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# A Mobile Wallet System for Pharmaceutical Billing System

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## ABSTRACT

So many patients may have survived but for the extensively long procedure in access drugs. This has hence prompted the need for a cheap and easier means for patients and pharmacies to handle drug and billing system. This paper describes a wallet system for that can be used by patients to store mobile money within a hospital pharmacy and have access to drugs quickly there by reducing mortality rate through drug dispensing procedure.

**Keywords:** *Pharmacy Payment System, Drugs, Message Alert System, Internet, Billing System, Database*

## 1. INTRODUCTION

As technology advances, information in different organizations can no more be maintained manually. There is a growing need for the information to become computerized so that it can be suitably stored. This is where databases come into the picture. Databases are convenient storage systems which can store large amounts of data and together with application programs such as interfaces they can aid in faster retrieval of data. An initiative was taken to design a complete database system for pharmaceutical store of Research and rehabilitation in drugs so that its information can be stored, maintained, updated and retrieved conveniently and efficiently.

The existing information of the existing system is partly computerized via databases only in patients' admissions, doctors' appointments and medical tests and reports sections. A partly slow and tedious manual system still exists for example, in record of drugs service, assigning pharmacy to patient, the billing process and record of drugs sold, prescriptions etc. However, this paper outlines one complete database design for the entire payment system in which data maintenance and retrieval are in perfect harmony and speedy. Sample SQL-based queries executed on the designed system are also demonstrated.

The use of system in medicine dates back to the 1950s with studies that attempted to expand the mental capacity of physicians **[1]** or dealt with research on electrophysiology. 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.

The use of microcomputers, beginning in the 1970s, introduced the concept of distributed processing, increasing the number of systems in use in large hospitals **[1]**. 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.

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 undertaken in search of a better organization of the healthcare system **[2].** 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. This allowed for the emergence of hospital systems, covering medical, administrative, and hospitality areas, although hospitality may be considered as integrated into the administrative area **[3].** These three areas are interlinked by horizontal data and information flows, providing support to the developed activities. Also sample records are used in medical, administrative, and hospitality areas, generating inter-related demands and actions. In the proposed scheme, the information on the system records, which contain the procedures, prescriptions, professionals involved, and hospitalizations (when applicable), is fundamental.

## 2. SYSTEM RECORDS

A patient's medical record contains fundamental information for incorporation into a pharmacy 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. System 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 pharmacy 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 an increase in the quality of information, 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.

**[4]** 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 **[5Goldzweig, 2008**], who concluded that the impact of the implementation depends on the context of the implementation and applications, as well as on the clinical problems and the patient population. Another possibility presented by pharmacy records is the electronic prescription. **[6]** 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, reducing the dosages prescribed when associating the support systems with clinical decisions **[7]** and permitting a more rapid renewal of prescriptions and dosage changes.

## 3. PHARMACEUTICALPAYMENT MODEL

Pharmaceutical management is the key functions of pharmaceutical management, and the various processes that make up a pharmaceutical management system. It provides guidelines on preparing a profile of the pharmaceutical management system in the country of interest; it also provides details on pharmaceutical management indicators. Management of pharmaceuticals is directly related to a country's ability to address public health concerns. Even so, many health systems and programs run into difficulty achieving their goals because they have not addressed how the medicines essential to saving lives and improving health will be managed, supplied, and used.

Pharmaceuticals can be expensive to purchase and distribute, but shortages of essential medicines, improper use of medicines, and spending on unnecessary or low-quality medicines also have a high cost wasted resources and preventable illness and death. Medicines are so important and resources so limited, ways have been developed to improve the supply and use of medicines while minimizing costs. Pharmaceutical management represents the whole set of activities aimed at ensuring the timely availability and appropriate use of safe, effective quality medicines and related products and services in any health care setting.

## 4. EXISTING SYSTEM

Base on the research done, some pharmaceutical systems have already been in existence; this system has their various attribute, below are examples on existing systems of pharmacy information payment system.

## 5. MCKESSON PHARMACY SYSTEM (MPS)

Pharmacy system is not really a payment system but is a business service to achieved better services. This system is design to keep bond with patients, and to continue serving them as intended. McKesson payment system (MPS) provides world class services and support to pharmacy user, once the new pharmaserva pharmacy management system is installed, a dedicated support specialize will be assign for the first few month, to ensure that the specialist will have the knowledge and confidence needed to operate the system Pharmaserva provides reliability, robust functionally, and world class support.

