
Improving Healthcare Financial Control in South Africa through Effective Health Information System

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Abstract: *Health care is an important aspect of the economy of South Africa and hospitals prefer and encourage patients to be members of these medical aid schemes. Healthcare development can only be effective if patients provide support by paying their bills as at when due, or pay through their medical aid schemes. These bills are used in buying health care products (medicine), pay bills of doctors, nurses and care workers as well as provision of facilities for the improvement of the hospital. This paper aims to bring a system which ensures patients pay their bills through the hybrid combination of health information systems medical aid system.*

1. INTRODUCTION

Healthcare can be termed as a state of complete physical, mental and social well-being and not merely the absence of disease [1]. It can also be termed as the complete state of the human body in respect to all variants such as disease and physical inadequacies.

The need for improved health care and change of health care systems from paper based to computer based which will enable efficient statistical reports lead to the introduction of Health Information Systems (HIS) in 1984, [2, 3], it also changed health care from institutional based global and regional based, enabled data retrieved from patients to now be used for analysis and forecasting for the future [4]. The general health care systems are changing and is promoting the in the development of systems that integrate doctors, nurses, insurance companies to improve health care payments and financial control[5,6] and now medical aids are now involved in the health information systems[7].

In south Africa health finances can be controlled through the medical aids such as Momentum Health, Gems, Bonitas [8] combining with health information systems and become better health care systems such as Mzansi med[7]. South Africa is one of the world's populous countries and has encouraged its people to use medical aids at all times, it is a criteria for international students studying in south Africa to have or be registered to a medical aid scheme[9]. These medical aid schemes have helped patients at different stages of treatment and it all depends

on how much medical aid cover an individual has been approved for. The unique advantages of the medical aid schemes include easy access to the best private hospitals, helps pay for surgeries and dental work helps to pay for any emergencies and unexpected medical costs [8].

These medical aid schemes are designed to assist the hospitals in financial control, the medical aids serve as a guarantee that the patients will be able to pay for the treatment and services the hospitals or clinics will provide to their patients. Health care finance is vital because without enough finance there would not be money to buy equipment such as scanners, beds, ultrasound machines, syringes, needles and tablets. Also the finance is important so the hospitals can send their employees for further training and also to pay salaries of their employees.

Mzansi med's goal is not only to streamline Patient information flow and accessibility for doctors and other health care providers, eliminates error caused by hand writing, the new technology system Mzansi med will stand to provide financial control which is a vital ingredient for the success of any health care provider such as hospitals or clinics.

This paper aims to introduce a new HIS which works hand in hand with the medical aid system to ensure financial control in the health care industry. The rest of the paper comprises of related work in section 2, methodology in section 3, while results are in section 4 and section 5 comprises of the conclusion and further work.

2. RELATED WORK

The application of information systems in healthcare has great potential in effective healthcare financial control. These systems can enable the provisioning of affordable healthcare and access to more healthcare services thereby significantly improving the overall quality of life of patient. One of such early systems is the 1998 Intermountain Healthcare Information System [10]. This information healthcare system was developed based on the insights of W.Edwards Deming and designed to increase accountability, drive improvement and ensure cost savings. [11] carried out a study to examine the potential health and financial benefits of information technology in healthcare. Their study showed significant financial control and savings especially in the use of healthcare information systems in handling patient records. [12] implemented an information system platform for healthcare services. The architecture of the platform included a web based application server and client system. Although their system architecture was designed to collect certain physiological body data from patient and provide the necessary web service to view and analyze the patient's health record, their architecture significantly managed healthcare costs. This was achieved by deploying a service-oriented architecture, which consisted of HL7 standard messages and web service components. The platform could transfer health records into HL7 standard clinical document architecture for data exchange with other organizations. [13] carried out an article survey that looked into the emerging trends in Healthcare Information Systems focusing on the use of analytics techniques to cluster patients into similar groups, or to process streaming data for detecting abnormal medical conditions as early as possible. Their study aimed to bypass several architectural challenges in healthcare systems and provide support for "big-data" handling and also ensuring affordable healthcare cost. Adopting data mining techniques, [14] proposed a Potentially Preventive acute health Events (PPE) system integrated with Electronic Healthcare Records (EHR) for the diagnosis of Ambulatory Care Sensitive Conditions (ACSCs) with the aim of healthcare financial control (in determining and reducing medical costs) and developing clinical decision support system. [15] modeled and analyzed the Zhishan community healthcare group (CHG) service system using a multi-agent simulation. This healthcare information system model was built and validated according to publicly available

