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Centralised Patients Information Processing and Management System for Nsambya General Clinic

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ABSTRACT
The main purpose of the study was to develop a patient payments record management system for Nsambya General Clinic. This work comprises four steps that were, one of which includes a number of sub-topics like background, problem statement and also objectives discussed in this work, and the justification of the study. The second describes the methodology including both the physical and logical techniques used and the tools applied during the design of the final report. The third includes system development and testing which illustrates the system development life cycle up to the end, the fourth describes system evaluation including the design layouts of the system the problems encountered during the development phase and lastly, the recommendations made. It is helpful to the user as well since it will produce the information required for the project design. The designed new computerized system result can improve the speed of data recording, and security. In the appendices, the methods used like the questionnaire, questionnaire orts, codes and many others are included in this part.
Keywords: Life cycle, Patients, Clinics, Management, Information.

INTRODUCTION

Nsambya General Clinic is a privately owned clinic located in Nsambya, Along Ggaba Road just after The American Embassy from Town. The Director of Nsambya General Clinic and the founder Dr Ben Kiwanuka stated that it was founded in 1991 with only a small branch located at Nsambya (Kampala) with very few patients but as of now the clinic has expanded into a bigger clinic and it is estimated to have more than 800 patients. The clinic offers services like treatment, simple surgeries, gynaecology, antenatal care, dental care and emergencies like accidents. The clinic has got well-trained nurses who are able to take care of patients to their satisfaction. According to [1], many people live in absolute poverty whereby it is hard for them to afford the necessities. This makes it difficult for them to live in good health. The increasing spread of AIDS also has made people lose hope. Besides, the increasing change in climate has made it worse whereby in rainy seasons diseases are spread at a very high speed [2 - 5]. With all of this, there is limited support from the government and even the required medicine is not available in hospitals. Under the above circumstances, therefore, many people have now adopted the new methods as noted earlier in the introduction with a thought that it is better than even the early methods of using injections. Nsambya General Clinic has the vision to introduce another method besides the noted methods. With all the entire above, there is no centralized system which can be used as a central location for data storage and access to patient information, the Clinic is still using the old method of data recording since they are based on files and books to register new and old information [6, 7]. These methods are very slow, provide false information sometimes and even they are not secured, with no backup at all times. Therefore, there was a need to design and implement a system to help in recording patients as well as providing easy access to data and or information whenever needed by the administrators.

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Problem Statement

The increasing number of patients at Nsambya General Clinic resulted in poor data recording, increasing expenditures on purchasing stationary, low speed in data recording, poor management and lack of integration and coordination among workers. It is in this context therefore that designers designed a system to help in data recording processing and improve security through backup files.

Aim of the Study

The main purpose of the study was to develop a patient payments record management system for Nsambya General Clinic. To design and develop a Patient payment records information system for Nsambya General Clinic.

Specific Objectives

- To investigate the existing methods of patient records management.
- To analyze the requirements for a computerized record management system.
- To design a computerized records management system.
- To access the impact of computerized information systems on the performance of the clinic.
- To develop a centralized computerized record management system.
- To implement a computerized system in which all the company data and required information for the clinic can be stored and secured for future reference.

Research Questions

I. What are the different methods of records management used by Nsambya General Clinic?
II. What are the systems requirements for the computerized records management system?
III. Are they substantial to the satisfaction of the customer?
IV. Are the existing records management procedures able to help management follow up on their clients?

Justification of the study

The system is designed for growth and development. Therefore, is to benefit all the users and administrators as well as patients. Keeping payment receipts is not an easy task, so with the new system, the patients can be given clearance cards and or forms after clearing the required payments. Administrators can be able to monitor the performance of the company. To a great extent, the workers can secure data by creating backup files and finding the required information easier than taking a long to check in manual files. All of the above questions have been answered through a designed system. Since it is compatible with all computer components, it can achieve all the user requirements like producing reports and many others at any time whenever needed by the user [8-10].

METHODOLOGY

Analytical Tools and Design

The designers used the prototyping method where by data was collected from the company files and members, organized and represented in a format that was good to illustrate the flow of the whole work and even the nature of the project. Since the company needed a new system in a short limited time, the designers applied rapid application development (RAD) to complete it in a short time.

Data Collection Methods

During data collection, the designers drafted a questionnaire that they use. Questions were sent to the Nsambya General Clinic administration and they gave feedback through writing and answering the set questions. They analyzed the data, organized it and made conclusions so that the information is smart and accurate. In addition, the designers use interviews as well as observation from the existing files of the company and the user or workers at the branch. Since the research required a lot of writing, the data collection tools included not only pens but also books and papers [11].

Design Techniques and Tools

The format of the application will extremely be object-oriented with buttons and objects that will support the user with a lot of reduced expertise. The tools which the researcher will use include visual basic tools interface design, and Microsoft access to help in creating databases. The designers preferred the mentioned tools because they found them easy to use, compatible with all machines, common everywhere and can be accessed at any time whenever required.

Testing of the Designed System

After system development, to ensure that the system was tested using different ways; - These included unit testing whereby the different units of the project were tested to ensure that they are producing the designer's intentions. This was done by carrying out continuous testing and debugging using true data as well as false data.

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Documentation

After the overall stage, the researchers will include text to direct the user on how to use the new system. Documentation included directions on how to install the new system and even help files on the new system will be used, maintained as well as secured in terms of password assignments.

Preliminary Investigation

During this phase, the designer conducted interviews, drafted questionnaires and used the existing literature to find out the organization's objectives, intentions, and requirements as well as the nature and the scope of the problems in the existing system.

The Nature and Performance of the Existing System.

- ✓ The file-based system consumed a lot of space.
- ✓ Chances of information loss and misplacement during their transfers were very high

Information security was very poor with no backup files, unauthorized users, and data redundancy to mention but a few.

- ✓ A lot was spent on purchasing stationery.
- ✓ Data retrieval and processing was very slow and consumed a lot of time.
- ✓ Files are prone to natural calamities such as water, fire, pests, and dust.