The service is based on business marketing service which means, there is a marketing and advertising process include in this system. It's a health service and information technology company dedicated to making the business of healthcare run better, also it help improve financial, operation and clinical performance with solution that include pharmaceutical and medical surgical-supply management.. For customer the important thing is the quality of the medicine is more to be focus then the profit of the selling medicine

McKesson pharmacy system, an automation in customer support center achieved certificate under the prestigious service capability and performance (SCP) standards, it was achieved after an extensive audit of its customer support operations base on stringent set of performance factors that

represent best practice in the industries. The service was design to improve the quality and effectiveness of technology service operations, SCP represent the benchmark of service excellence and are used by leading technology all over the world. Currently more than two hundred service organization around are using the SCP standard to improve their business operator e.g. Assurant solutions, advent software and many others.

This system pros a good number of functionality which are listed below;

i. The acquisition and partnerships with different healthcare service provides, being considered by the company is a good opportunity that they must avail.
ii. The environmental concerns do not directly affect the growth of company so they can take many new steps and follow new strategies without any high risks factors being involved.

The system has the following weakness:

i. Healthcare is a high risk industry as it is related to critical patient condition and involved life or death situation.
ii. Lack of proper healthcare information grouping, process and services that they provide for clients. The increasing integration of technology in the form of use of computer and internet and information system is critical to success of healthcare service.
iii. Since there is flowing demand for effective products and services which McKesson is not strong enough to deliver, their aim at leading the pharmaceutical business is at risk.
iv. Being a company in the healthcare and medicine business, the company faces several legal tangles and restriction related to patients and having to be very careful in designing its strategies.

The need of more users is needed in the system so that when demand is requested, the user will be able to meet the needs of customers. McKesson pharmacy system should make sure that the environment is conducive to meet demand of customers.
The system should be design to improved dosage accuracy and patient safety why saving patient time.

## 6. PHARMACY SYSTEM VERSION 2.0

Pharmacy System v2.0 comes standard with a very long list of included features, however in order to help their clients make the business more successful the system offer many additional services like website search engines submission and promotion, and marketing services, shows the website portal of the existing system that provide the ecommerce website and system. pharmacy system v2.0 has services, website search engines submission and promotion, and marketing service. the functionality of this system is as follows;

i. payment functionality**:** it is the pharmacy system v2.0 dispose of how payment is done. this system makes use of cash and banking.
ii. Product management**:** this module performs to bulk product categories inset multiple ways to manage product. it also define product and marketing categories, assign one product to more than one category, set a marketing, prescription or handling fee in percentage for every product and many other features extremely suitable in the case of online pharmacies.
iii. Orders and accountancy**:** this module is the integrated back office you could access security information for the order and see statistics and generate accountancy information in real time. it also provides functionality to monitor, accept or reject the user payments and to send email notification.
iv. Back office user management**:** its process is to define different user groups v2.0 and user for the back office (for example pharmacies, payment approval etc.) and assign them different permission to the back office. it also provides full statistic and history and history information for the users.
**v.** affiliates funtionality: it allows affiliates partners to register, generate links to product items, put them on site and monitor their earning report and statistic**.**

This system also has is weakness which is listed below**:**

i. The payment system does not issue out payment receipt.
ii. Security authentication is not strong; one can easily access the system.
iii. Adding of drugs is not store in the system.
iv. Email notification is not set, for easy communication between the pharmacy and the administrator.
vi. From the back end the administrator could monitor the affiliate's activities and control the payment to the affiliates.

## 7. GE CENTRICITY (2014)

Health Care Systems, Inc. (HCS) began developing top notch pharmacy information system software in 1984. . With so many vendors touting dozens of products, healthcare providers face a daunting task knowing which pharmacy system is the best fit for their organization. Since then, focus has been on continuing to provide pharmacists with the tools they need to improve patient safety. All HCS pharmacy solutions were created with input from pharmacists in real clinical settings, with the goal to simplify the complex clinical and managerial responsibilities of pharmacists.