statistical and transactional data from Zhishan-CHG Taiwan, and estimated the system's financial sustainability under different conditions. Five scenarios were explored in the experiment simulating the capitation payment scheme in over a period of three years. The results can be summarized as follows: (1) medical cost expenditure per person can be reduced as more patients are enrolled in the capitation system, (2) the service model with a health promotion agent outperforms the model without one in a fee-for-service (FFS) cost control system, (3) greater quality and retention rates improve capitation income, (4) the risk of the CHG service system can be mitigated by excluding inpatient medical costs from the virtual points assigned by National Health Insurance, and (5) simulation results show a positive financial outcome for Zhishan-CHG. [16] presented a study showing the relationship between information quality and healthcare quality. Their study provided a way to effectively use information on patient's health to provide better and cost effective healthcare. Taking into account the top priority of the directorate of the National Health Information System of South Africa (NHIS/SA), [7] proposed and developed a healthcare information system which helps to link the medical aid schemes to the Health Information System (HIS) thereby reducing the time needed for the hospital to confirm the medical aid and quickly treat the patients. The medical aid cards developed in their work are shown to doctors on request, so that the patients are not requested to pay cash, since the medical aid will cover the cost. To ensure that the that the patient is on the medical aid, their system is further developed to enable medical doctors or healthcare service providers to verify that the patient is on the medical aid system, the system also provides access to the patient's medical history. This current study is an improvement on our earlier work [7], by enforcing financial control and forcing payments to be made before treatment can be provided to patients.

3. METHODOLOGY

The evolved system was designed using Dreamweaver and the database was designed using mysql server. The pseudo-code of the system is as follows:

Given a patient x

[1] X logs into the online HIS (by providing his name and Identification number)

- [2] X User name is verified and send to the medical aid system
- [3] Y Checks if X is a member, if X is not a member Y tells X to pay cash
- [4] If X is a member Y furthermore checks what type of member X is

- [5] Once Y confirms the type of membership X has,
- [6] Y Provides the doctor with the limit of services that can be provided, and provides advice to the doctor.

The pseudo-code is furthermore explained in the flowchart in figure 3.1.

