AUTOMATION OF HEALTH RECORD MANAGEMENT USING SOME SELECTED HOSPITALS IN SOUTH WESTERN NIGERIA AS CASE STUDY

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***Abstract*-We live in an era when manual systems are becoming obsolete and being replaced by e-platforms for enhanced efficiency and better productivity. In this paper, an attempt was made to develop an automated record management system for a typical health institution. The record systems of five hospitals in south-west Nigeria were used as case studies for evolving a robust and comprehensive design for the electronic database. Java programming language (NetBeans IDE 6.7.1) was used to develop the application while MySQL was used as the query language. The application offers numerous advantages over the traditional manual record-keeping system among which are data consistency, data integrity, ease of data retrieval, record integration and data mining.**

Keywords: Automation, Health systems, Electronic Record, Object-Oriented Programming Language

I. INTRODUCTION

A medical record is a personal document that holds the information of a person's past illnesses, conditions, treatments, and the like as well as the related medical history of close relatives. Medical records are usually kept and maintained by health care providers, but there also people who opt to keep a personal medical record [1]. Medical records sound tedious, but they are important because they allow doctors to work quickly, efficiently, and accurately without having to ask the patients for the information they need again and again. A medical record can hold information on the treatments that are recommended for the patients, the care given to certain illnesses the patient has, and the various medication that the patient can and cannot take [7]. Medical records are traditionally written on forms and paper, and then compiled in a folder for filling. However, because of the rising number of people going to the hospitals, and the declining doctor-patient ratio, medical recording has become harder and harder to do [3]. This is why people have been turning to electronic medical records. Electronic medical records allow doctors and hospitals quick and easy access to medical records from anywhere, and also allow them to update these records quickly. Being able to access medical records fast enables doctor to give their diagnosis more quickly, or give more appropriate treatments [2]. Everybody has a unique body that reacts differently to different medicines, and has experienced different illnesses and treatment in the past. Everyone has different health requirements, and medical records help keep the doctors on track. Medical records allow doctors to plan a patient's treatment and recovery, and help them find out possible causes of illnesses in patients. When the doctor is armed with information, it is easier to diagnose and treat patients [6]. Medical records are usually written and kept in folders, though electronics medical records have become increasingly popular as of late because of their accessibility and addition features [1]. Medical records are strictly monitored by law, because the information is very personal and should only be seen by the patient and his / her doctor. Medical records have lots of useful information on patient, some of which the patient may not want anyone else to see [8]. The rest of the paper is organized as follows. The overview of health information management is explained in section II. The current trends in health record keeping are explained in section III. Section IV of this paper presents the benefits of electronic medical records. The processes involved in the automation of medical records are explained in section V. Section VI briefly discusses the highlight of how the work was done. Result and discussion are presented in section VII. Concluding remarks are given in section VIII.

II. OVERVIEW OF HEALTH INFORMATION MANAGEMENT

As a way of meeting the mission of providing high quality health care to the community, the Health Information Management (HIM) department maintains health records so they are available when health care provider needs them. Every encounter a patient has with the hospital, whether an overnight stay, day surgery, an emergency room visit or a simple x-ray, results in a record that must be processed, coded for reimbursement and maintained. In addition to managing records, the HIM department provides information to State and Federal agencies as required [2].

A. Health Record Management

Medical records refer to the documents that contain information on a patient's complete medical background. They are kept with the doctor or health care provider so that they can be accessed quickly in case of emergencies [4]. Medical records hold information on the person's personal data, past illnesses and diseases, surgeries and treatments, prescriptions and medications, as well as the person's family history. Doctors need to know the details in these medical records to be able to make accurate and quick diagnoses for their patients, but that does not mean that these patients are willing to let other people see their medical records [6]. Medical records allow doctors plan a patient's treatment and recovery, and help them find out possible causes of illnesses in a patient. When the doctor is armed with information, it is easier to diagnose and treat patients [2].

B. Applications of Health Records

Generally, only the patient may obtain copies of health records, or in the case of minors, a parent or legal guardian. Information related to drug/alcohol abuse, psychiatric problems, HIV or AIDS receives special consideration under additional State and Federal regulations in the United State of America. The hospital requires a Release of Information form to be signed by the patient prior to release of any copies. There are some exceptions, below are some examples [3].

- Coroner: this is act of getting information from hospitals in a country to release the statistics of people living with a particular ailment like number of people that has AIDS in a year or it could be death rate in that country for that year. Any records, which pertain to a Coroner's Investigation, may be released without consent.
- Patient Primary Insurance: All require proper written request, however, these do not require signed release by patient. Our "Conditions of Admission", in the U.S, now states health record information can be released to primary insurance companies for requisition of payment.
- Government Agencies: Requests for records as a Medicare/Medicaid Participating Hospital do not require patient consent [1].

