

Maternity Management Information System for Katutura Hospital Maternity Department, Windhoek, Namibia

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Abstract: This project aimed at developing a maternity management information system for the Katutura Hospital. Applying the prototype methodology, the Maternity Management Information system was developed and was user friendly compared to the existing maternity system. The system allows patients to make appointments/book, make payment and get access to health information tips during the pregnancy period. The system has been tested and it works. Currently the system does not allow for medical aid integration and hence future development of similar systems or higher versions should consider integrating medical aid portals into the system.

Keywords: maternity, maternity information systems, management, paper based system

1. Introduction

The existing maternity system records at the Katutura Hospital currently appear to be paper based and hence records seem to easily get lost. As a result of the paper based system, integration lacks in the current system and hence most processes/ or activities are undertaken manually. The said paper based system could suffer the time consequences as indicated by [1] that doctors spend a lot of time writing diagnosis and prescriptions by hand, instead of spending it more productively on diagnosis and prescription to more patients. Implementation of an automated maternity management information system, can aid overcoming the challenges of the paper based system, at the Katutura Hospital. This would benefit the patients whose care would be greatly improved and also increase the efficiency of the medical staff at Katutura hospital.

A paper based system may require large storage space. This is confirmed by [2] work in which, the researcher [2] indicated that paper based medical records require physical space for storage purposes and the required physical space could become large over a long period

of time. Considering the possibility of computing systems storing millions of patient medical records, the need to consider development of an automated maternity management information system, arises.

Paper based systems do not have multicomponent interventions that are capable of addressing heavy workloads, instantaneously get updated with new information and serve as an up-to-date maternity repository for maternity education. The work of [3] confirms this as the researcher found that paper based system does not instantaneously address heavy workloads like automated systems. The development of an automated maternity management information would therefore be useful in this regard.

Pregnant women seem fragile and forgetful and as a result, they may tend to forget their follow-up appointments. In consonance with this, [4] pointed out that; pregnancy-induced brain fog is a true frustrating hallmark of pregnancy. Considering this and the possibility of pregnant woman suffering from ‘pregnancy-induced brain fog’ and hence the likelihood of forgetting their hospital appointments, there is the need to develop an automated maternity management information system.

Existing automated maternity information systems include the Pregnancy Risk Assessment Monitoring System (PRAMS), Maternal & New-born Clinical Management System (MN-CMS) and the K2 Athena-Electronic and Personal Maternity Record. According to [5], the Pregnancy Risk Assessment Monitoring System (PRAMS) is a state-specific, population-based system that captures data on maternal attitudes and experiences before, during, and shortly after pregnancy and hence not suitable to be used as a maternal information system for individual’s interaction with a hospital. Though an effective and efficient recording information system, reflecting best standards in documentation, Maternal & Newborn Clinical Management System (MN-CMS) was developed in Ireland and might have not considered in a Namibian hospital context and hence the need to develop a tailor made maternity information system for the Katutura Hospital. Though user friendly and keeping records of the pregnancy throughout the whole maternity pathway, the K2 Athena-Electronic and Personal Maternity Record system does not have scheduling and reminders feature and hence the need to develop a maternity information system for the Katutura Hospital that allows for scheduling and reminders.

2. Aim and Objectives

This project designed and developed a maternity management information system for the Katutura Hospital in Namibia. The developed system supports:

- Appointment/booking, self-register and reminders.
- Patients (maternity patients) to make payments online.
- Educative maternity health information and/ or tips.

3. Methodology

Using the prototype methodology (as illustrated in Figure 1), the developers in this project gained inputs and insights from the maternity health system users on how the manual system currently works and how they would like the developed system to operate.

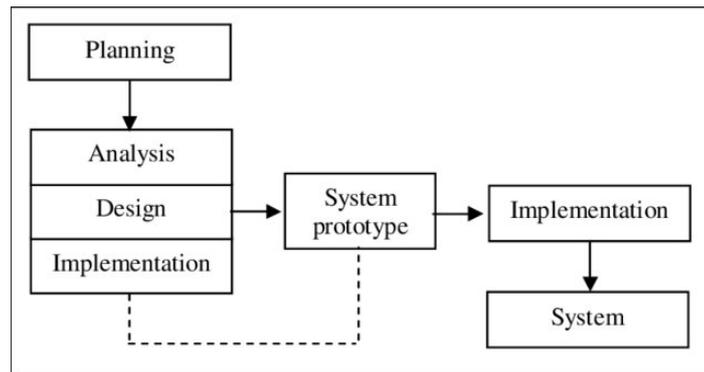


Figure 1: Prototype Methodology (Source: Ahab, Hassan, Mohd, & Hanafi, 2016)

The population of this project was made up of the Katutura maternity department of the Katutura Hospital consisting of Doctors, nurses and pregnant women of the said department. The total population size was 33. Interviews were used to gather the user requirements from the population. The developers applied a qualitative approach to reach a saturation point of and to gather detailed information on the system requirements, and also as common techniques for gathering requirements as indicated by [6].