And it was in this context that the designer came up with the system that can overcome all of the mentioned problems as well.

Systems Analysis

During this stage, data was gathered and analyzed using flow charts as a modelling tool to present a graphical representation of the new system and the existing system.

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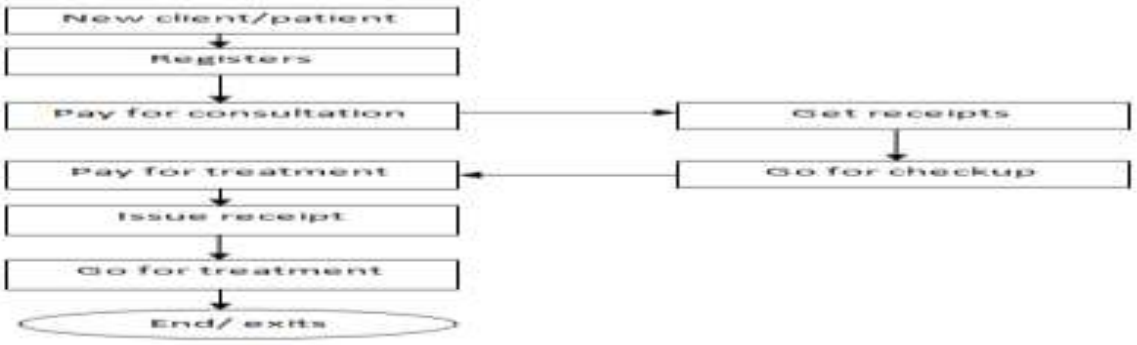