C. Medical Record Folders

Medical records are documents that doctors and other health care providers compile regarding a patient's medical history and background. They often include information like personal background, physical statistics, past illnesses, hospitalizations, treatments, surgeries, medication, prescriptions, as well as allergies, medical reactions, and laboratory test results. Medical records are traditionally written on forms and paper, and compiled in individual folders for every person. However, this has become increasingly difficult to do because of the large number of people coming in every year. This is why health care providers have turned to electronic medical records for archiving. Written medical records are compiled in large folders with two punched holes in the middle and large fasteners. The folders are often thick because there are some people that frequently visit the hospital, or have many conditions. The folders are usually fastened in such a way that the fastener can easily pop off, allowing for new pages to be added without having to move the other pages from their place. This is very convenient for those who are in charge of maintaining the folders. They are usually filed in large cabinets and drawers according to date, department, and patient name, though the arrangements can vary from hospital to hospital. The doctors and the patients have to wait while the staff members retrieve the medical record folders before the diagnosis or check-up can begin [8].

D. Setback of Medical Record Folder

Electronic Medical record is becoming universal method in different hospitals doing away with folder and files. However, this has become increasingly difficult to do because of the large number of people coming in every year. This is why health care providers have turned to electronic medical records for archiving. However, there are many people who still prefer written medical records to the electronic software and programs that many hospitals use today. This is because they believe that it is important to have tangible proof of the patient and doctor sessions, especially when they have to protect themselves from lawsuits. Medical records can prove that what the doctor has been doing was right all along [8].

III. CURRENT TRENDS IN HEALTH RECORD KEEPING

A. Electronic Health Records

Electronic Medical Records (eMR), electronic medical records have become increasingly popular as of late because of their accessibility and additional features. Electronic Health Records (eHR) of a patient's clinical history are used to support clinical actions by health professionals. However, there are many people who still prefer written medical records over the electronic software and programs that many hospitals use today. This is because they believe that it is important to have tangible proof of the patient and doctor sessions, especially

when they have to protect themselves from lawsuits. Medical records can prove that what the doctor has been doing was right all along. They include information such as test results, medication and general clinical history. They can be made rapidly available through ICT to authorized personnel providing patient care [1].

IV. BEMNEFITS OF ELECTRONIC MEDICAL RECORDS

The success of an Electronic Health Record (eHR) depends on the ability of an organization to effectively manage the transition of their clinical documentation from paper-based systems to electronic systems. Due to the high level of the shortcomings of manual health records management, such as misfiling of patients health records, enormous amounts of space, legibility of doctors handwriting, transfer of medical records or files from one department to another, etc., this section presents the benefits of electronic medical records to the manual health record management, namely:

- Improves quality of care and client safety
- Provides real-time access to clinical information
- Electronic health records reduce paperwork
- Establishes the foundation for an effective, integrated electronic health record (eHR) strategy
- Increases productivity, which results in more clients served
- Increases efficiency and reduces costs through improved documentation and clinical records management.

V. METHODOLOGY

The work was conducted in the following manner:

- Visitation to five different hospitals to procure information on how they keep their medical health records.
- Comparison of the information collected from the hospitals.
- Interpretation and analysis of the information gotten and automating the information.

A. Overview of In/Out patients through the hospitals Sections

The chart in Figure 1.0 presents the overview of the In / Out patients through the hospitals sections.