The tools software tools applied in the system development include JavaScript to define the content of the web pages, HTML XAMPP, HTML for the front end, MYSQL for the back end Database Management System and PHP to connect the front end and the back end. The hardware tools included laptops in good working conditions for the developers use in development and the prototype test, a minimum 4GB RAM to support the XAMPP and also reliable good internet access (in terms of network requirements).

4. Technology Description and Prototype Development

4.1. System Design

Figure 2 provides insight into the context level diagram of the system and is composed of the interaction between the various users of the system and the system. The users of the system include the Admin, patient, Doctor and Nurse.

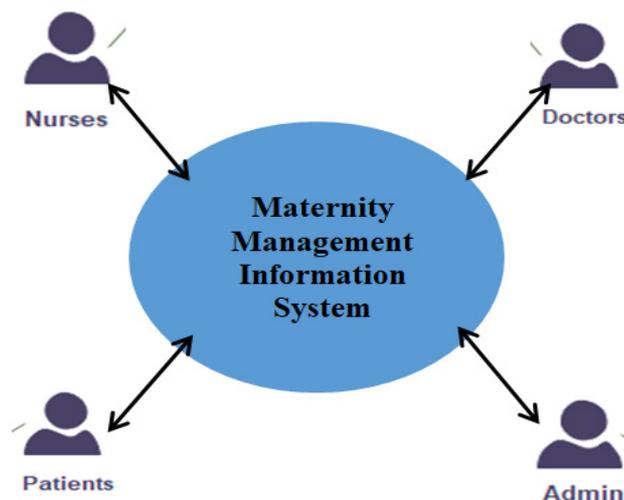


Figure 2: Context level diagram

Figure 3 illustrates the Data Flow Diagram that shows the flow of data between the various system users and processes.

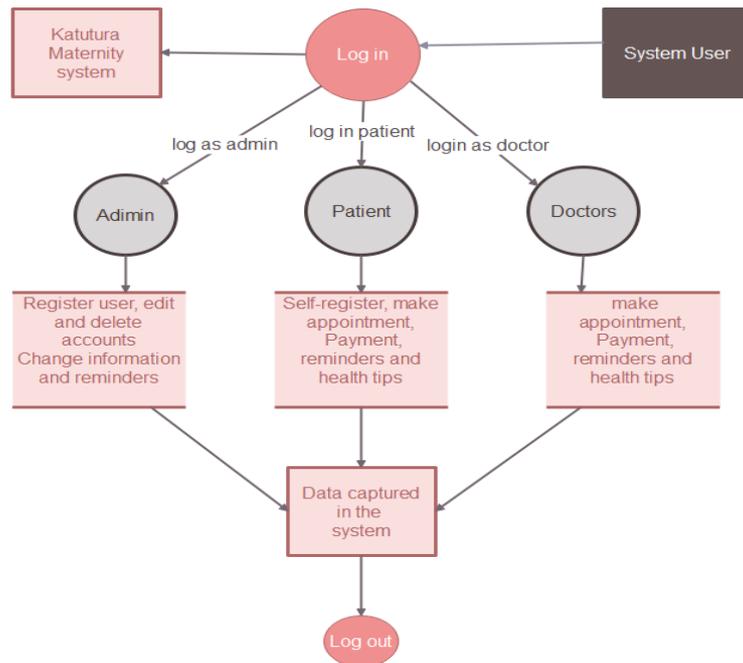


Figure 3: Data Flow Diagram

4.2 System User Interface Components

This section illustrates the user interface screens that users see when interacting with the system. Figure 4 illustrates the homepage of the system. The page incorporates the home, about, appointment, registration, contact and logon Tabs.

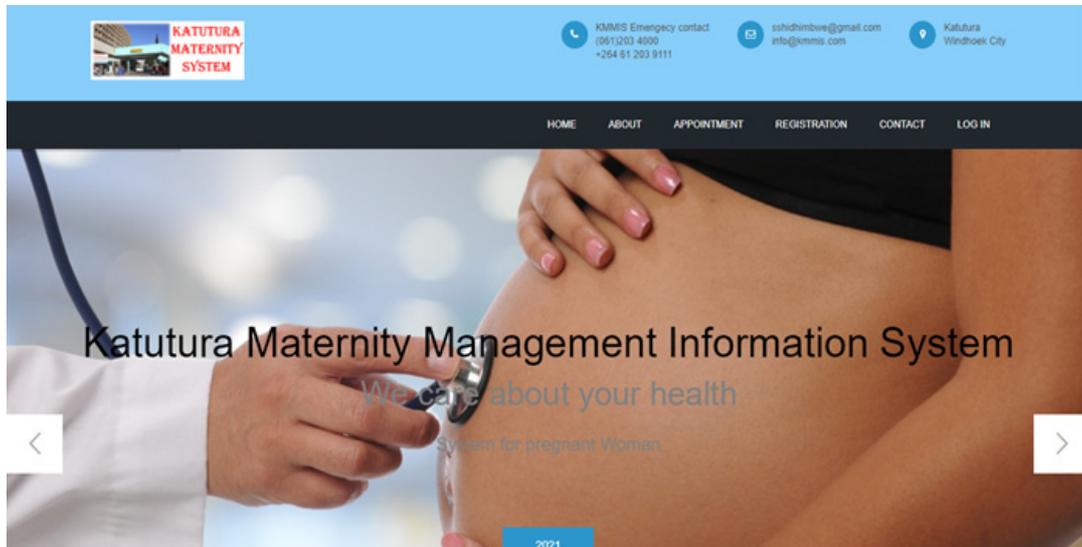


Figure 3: User Interfaces

To self-register and use the system, a user has to click on the registration Tab and the registration panel as in Figure 5, will open up.