Figure 1: The logical design for the current system

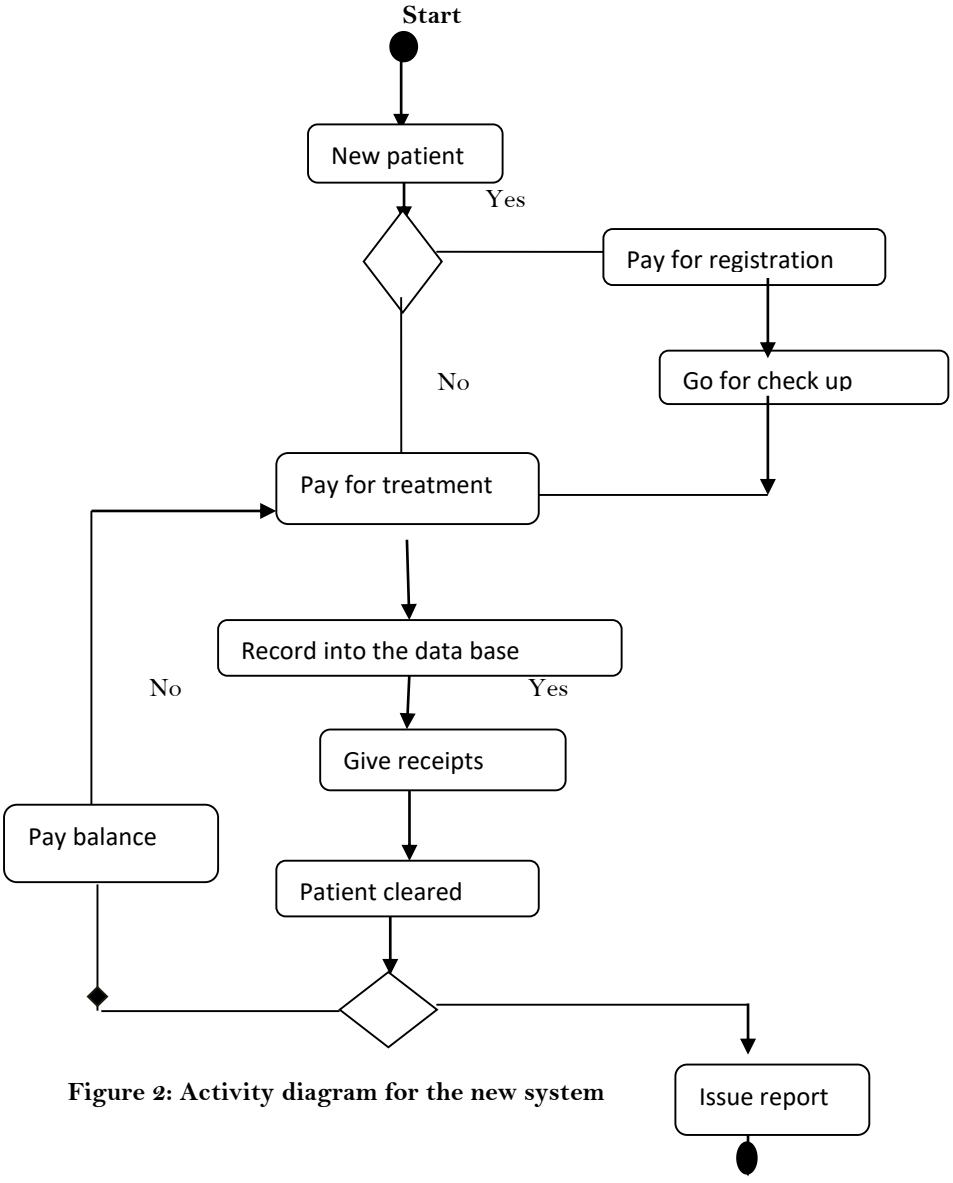

Figure 2: Activity diagram for the new system

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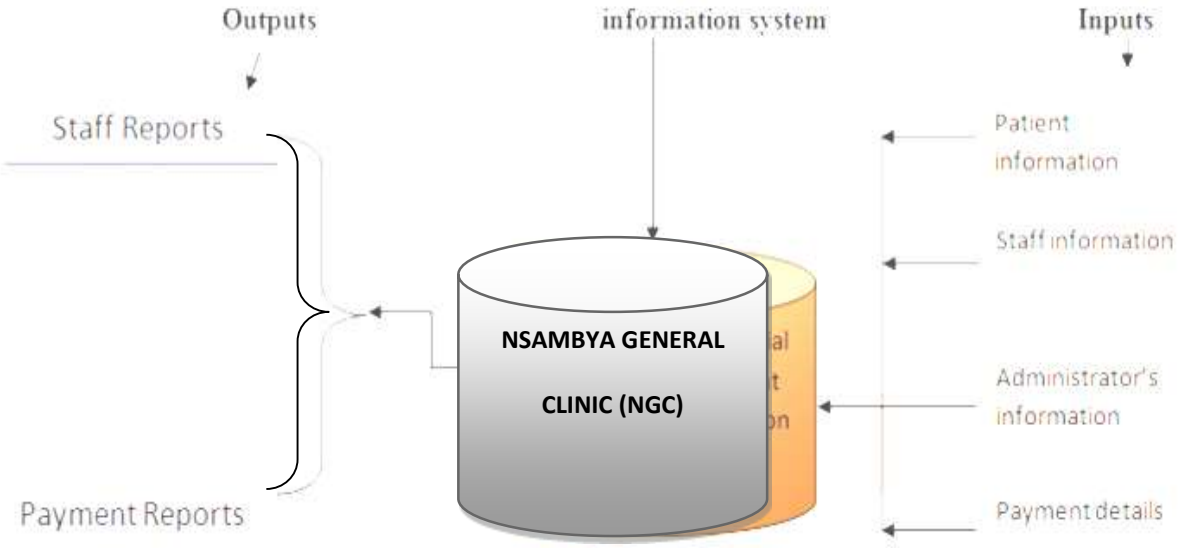

Figure 3: Conceptual model for the new system

In the diagrams above, the system consists of a number of input forms. When a new patient comes, then the user or the data entrant will only run the system, opens the form patient enters the required details, and if necessary he or she outputs the required reports. All of the processes and all input forms will only be allocated to the Nsambya General Clinic patient management information system. The purpose of the reports is to output the required information on the patient and even to avoid carrying receipts every time the patient comes for treatment. Input forms are for the purpose of inputting data required by the user so that it can be processed to produce reports [12 - 14]. At the time of data analysis by the administrators, it will now be possible for them to retrieve data and all of the required information about the patients. Even through reports, it will now be possible for the patients not to carry payment receipts whenever required by the data entrants for payment review.

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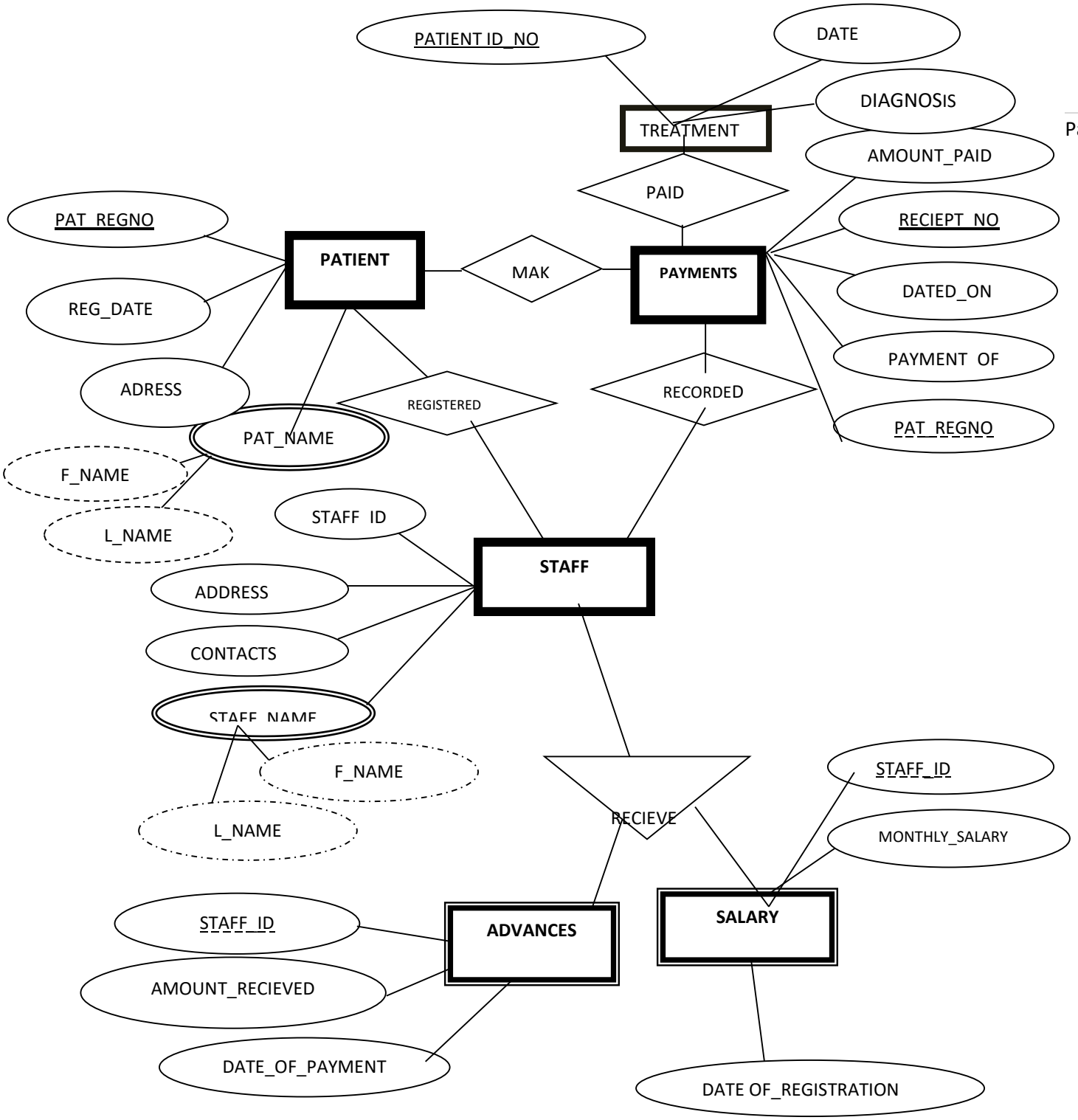

Figure 4: Entity relationship diagram for the new system

Data Dictionary

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This one contains all lists of files in the database system, the number of records in each file, and the names and types of each field. Most patient information systems hide' the data dictionary from the users to prevent them from accidentally destroying its contents. For this case, a data dictionary was a collection of descriptions of each data object, or item in a data model for the benefit of programmers and others who need to refer to them. Below are the different entities and their corresponding attributes in the Access database and their entity relationships.