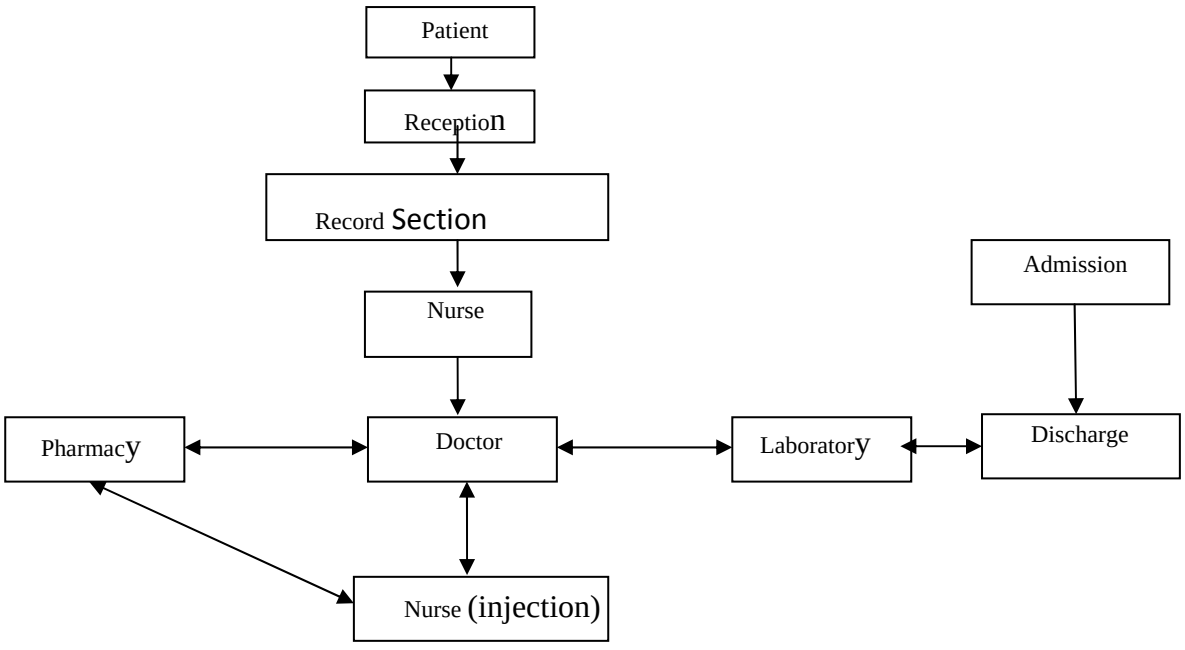

Figure 1.0: Chart for In/Out patients

B. Java Development Kits and Java Standard Runtime Environment

This is the programming language used in this work. The Java Se Runtime Environment contains the Java virtual machine, runtime class libraries, and Java application launcher that are necessary to run programs written in the java programming languages.

C. Netbeans IDE 6.7.1

Netbeans 6.7.1 is a Java integrated environment in which the program is run. Netbeans IDE is an integrated development environment (IDE) for writing, compiling, testing, and debugging desktop applications for the java platform. Netbeans IDE includes a full-featured text indicator with syntax highlighting and error checking, visual design tools, Ant support, version control system support, and other features which include code completion, embedded functions. The integrated development environment (IDE) in Netbeans was used to write the code and it was compiled to make the code free of error. The code was run with it to generate the required interfaces needed on Java platform.

D. MySQL Server 5.5

MySQL is a multithreaded, multi-server SQL database management system (DBMS). The basic program runs as a server providing multi-user access to a number of databases. In this work, we used MySQL server as our database to manage the information given by each patient coming into the hospitals.

E. Object Oriented Programming Languages

Object oriented languages have come a long way. Today, there are several of them in use for many purposes especially automation. In this work, we used Java programming language to design our software, due to its robustness as an object oriented programming language.

VI. HIGHLIGHT OF HOW THE WORK WAS DONE

This section briefly presents the highlights of how the work was carried out.

A. Five hospitals were chosen as our case study in western Nigeria.
B. We went to each hospital to investigate how medical records are being managed.
C. Analyzed and compared the information collected from those hospitals to generate our own format.
D. We used Java programming language to implement our deduction to develop the software. MySQL was used as our database manager.

VII. RESULT AND DISCUSSION

This section presents the automation of different paper-based forms for medical health record keeping based on the data gotten from the hospitals. Five different hospitals were used, and these hospitals include: MAPOLY Health Centre, LASU Medical Centre, LAUTECH Health Centre, General Hospital, and Baptist Medical Centre. The main form in figure 2.0 is the first interface that interconnects other interfaces. Hence, the main form houses all other interfaces like the New Registration, Confirmation Registration, Health History, and Appointment forms.

Figure 2.0: Main Form Interface

A. New Registration Form

Through the Menu bar on the Main interface, the New Registration form in Figure 3.0 can be created for patients, where you enter the data of the new patient coming into the hospital to have his record on the database for future reference for his / her next visitation. The interface consists of Surname, First name, next of kin, age, sex, card number, phone number, Date of Registration, Home address, and Contact address.