GE Centricity Pharmacy is an electronic medication order management and decision-making system. The system is used by pharmacists and pharmacy technicians in seven pharmacy satellites (Weinberg, Carnegie, Osler, Pediatrics, Investigational Drug Service, Wilmer, and the central pharmacy) to fill medication orders that come from multiple systems and clinical areas around the clock. GE Centricity Pharmacy is used to help pharmacists to determine whether a medication may by contraindicated for a particular patient based on other medications that are on their profile, allergies, age, and/or weight.

This determination is particularly important to avoid adverse reactions and increase patient safety. On average, this system

is responsible for tracking over 430,000 dispensed medication doses per month. This system is also used to manage the distribution of medication. Whether the medication has to be prepared specifically by a pharmacist, or taken directly from one of the secure narcotic cabinets on a nursing unit or by nursing staff, GE Centricity Pharmacy manages that transaction.

In addition, the system is used for preparing drug utilization, patient profiles, and operational reports as well as for sending medication billing information to the Keane system (Johns, 2010). GE centricity is a standalone platform installed on a single machine, it check for contra indication in terms of decision making but should be Improvement on the system Web Based system application that can run on multiple platforms

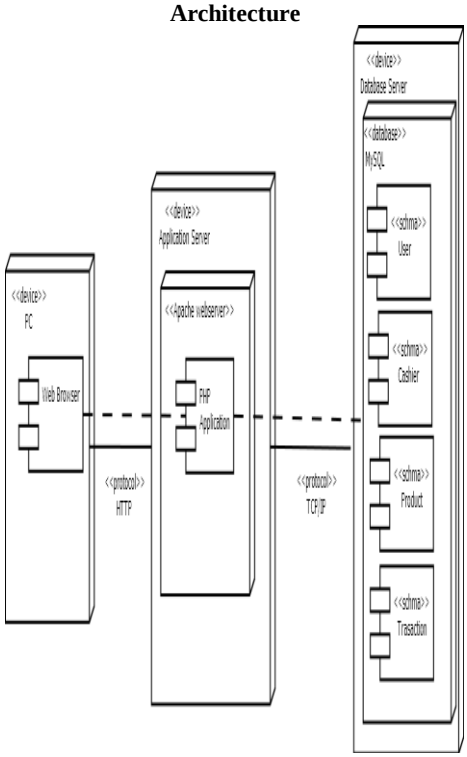
## 8. OUR SYSTEM

The drawback of the existing system is that it is very difficult to retrieve data from case files. It is difficult to handle the whole system manually and it is less accurate and to keep the data in case files for future reference. Moreover it is very difficult to retrieve data. Redundancy of data may occur and this may lead to the inconsistency. The proposed system is very easy to operate. Speed and accuracy are the main advantages of proposed system. There is no redundancy of data. The data are stored in the computer's secondary memories like hard disk, etc. it can be easily receive and used at any time. The proposed system will easily handle all the data and the work done by the existing systems. The proposed systems eliminate the drawbacks of the existing system to a great extent and it provides tight security to data. Pharmaceutical payment system, actually has made it very easy for the user in the pharmacy store attendance in prescribing and dispersing of drugs, various develop existing system has been into existence and each of those system has their own modules functionality. With the research carried out during this short period, some of the existing system mention above cannot certify the need of the pharmacy. Below is a system proposed for this project that will enhance the existing systems?

This project is aimed to automate the pharmacy payment system. This project is developed mainly to administrate pharmacy appointment with the patients. The purpose of the project entitled as pharmacy management system is to computerize the Front Office Management of pharmacy to develop software which is user friendly, simple, fast, and cost effective. It deals with the collection of patient's information, diagnosis details, etc. Traditionally, it was done manually. The main function of the system is to register and store patient details prescribe by doctor and retrieve these details as and when required, and also to manipulate these details meaningfully. function of the propose solutions are as follows:

i. manually pescription generations: it is to insert prescription of drugs prescribe by the doctor in every order at any time in pdf file format (the prescription may include information of the signature of the doctor, prescription of drugs).
ii. Statistic**:** it is a statistic that can display when the drugs item is inputted by the user at any time for the web page for others and turn over, the users and many others.
iii. security: pharmacy system has not only a secure web base system but also dispose some additional security tools and features like the algorithm for the credit card number validation. it also protects the confidential data and guarantees the security running on the system.
iv. message alert notification: this system allows one to set message alert after the total amount of drugs bought has been debited from his/her account.