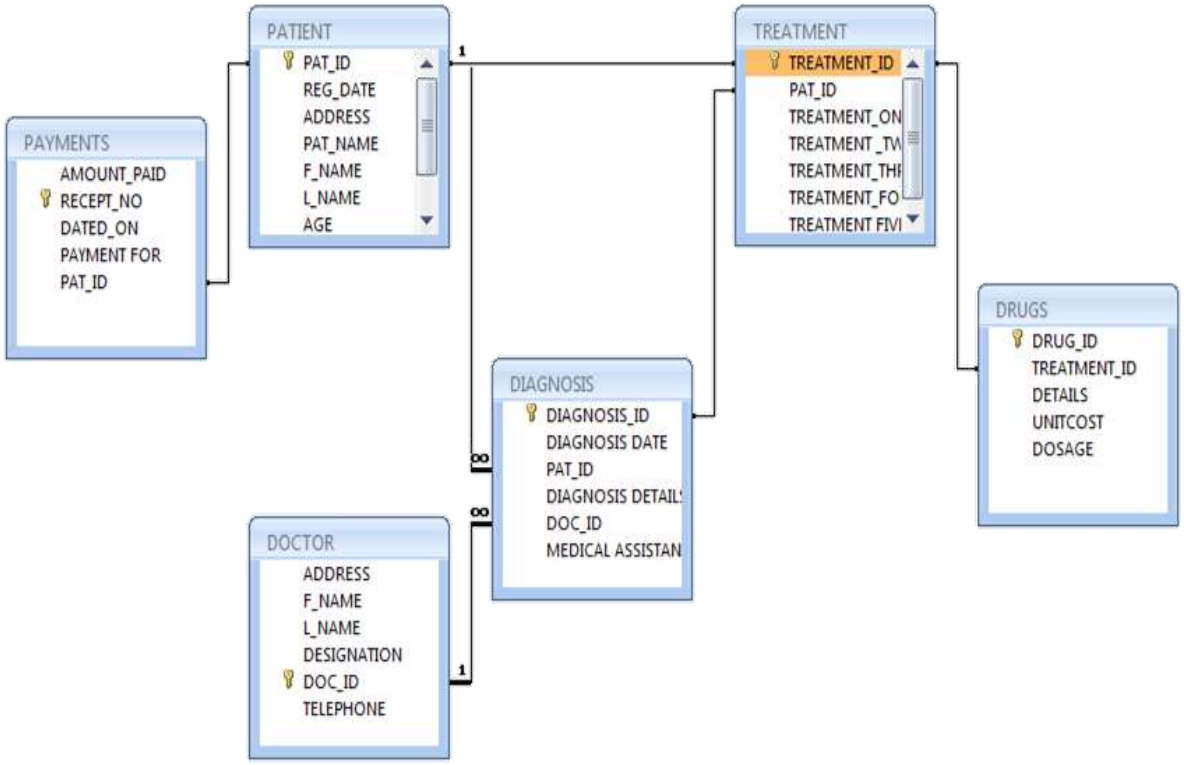

Figure 5: Data Dictionary

System Design

Under this, the main objective was to make a preliminary (logical) design and then a detailed Physical design. The logical design described the functional capabilities of the new system as well as the requirements specifications. The physical design illustrates how the proposed system will deliver the general capabilities, the output and input requirements, the processing requirements as well as the security control and backup.

Functional Capabilities of the New System

- Improve security and access controls over data.
- Provides better services to the patients and administration.
- Change the access to data needed from sequential to random.
- Allows regular updates.
- Provide accurate and timely information needed by the administrators.
- Increase throughput and decrease the response time.

System Requirements Specification

This describes the requirements and needs for the information system to give or produce an output. The requirements are divided into functional requirements and non-functional requirements. The functional requirement includes all the features and functions which must be included in the system for it to produce the specifications. The nonfunctional requirements are mainly defined by the user and they are not included in the system.

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Functional Requirements Include

- The system was able to output patient reports as well as respond to user requests in a short time.
- Be reliable, and portable. Compatible, and usable.

Non-function Requirements Include

- The development cost and user training costs should be cheap.
- The system must be completed in the agreed time
- They must be able to respond fast and in a short time.

Hardware Requirements

The hardware requirements are hardware specifications which were needed to design and implement the system. They include the following below.

Table 1: Hardware Requirements

Component	Specification
Processor	Intel's Pentium iv
Ram	256 MBS
Hard disk	80 GBS
CD ROM drive	52 x
Printer	HP laser printer

Soft ware requirements

Include all the software requirements which must be in existence for the system to perform the necessities. They include.

Table 2: Soft Ware Requirements

Components	Specifications
Operating systems	Windows XP service pack ii or above
Office	Microsoft Office 2003 and above
Application software	Visual Basic 6.0
Database management system	Access database
Antivirus	Avila, Norton etc.

RESULTS

System Development

In this the designers describe all the processes in which hardware and software architecture, components, modules, interfaces and data for the new system are defined so that they can meet the specifications or requirements. The designers also described a preparation of an assembly of methods, codes, models, and techniques which were united by the regulated interactions to form a whole project.