The screenshot shows a web form titled "Patient Registration Panel". It contains several input fields: "Patient Name", "Address", "Mobile Number", "Town" (with a "Select" dropdown), and "Email" (with two separate input lines).

Figure 5: Self-Registration Panel

Figure 6 illustrates the appointment interface, where a user is able to book an appointment to see a Doctor or visit the hospital. To book the appointment, the user has to click on the appointment Tab and enter their details (such as; surname, first name, contacts no, physical address, email address, reason for the appointment, proposed appointment date, etc.). The system does not allow a patient to select gender as Female has been selected by default as the users of the system are females seeking a maternity appointment.

The screenshot shows the "Make an Appointment" interface. At the top, there is a blue header with the "KATUTURA MATERNITY SYSTEM" logo and contact information: "KMMIS Emergency contact (06 1 203 4000 +254 61 203 9111)", email "ssh@kmmis.com", and location "Katutura Windhoek City". Below the header is a navigation menu with "HOME", "ABOUT", "APPOINTMENT", "REGISTRATION", "CONTACT", and "LOG IN". The main content area features a form with the following fields: "Patient's Name", "Address", "City", "Contact Number", "admin" (likely a role or user identifier), "Select Gender" (with a dropdown arrow), "Date of birth", "Appointment Date", "Appointment Time", "Select Department" (with a dropdown arrow), and "Select Doctor" (with a dropdown arrow). A background image of a female doctor in a white coat is visible on the right side of the form.

Figure 6: Appointments Interface

Figure 7 demonstrates the payment portal through which users are able to make online payments. To use this portal, the user has to click on the payment Tab, enter her details, visa card number (including expiry date), the amount intended to be paid and the payment date.

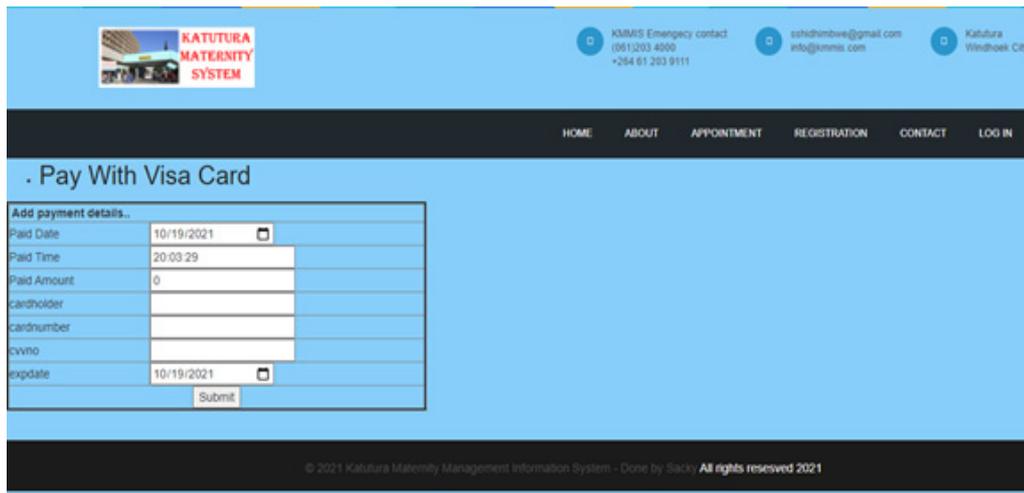


Figure 7: Payment interface

5. Results

The objectives of this project were achieved as the project succeeded in designing and developing the maternity management information system for the Katutura hospital, Namibia. The developed system allows users to self-register, book appointments, get reminders; make payments online, and also access educative maternity health information and/ or tips.

6. Business Benefits

The developed system will benefit the maternity patients (pregnant women), doctors and nurses as it enables pregnant women to access some maternity services online such as maternity health tips, booking/ scheduling appointments online and getting reminders. It would also benefit the Ministry of Health and Social Services as the system will have to up to date records that can be easily retrieved and tabulated compared to the paper based system. It could also possible reduce queues and remove some stress from the patients.

7. Conclusions, Recommendations and Future Work

The project's main objective and sub-objectives were achieved as the project developed the maternity management information system. Due to the timing of this project, the developed system could not integrate the medical aid scheme so medical aid subscribers could use their subscriptions for payments. Similar future projects or a higher version of this system, should consider incorporating medical aid scheme into the system so medical aid subscribers can benefit from their subscription through the system. It is also recommended that a module on prevention of mother-to-child transmission (PMTCT) be incorporated into the maternity management system as it is currently a challenge tracing and monitoring HIV positive pregnant women at Katutura hospital.

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