**The architecture of the Pharmacy Payment System is illustrated in Figure 3.1: Pharmaceutical Payment System Architecture**



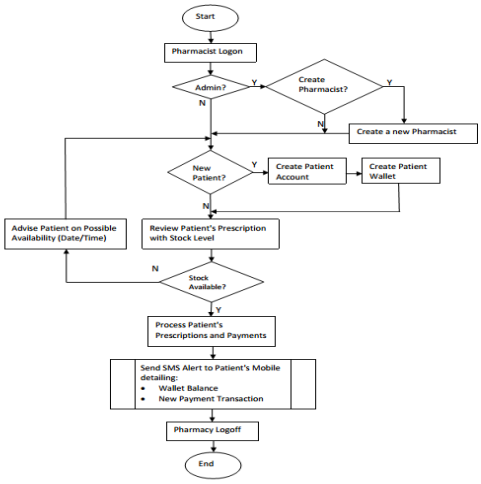




**Diagram 3.2:The flowchart diagram**

## THE FLOWCHART ALGORITHM

The flowchart algorithm shows the diagrammatical representation process of how the user login into the system for authentication purpose in the system.

## SYSTEM OPERATION

The system operation is process after the system has been installed and train by the user (pharmacist). The user login with user password and ID, after that the system confirmed the password using the system database server. Unwanted texts are rejected for safety of the system, protecting it against attack from other user. The user successfully login to the system, the system perform the basic task, creating an account for the patient fund the patient wallet with cash and also the drugs store is stock with drugs and the process of drugs prescription with payment process is carried the lastly the total of drugs bought us deducted from his/her fund wallet, then a debit alert is sent via message alert.

## EXPERIMENTAL TESTING

This is the center that provides all links to other pages in the site. It consist of five modules, Dashboard, Patients Account, Stock and payment process. This page gives a brief introduction message about the web base of Pharmaceutical payment. This page is where the pharmacist is provided with options in different categories. The homepage is shown in the figure below:

## THE MANAGER PHARMACIST WEBPAGE

This page show the information of pharmacist stored in the database i.e. the password and user name is generated after the account has been created by the administrator. Update and deletion of user account is also done.


**Figure 4.1: The manager pharmacist webpage**

### 4.3.2 THE LOGIN WEBPAGE

This page is used to login either by the administrator or the pharmacist by their login identity and password, which has been set by the admin and access is granted if found in the database und denied if not.

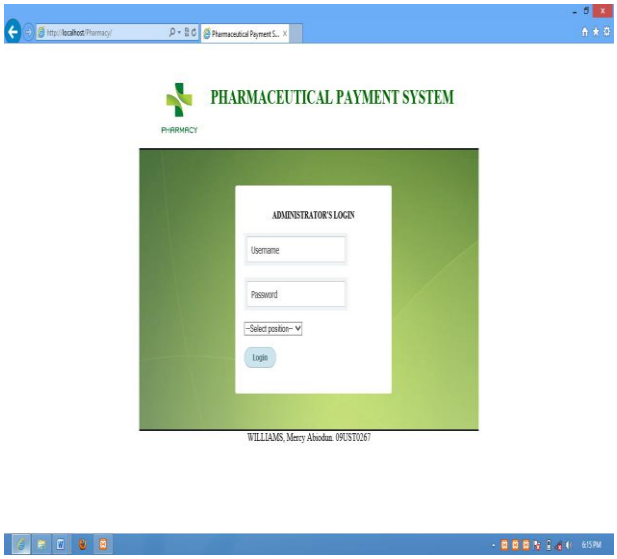



**Figure 4.2: The login webpage**

## PATIENT ACCOUNT WEBPAGE

This webpage is used to create the patient account, when the account is created; the information is stored in the database and its show in the below figure. Also an account can be updated it there is any changes to be done, and a patient account can be deleted if the patient has move to another location.