The New Computerized System

The new system was developed with the capability of storing a vast piece of information. The difference between the old and the new system is that data capturing and processing is computerized and that computers are commonly used instead of papers and books. It requires low space for storage, security is high compared to the old system and more efficient in generating reports within a minimum time and with reduced errors.

Functionalities of the New System

A functional feature is that feature which must be included in the information system for it to meet the specifications of the organization and the user requirements. The main functionalities of the new system are highlighted below.

- Data input. This includes the data which must be added to the system so that it could be processed to produce the required information. Here data would be captured and input into the computerized system through the keyboard by typing.
- Data manipulation. Data manipulation and processing were in different forms editing, updating, and deleting, to mention but a few. The data was saved and the wait for retrieval for any purpose. Besides, totals for each transaction are captured.
- Storage. Looking at storage, data was input and stored on the hard disk. It was updated and edited and all of these changes were stored into the system. Data could also be transferred using external devices like CDs and many others.

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- Output. At the end of any transaction, there will be a need to attain an output. The system, therefore, was in a position to give out reports for the company. Specific data could also be found by just clicking the button find record.

The Form Designs

Forms were designed in such a way that the user has a provision to add, save, search for a specific record and or delete a record. The user can also navigate through the records by clicking on the navigation arrows. The form is unloaded by pressing the exit button or close program buttons.

Reports

- Patient payment details report. It showed how the patient has been paid.
- Payments record. Showed all the details of all payments recorded.
- Diagnosis. This shows all the details of how the patients have been receiving their treatment.

Implementation

It involves a variety of sub-sections which must be carried on for the new system to run well. They are described below;

Data Conversion

The data from the old system is transferred safely to the new system. This is done by; Users entering data into the new system. One has to ensure that data entry error is controlled from the file system to the new computerized system.

Installation and Change Over.

- Installation on site. Here the hardware was bought on-stand e, the software was installed (this included the operating system and the new information system).
- Site commissioning. Here the system was installed on-site, connected to any other third-party component, and commissioning tests are run to identify discrepancies between interfaces until the system works without any problem.

With system changeover, the direct method was used. It occurs when at a given time one system ends. And a replacement starts immediately. The advantage was that it was the cheapest and there was a clear breakdown between the old and the new system. This system does not operate on its own dependence, but the database management system software was supposed to be installed first then followed by the new system.

User Training

All the users of the new system were trained on how to use the new system. This was conducted using a projected on-screen presentation. The training was the most interesting part of the study. The administrators were the first in the training and then the workers followed. The administrators were given more details than the workers to ensure that the users do what they are supposed to do than going into details.

Accessibility

Not everybody has access to the system but only authorized personnel have privileges. The system was created and secured with passwords. The administrator can change the password at any time whenever needed.

Forms and Reports Layouts

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Figure 6: The Splash form

Figure 7: Login form

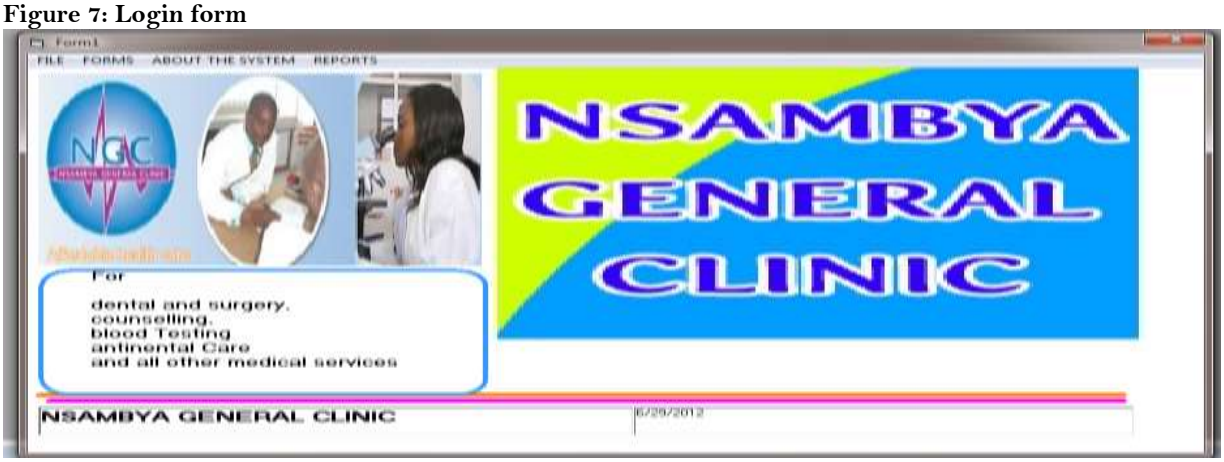

Figure 8: The MDI form (multiple documents interface)

