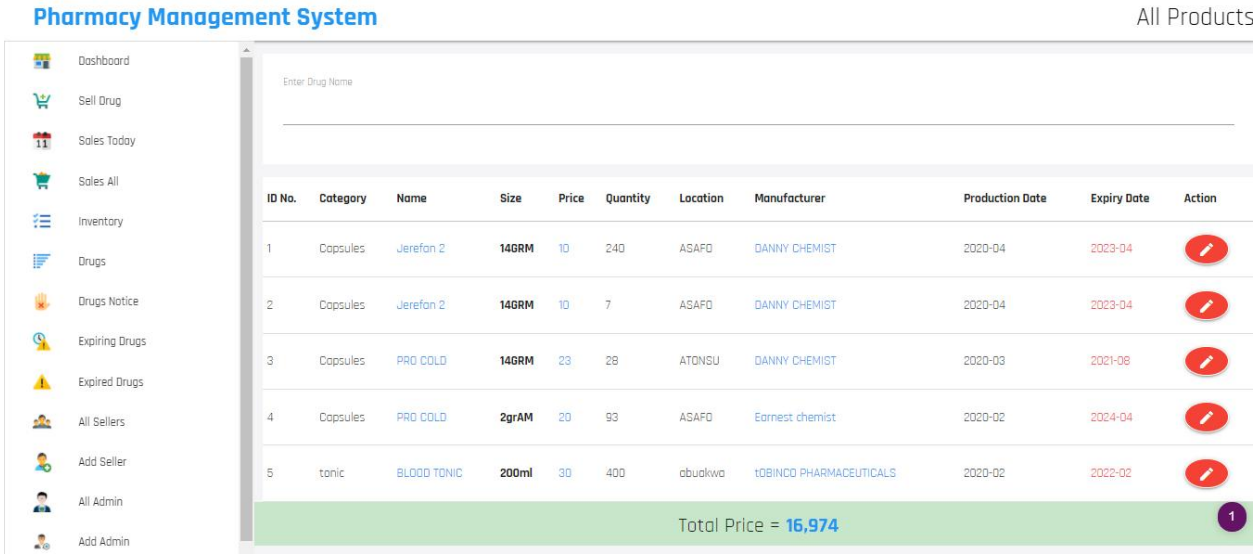



***Fig. 4.9***

### 4.4 USER GUIDE (Manual)

Below are instructions on how to use the pharmacy management system (PMS).

1. Extract the file pharmacy management system and copy **pharmacy** folder
2.Paste inside root directory of the server(for xampp, xampp/htdocs, for wamp wamp/www folder)
3. Open PHPMyAdmin in the browser and access http://localhost/phpmyadmin
4. Create a database with name **pharmacy**
5. Import pharmacy.sql file(given inside the zip package in SQL file folder)
6.Run the script http://localhost/pharmacy to launch the pharmacy management system.
7. Now the login interface of the pharmacy management system will launch once the database connection is established.
8. The user can now login into the pharmacy management system.
9. After a successful login, the user can get access to the dashboard of the pharmacy management system and then perform all the administrative functions in the system.

### 4.5 USER SYSTEM REQUIREMENTS.

In other to run the pharmacy management system, there are some system requirements that must be met for a successful operation. The hardware requirements are that, a CPU of 1GHZ or higher with a RAM of 2GB or higher is required. Also, a hard disk with a minimum space of 50 Gigabyte or higher is required. With the operating system, Windows XP or higher is required to successfully run the pharmacy management system.

# CHAPTER 5

# CONCLUSION AND FUTURE WORK

## 5.1 SUMMARY AND FINDINGS

The pharmacy management system would provide effective, efficient, reliable and secure way of managing the pharmacy. This Pharmacy Management System (PMS), was developed to enable the pharmacist to retrieve, protect, store and manage data related to the pharmacy. PMS, was developed purposely to make the task of running a pharmacy easier and faster. PMS was developed using HTML and CSS for the interface and PHP for the backend with the help of MYSQL Database for the development of the database system.

## 5.2 STRENGTH OF THE SYSTEM

For security being one of the topmost priorities in developing this pharmacy management system, a secure and reliable mechanism was implemented during the development stage. The system ensures that users are authenticated before they are allowed to access the administrative part. Anyone who tries to access the system with invalid information will be denied access into the pharmacy management system to avoid any data manipulation. Also, the system was developed in such a way to have optimum user friendliness. The interfaces are easy to understand without much user-technical knowledge thereby making the system easy to use without any difficulty or challenge. The colours and font size that are used in the system were carefully selected according to the knowledge drawn from human computer interactions (HCI).

## 5.3 LIMITATIONS OF THE SYSTEM

Considering the advantages this pharmacy management system ought to provide to the end users, the system cannot send SMS notifications to provide timely alerts to the pharmacist. This application is limited to internet connected devices therefore without internet connection the user cannot make use of the system.

## 5.4 WHAT I LEARNT IN DEVELOPING THE SYSTEM

Developing Pharmacy Management System (PMS), has enlighten me not only on the pharmaceutical industry but also a lot on developing a running software. I gained the knowledge that Drugs are arranged according to the classification adopted (oral drugs, injectable drugs, infusions, drugs for external use and antiseptics). Also, No products or packaging, even large-sized, should be stored on the floor, but on pallets which permit air circulation and protect against humidity. An inventory of current stock quantities and expiry dates should be done before each new order is received.

In addition to the above, I was exposed to the environment of PHP programming language and how to use the bootstrap framework to develop responsive interfaces. Developing the system has also enlightened me on the software methodology cycles that are implemented in the development of a system. I learnt that the prototype model serves to clarify requirements, which are not clear, hence reducing ambiguity and improving communication between the developers and users.

## 5.5 CONCLUSION

The Pharmacy Management System is a system that stores data and enables functionality that organizes and maintains medication use process within pharmacies. Since this has been designed exclusively as a project, the challenges that are faced by most pharmacies like keeping track of expired drugs in the pharmacy are considered in this project. But enhancement to the project can easily be made without changing the current design and programming structure. Pharmacy Management System is really essential and beneficial in managing a pharmacy because it will help in providing accurate, secured, effective, efficient data and other related information to the pharmacist. The system will also provide easy access to the saved data to the pharmacist when required or necessary. The application would also help to get rid of all paper work that can get lost or misplaced in the course of time. Due to the complexity of the system and time constraints allocated for development there were some functionality that could not be integrated into the system. Example is the ability to determine the specific staff in the pharmacy that made a sale. The main factor that motivated me to embark on this project was the mistakes caused by pharmacist due to their workload when using the manual way. Again, managing a large pharmacy with records on papers will be

difficult to keep track of inventories with regards to the drugs in the store, expiry date and quantity of drugs.

## 5.6 FUTURE WORK

The initial tasks would be to implement the aspects of functionality that have already been mentioned that were not incorporated due to time constraints. Some advanced features such as barcode readers should be integrated in the system for easy stock taking. Also, SMS notification feature should be implemented in the system to provide the pharmacist with timely notifications and alerts from the system.

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