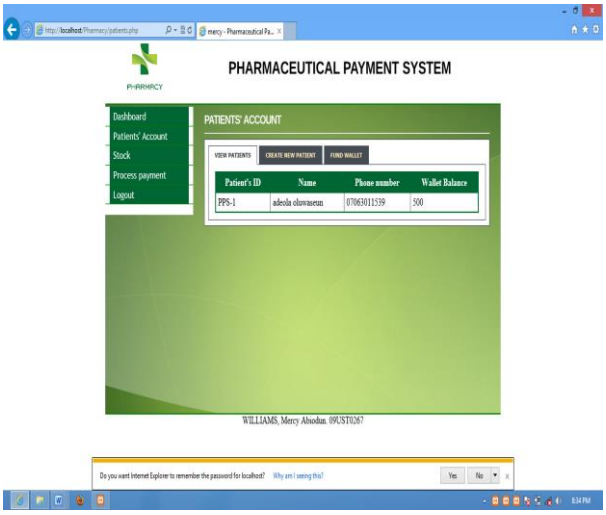



**Figure 4.3: The patient account webpage**

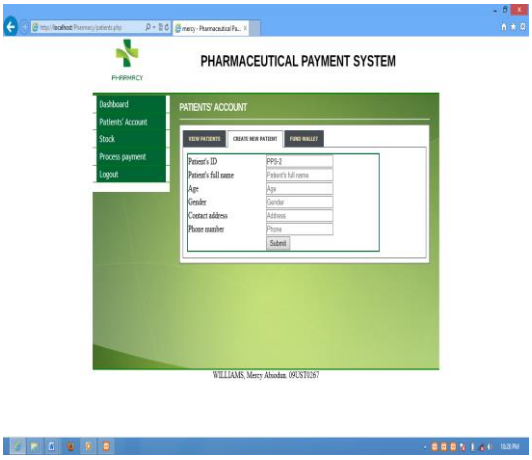



**Figure 4.4: Create new patient account webpage**

**PATIENT ACCOUNT FUND WALLET**

This page show how patient account fund wallet is generated, the patient ID is used and the account is either created or debited by the pharmacist.

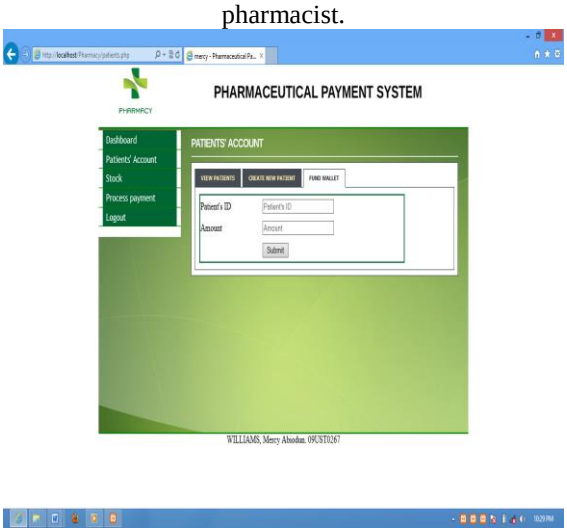



**Figure 4.5: Fund wallet webpage**

**MANAGE STOCK WEBPAGE**

This webpage shows how drugs are generated in the database, various type and categories of drugs are stored in the database, the drugs ID is generated automatically. Drugs can also be added if the drug is reducing in number and even be deleted if not in stock.