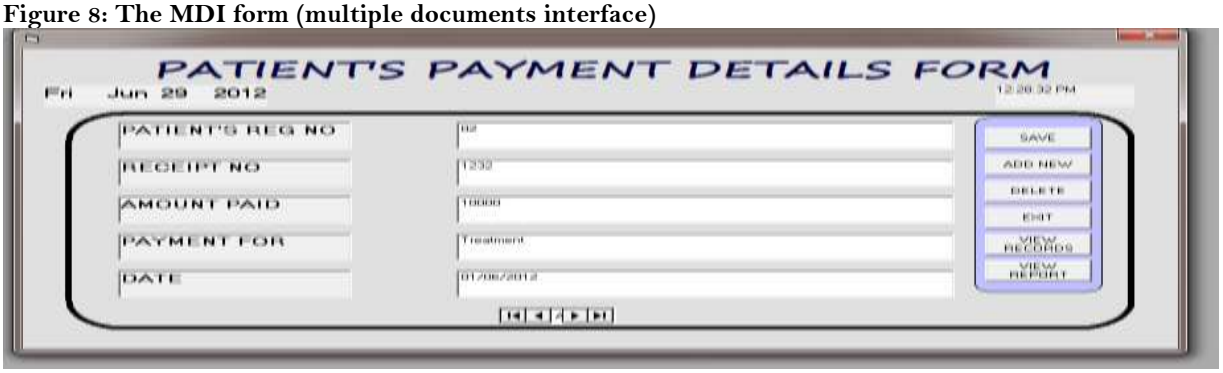

Figure 9: Payments form

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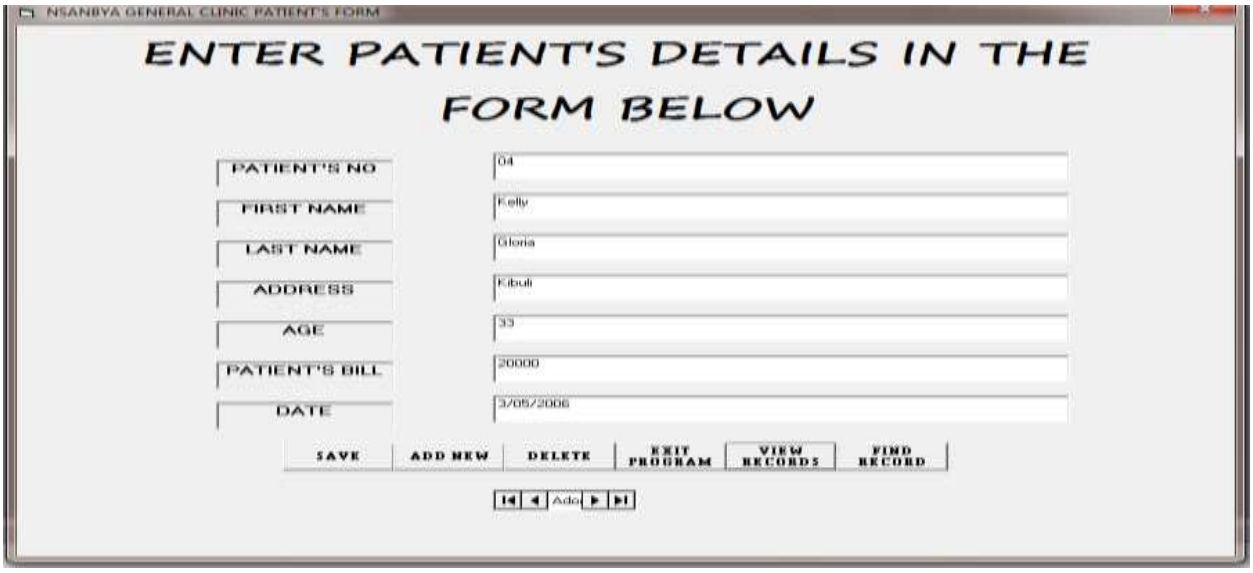