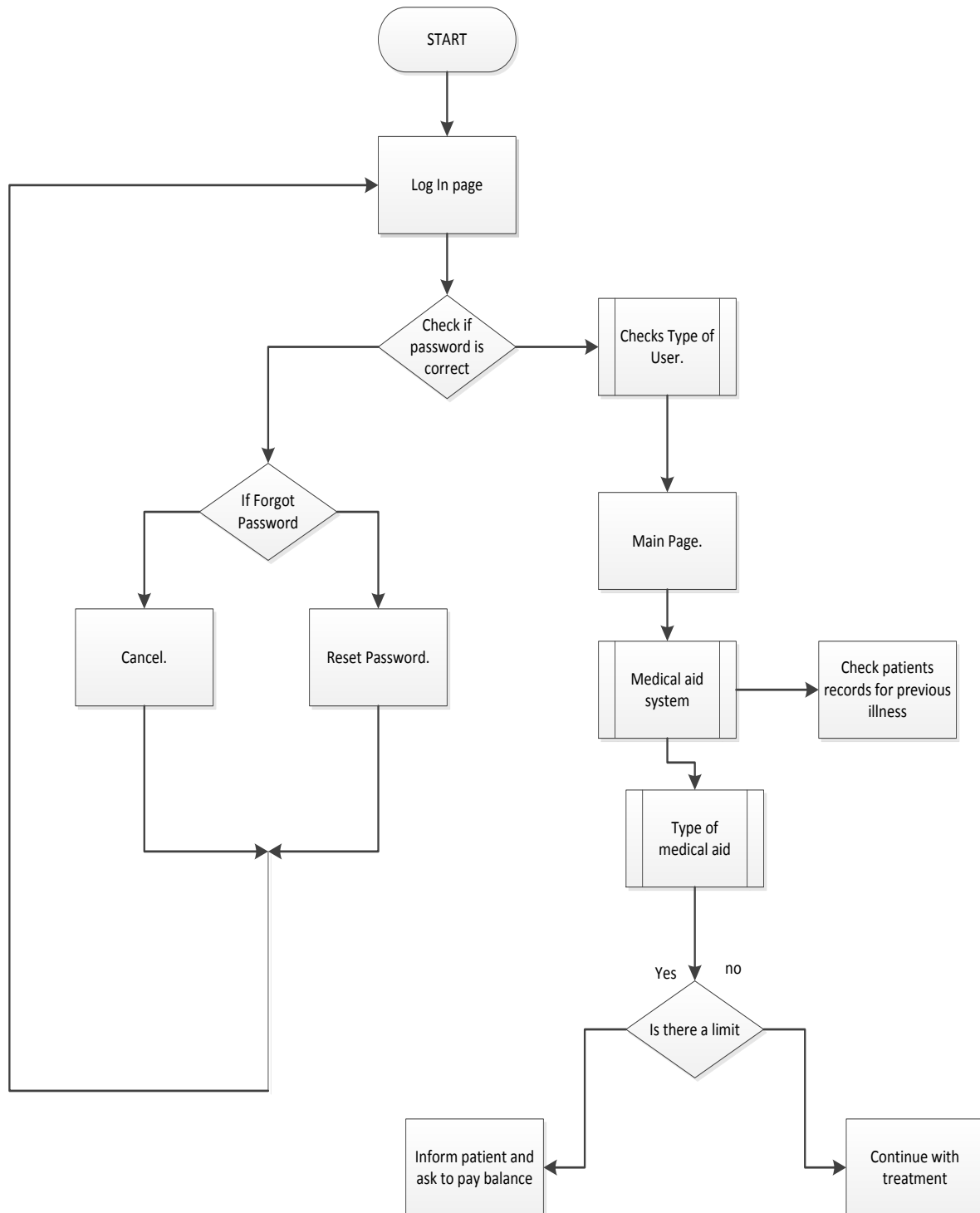


Figure 3.1 Flow chart of expert health care system

4. RESULTS



Figure 4. 1 Login in Page

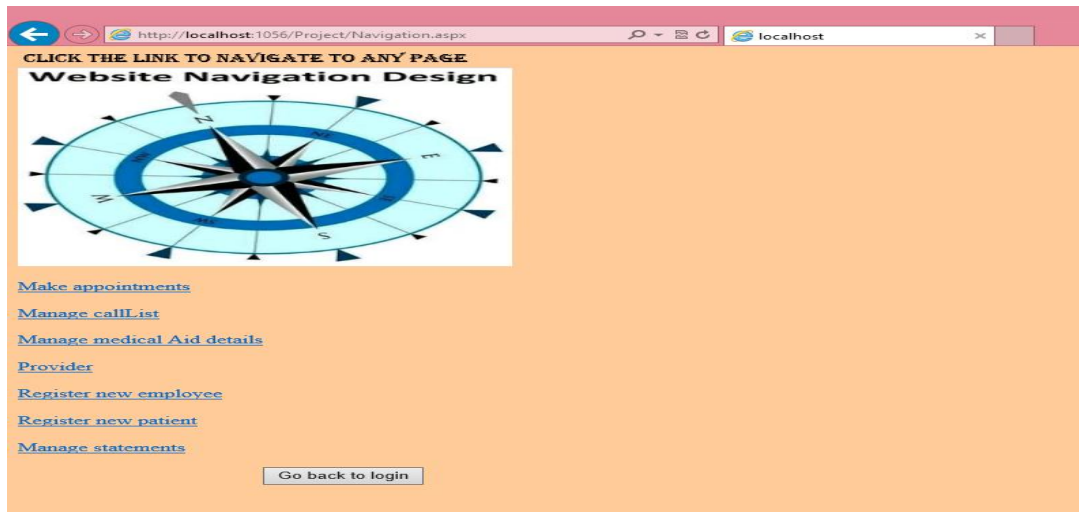


Figure 4. 2. Mzansi med navigation

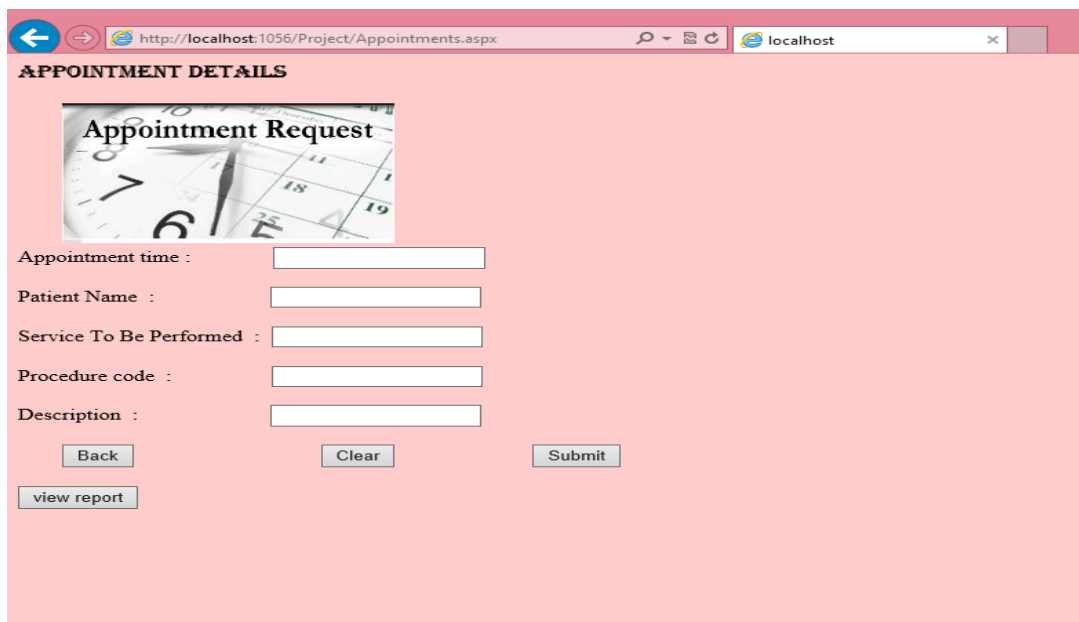


Figure 4.3. Appontment Details

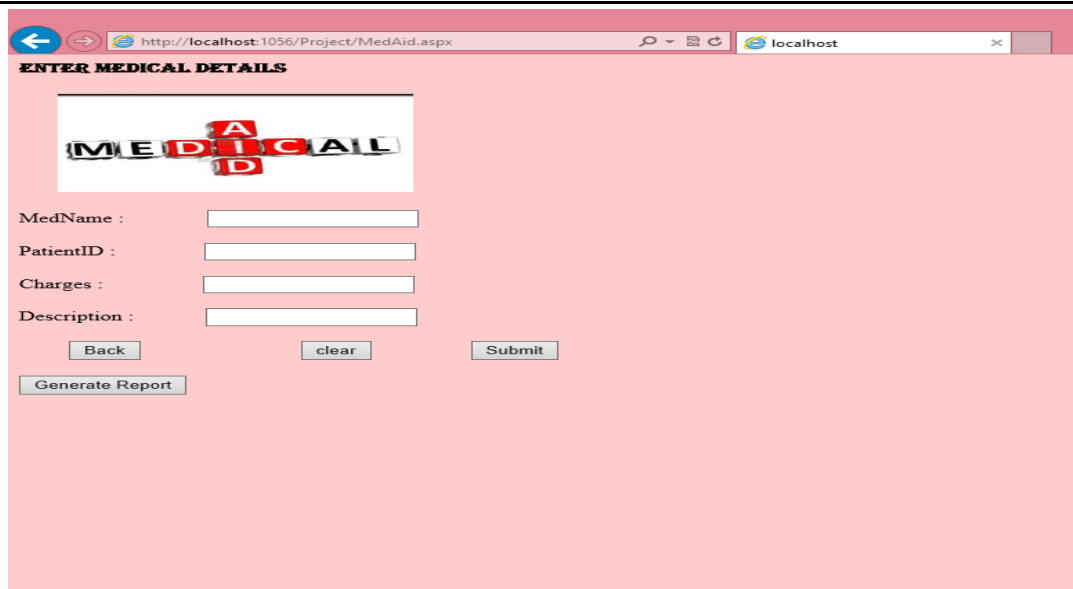


Figure 4.4. Medical Aid Details

The images show how the user will log into the system and how the user will get or obtain the best services from the developed system.

5. CONCLUSION AND FUTURE WORK

This study has successfully developed a HIS system that can work with the medical aid systems, which will assist doctors to confirm that patients are truly members of the medical aid and help get report of medical history of the patient, and furthermore prevent the hospital from running at a loss due to bills not being paid. There are still aspects of the study that need improvement such as can we successfully integrate a video conference system into the developed HIS to enable the doctors to discuss with the medical aids and previous doctors who have treated the patients.

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