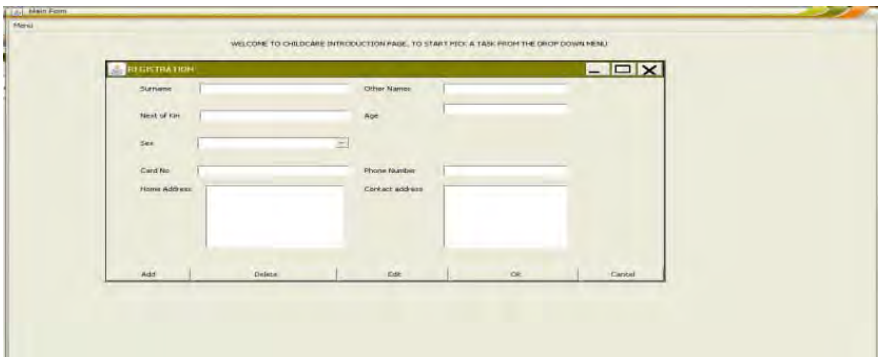

Figure 3.0: Registration Interface

B. Confirmation Form

This interface ensures that the patient coming into the hospital has registered with the hospital, it is also helpful in cases of emergency or when he could not provide his / her card. The Confirmation interface is shown in figure 4.0.

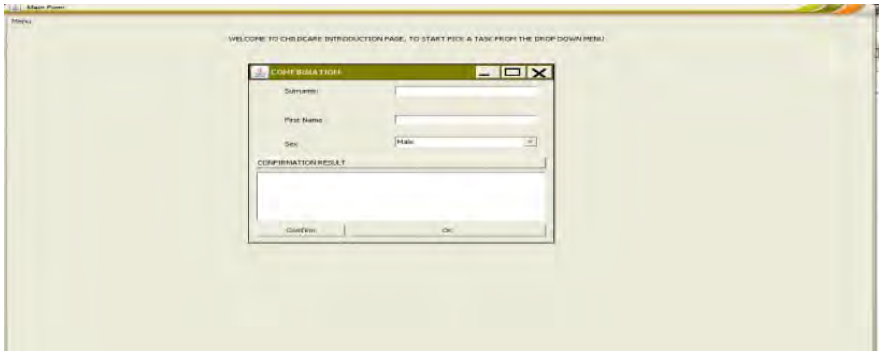

Figure 4.0: Confirmation Interface

C. Appointment Form

This form captures patient data such as surname, first name, appointment date and time, doctor to see, and card number into the database to book an appointment for a patient to see the doctor. The patient appointment form is shown in Figure 5.0.

Figure 5.0: Appointment Interface

D. Patients Health Status Form

Figure 6.0 presents patient health status interface, it describes where to enter data into the database to save details about a patient health status. From this interface, the list of patient registered into the hospital can be viewed at a glance. Here the patient name, card number, blood group, genotype, Rhesus factor and patient disease diagnosis is computed and saved.

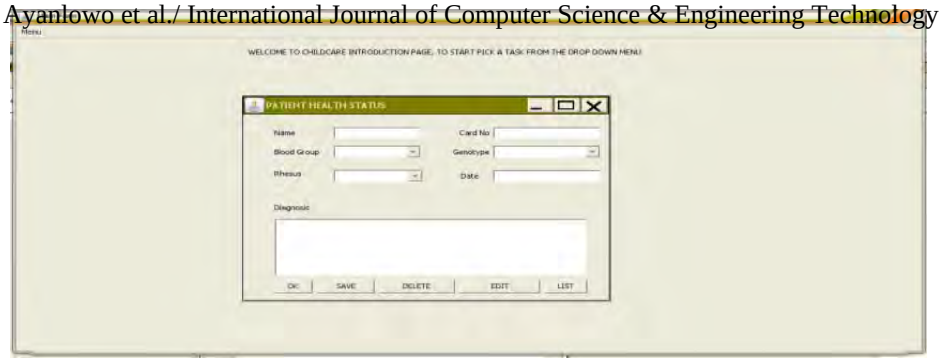

Figure 6.0: Health Status Interface

VIII. CONCLUSION

On the conclusion of this paper, the old way of using the forms and papers have become tedious and unprofessional in this present age. We have successfully implemented an electronic medical record keeping system (software) using Java programming language (NetBeans 6.7.1). The proposed system eases the process of searching through cabinets for patients files. The system was designed in a way that the doctor attending to the patient will be able to access the patient medical history from his personal system on his table. However, the system has been developed to work in any hospital in western Nigeria.

IX. RECOMMENDATION

From the foregoing discussion, the system (software) is recommended for use in hospitals for medical health records keeping, because it brings professionalism into the profession, saves time, reliable, and more efficient.

However, the system (software) will help health practitioners to access medical health record of patient with ease and facilitates smooth workmanship.

X. ACKNOWLEDGMENT

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