Figure 10: Patients form

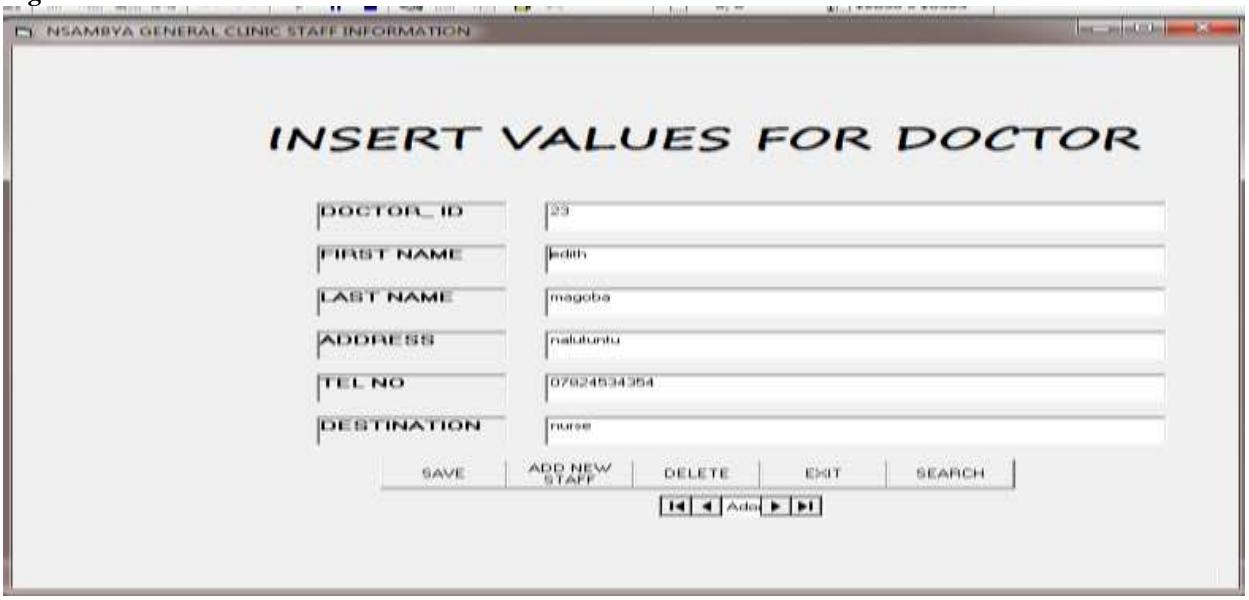

Figure 11: Doctor

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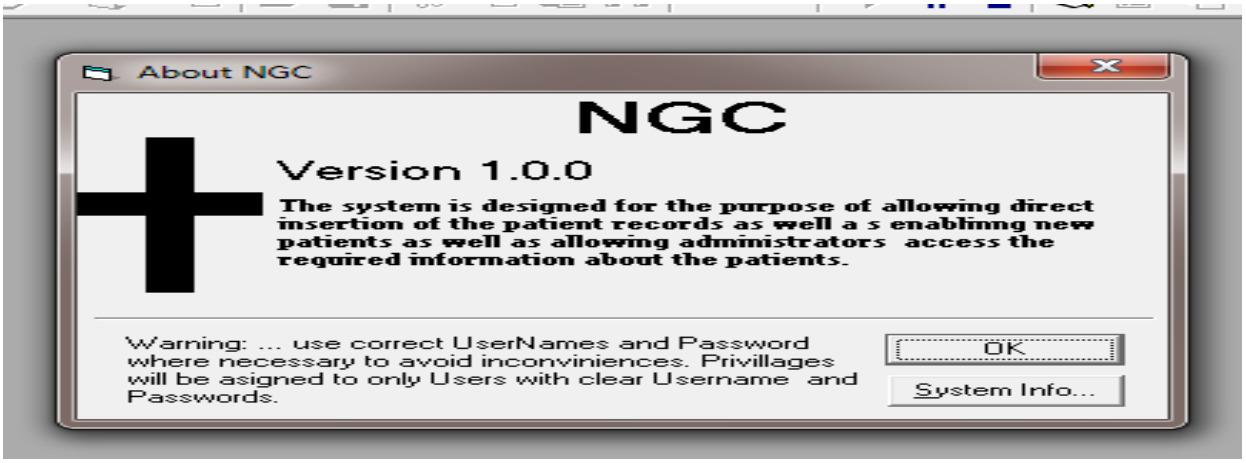

Figure 12: System components and report printing.

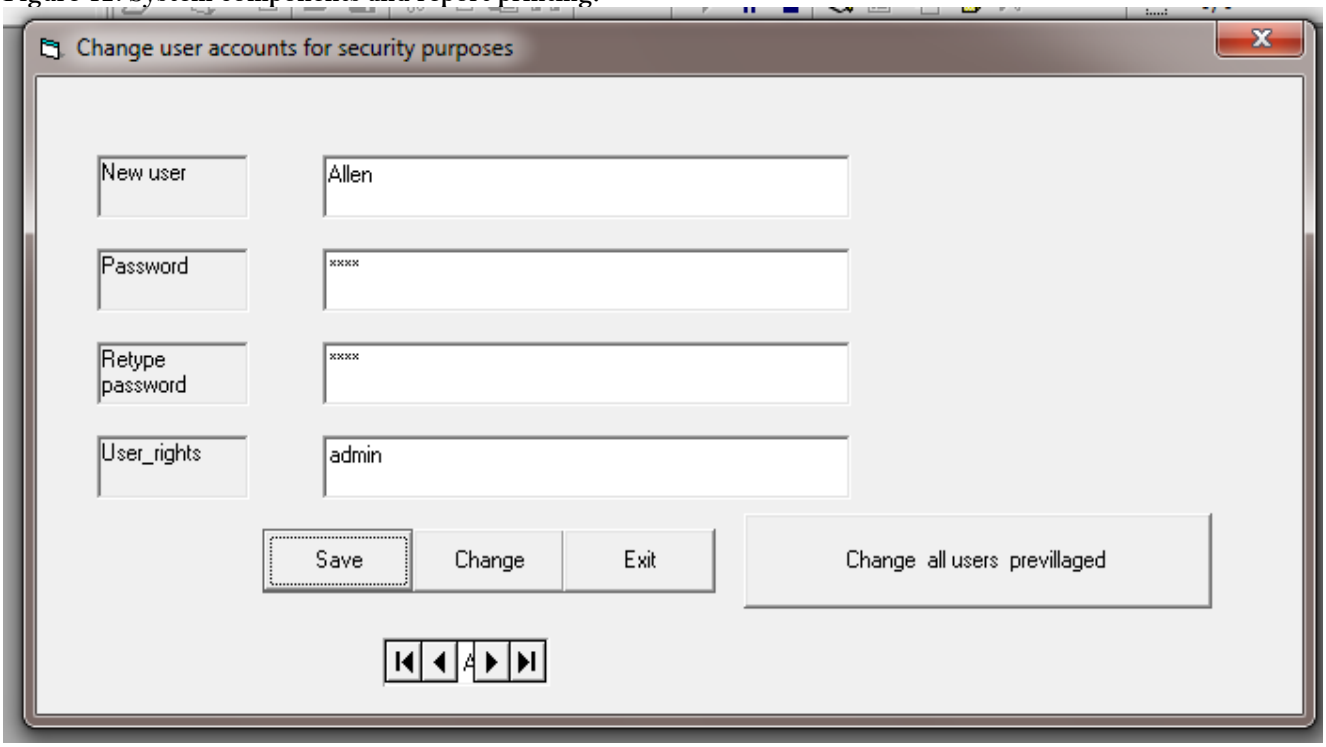

Figure 13: Change users

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Figure 14: Payments Report interface