**Figure 4.6: The drugs stock webpage**

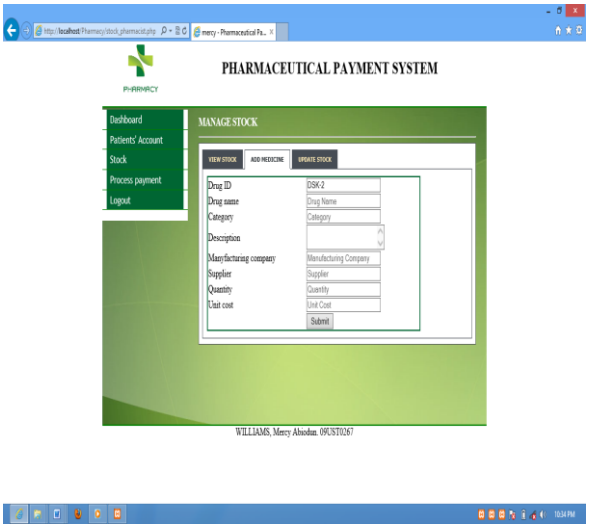



**Figure 4.7: The adding drugs webpage**

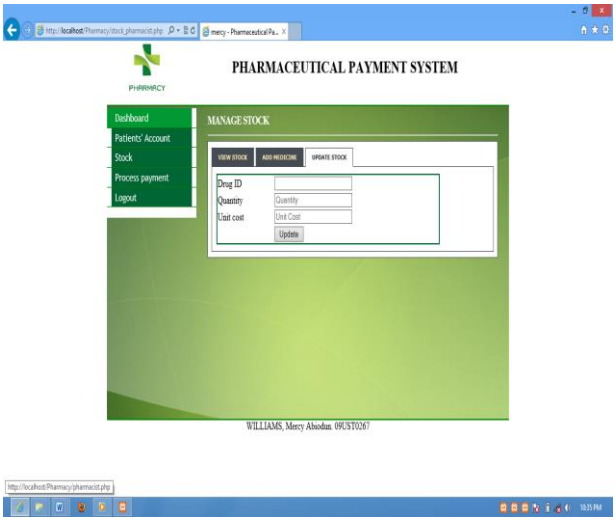



**Figure 4.8: The drugs update webpage**

**THE PRESCRIPTION WEBPAGE**

This page is use to prescribe drugs to patient and also payment is done on this page. The patient ID is used an the type of drugs he/she want to get is selected , the dosage to be taken and the duration of days to be used is prescribe, payment is done, the amount is debited form its fund wallet and a message alart is send via their mobile phone.

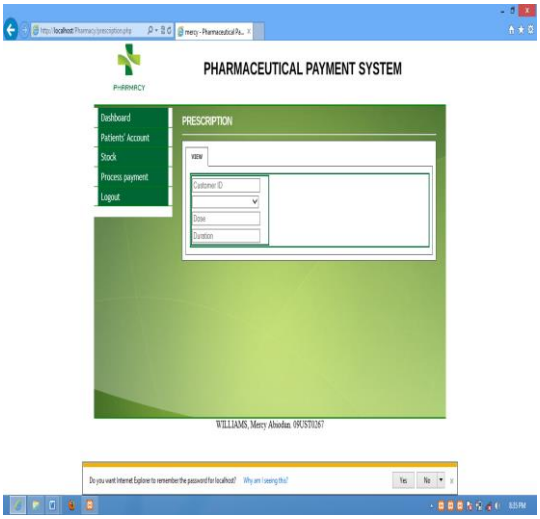



**Figure 4.9: The prescription webpage**

**EXPERIMENTAL RESULT**

The application has been design, implemented and tested with the researcher and other research all sited in a spacious environment. The research operation was carried out and series of question was been ask and it was found that the result of the application was 85% reliable.

## 9. CONCLUSION

The payment system is a cashless payment system that is design to meet the pharmacy demand of patient that buy drugs from pharmacy. This system is design to be friendly to user that tends operating it so as the system should be efficient and effective. Patient ID is created by the pharmacist and automatically an ID number is generated. The pharmaceutical managing system was thoroughly checked and tested with dummy data and thus is found to be very reliable, the system was design using MYSQL a database contains all the information needed to be maintained in a pharmaceutical payment system (PPS).

The system provide 85% performance with no more than a few mouse click, PPS is a great improvement over the existing system. The computerization of this system has speed up the process. In this current system, the front end will be easy to manage and the system will be friendly to all users. This research is aimed to automate the pharmaceutical payment system. This project is design mainly to administrate pharmacy prescription and payment with the patients. The purpose of the project entitled as Pharmaceutical Payment System is to computerize the Front pharmacists Management of hospital to develop software which is user friendly, simple, fast, less stressful, and cost – effective. It deals with the collection of patient's information etc. This system can be managed in any pharmaceutical management hospital.

**FUTURE WORK**

This system operate as a cashless pharmacy payment system in the pharmacy store, patient do not pay in regular base when drugs are sold to them because an account is created for the patient by the pharmacist also with their ID. This system has been and tested pertaining the uniqueness of the design and it meet to the satisfaction of the research, a lot of finding has been done which lead to the design of this research, due to the limitation the system is not an online payment system but an offline payment system because drugs are not bought online and is not display too, patient can only come around to buy drugs and the payment is deducted from their account wallet and their balance is send to them via SMS through mobile phone. This patient already have an ID with the pharmacy, it was generated by the pharmacist. The above are the limit to the reaches work of this project, any interested researcher that want to enhance on this project should work on an online payment system, in which the patient will have an ID with the pharmacist and will be able to login to the webpage to buy drugs and pay online. Also the drugs should be available online together with the picture.

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