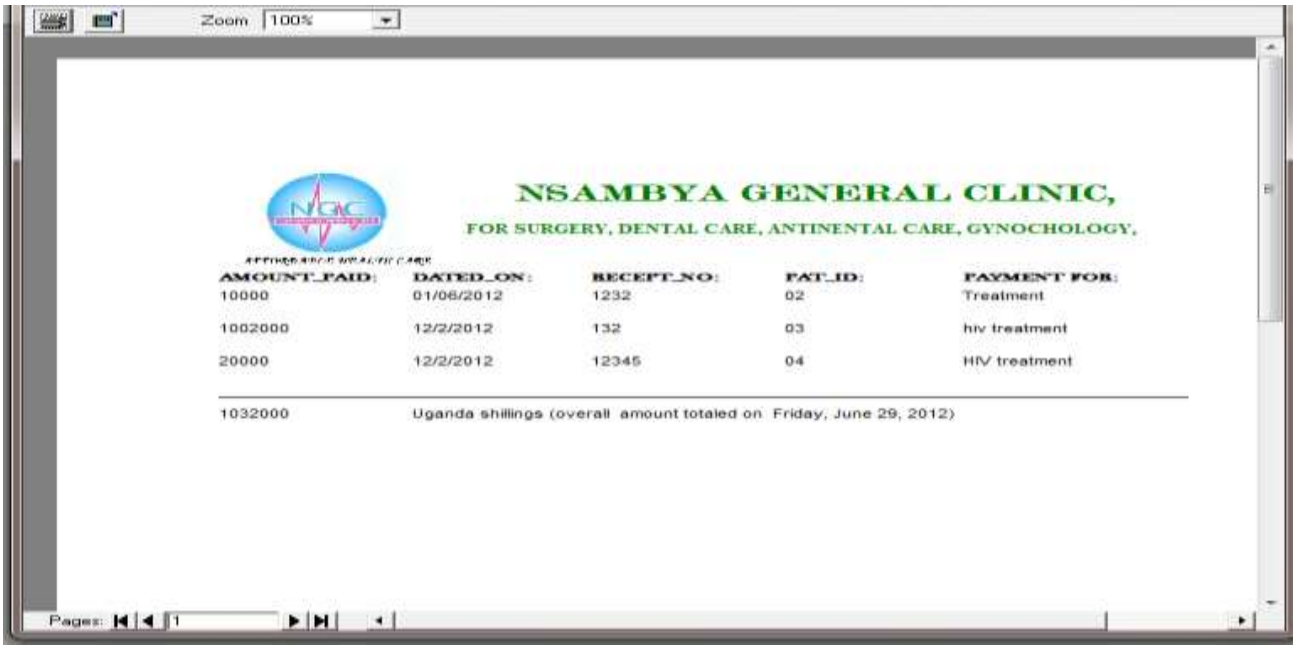

Figure 15: All payments

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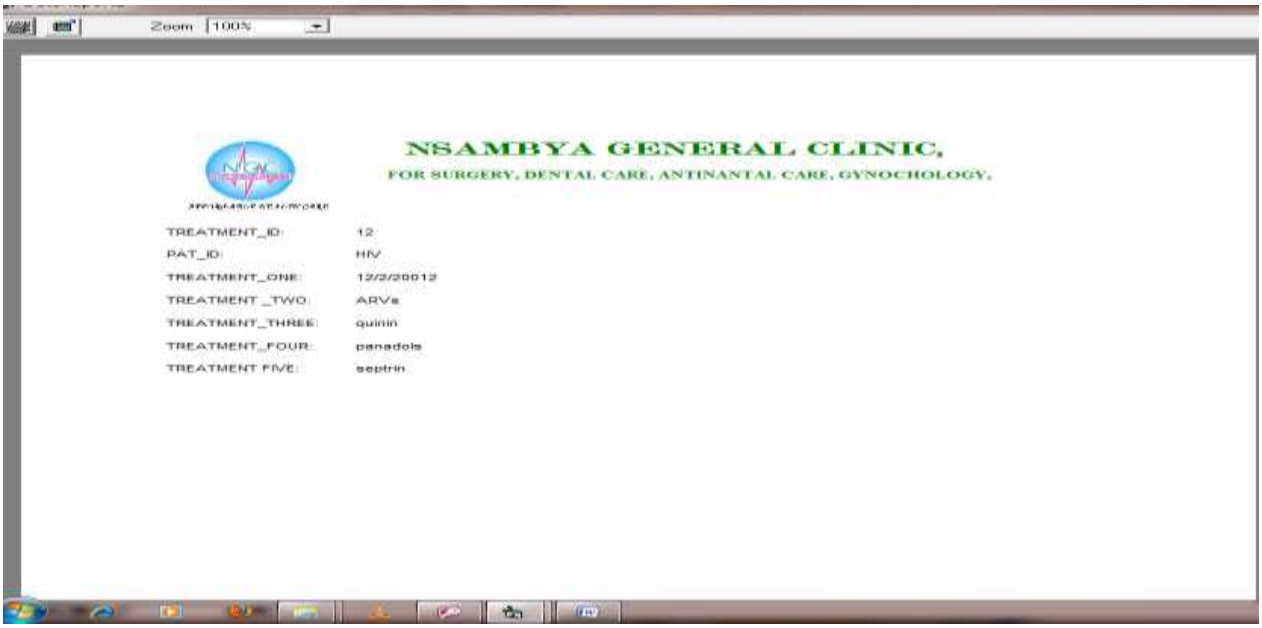

Figure 16: Treatment report

DISCUSSIONS AND CONCLUSION

System Evaluation

The old system was evaluated and found to have some pitfalls and lacked effectiveness and efficiency in the following areas. Data recording speed. The old system of using manual recording takes time while workers tend to look for different recording places. There was no data validation, and as a result, the company was prone, to errors leading to misconceptions, loss of funds and other inconveniences associated with lack of record keeping. It is in this context therefore the designer designed a new computerized system which as a result can improve the speed of data recording, and security to mention but a few.

Limitations

Factors such as finance for the purpose of software sources eg, visual basic programming language and Microsoft software and the time factors like printing costs, photocopying costs, and transport were a limit. During data collection, some people could not give true information and therefore there was a need to seek information from many users and administrators.

Problems Encountered

- Lack of full knowledge of the Access database designer (database connectivity)
- Power fluctuations especially during the design phase of the interfaces.
- Collecting some vital information was a hassle because the people concerned were very busy with patients.

Solutions to Problems

- There was training in Access during the course of the design
- Creation of backup files on CDS FLASH DISCS and other devices.
- Visited their site which is where we got the information concerning Nsambya General Clinic.

To a great extent, the designers worked hard and because of the determination of the designers, the system was developed.

System Maintenance

Due to the need for the system in a short time, a system does not produce some functionality like balances and producing weekly reports and many others. This will be maintained in future and the system will be in a position to produce all.

RECOMMENDATION

The system must be installed well and further, the database management system must also be installed. The package is highly recommended to be used in Nsambya General Clinic for the effective process and retrieval of patient payments as well as staff information. It is built with visual basic and Access. Therefore, this software must be

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installed in order to be compatible with every computer. With the entire above the system is expected to full fill the user specifications as well as meet the organization's requirements. The system may be found to have some pitfalls; however, it can produce the specification. The ineffective components will be improved as long as needed by the administrators.

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