

**HOSPITAL QUEUE MANAGEMENT APPLICATION FOR KAWEMPE NATIONAL REFERRAL HOSPITAL**

**BY GROUP 4 WITH PARTICIPANTS:**

|  |  |  |
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| **S/NO.** | **NAME** | **REGISTRATION NUMBER** |
| **1** | **SARAH NABITOSI** | **2022/ITB/WKD/0644** |
| **2** | **MARTIN KASEKENDE** | **2022/ITB/WKD/1481** |
| **3** | **LUCKY EKINAHEIRWE** | **2022/ITB/WKD/0308** |
| **4** | **MAJID ILABOROT** | **2022/ITB/WKD/0610** |
| **5** | **PROSCOVIA ATIMANGO** | **2022/ITB/WKD/1595** |

**PROJECT PROPOSAL SUBMITTED TO THE DEPARTMENT OF ICT INPARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A DIPLOMA IN INFORMATION TECHNOLOGY FOR BUSINESS AT UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY.**

**NAME OF SUPERVISOR: MR. MUSINGO STEPHEN**

**JANUARY, 2025**

# **DECLARATION**

We, Group 4, declare that this project proposal "Hospital Queue Management Application" is our original work and has never been submitted or produced by anyone for the award of a degree or diploma at any other institution. The content in this proposal is based on our research and analysis conducted as Group 4.

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| 5 | **PROSCOVIA ATIMANGO** | **2022/ITB/WKD/1595** |  |

# **APPROVAL**

This is to certify that this project proposal "Hospital Queue Management application" has been done by group 4 members in the names of Sarah Nabitosi, Martin Kasekende. Lucky Ekinaheirwe, Majid Ilaborot, Proscovia Atimango and has been examined and approved.

**SIGNATURE**……………………………

**NAME:** MR. MUSINGO STEPHEN

**PROJECT SUPERVISOR**

**DATE……………………………….**

# **LIST OF ACRONYMS**

|  |  |
| --- | --- |
| **ACRONYM** | **MEANING** |
| UICT | Uganda Institute of Information and Communications Technology |
| HQMA | Hospital Queue Management Application |
| CRM | Customer Relationship Management. |
| KNRH | Kawempe Natioanl Referral Hospital |

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# **CHAPTER ONE: INTRODUCTION**

## **1.0 Introduction**

Automated queue management application is an application that helps hospitals to manage patients in efficient way. The system eases patient flow management which is useful for the hospital, help in organizing queuing system that can analyze the queue status and take decision which patient to be served first (Md Nasir Uddm, Mm Rashid, Mg Mostafa, Belayet H, Sm Salam, Na Nithe and Sz Ahmed, 2016)

The research on the queue management application will be targeting and discovering the effects of delay in service.

## **1.1 Background**

Delay in service leads to patient frustration, causes death, and a negative hospital reputation, and sometimes causes death. For example, pregnant mothers when they are delayed to be worked upon leads to loss of both the mother and the child. In addition, the causalities if not attended to in time, lead to death.

Patients spend a considerable amount of time in hospitals waiting for services to be delivered by physicians and other allied health professionals. Delayed access to health care is assumed to negatively affect health outcomes due to delays in diagnosis and treatment. (Musinguzi Conrad 2011/HD07/227IU August 2013).

Not managing hospital queues well, leads to long wait times hence delay in service and serving the last patient first.

## **1.2 Statement of the Problem**

Due to delayed services at Kawempe National Referral Hospital, patients like expectant mothers and children are most affected, as they face prolonged waiting times, delays in receiving diagnostic results, and extended waiting periods for surgeries and specialized treatments. However, there has been effort to construct new buildings and recruitment of more medical workers. Arguably, over the years, healthcare organizations in Uganda have been trying to improve quality and achieve maximum patient satisfaction, though with little success in some cases (Ministry of Health (Republic of Uganda), 2017). Despite the efforts put in place to solve the delayed services at Kawempe National Referral Hospital, areas such as maternal and child care services, emergency department, diagnostic services, outpatient services among others. If the problem of delayed services isn’t solved, there will be increase in maternal and child deaths, **frustration and dissatisfaction, mental health on patients and** delayed diagnosis and treatment.

## **1.3 General Objective**

To develop a Hospital queue Management System that will streamline patient flow, optimize resource utilization and enhance service delivery efficiently.

## **1.4 Specific Objectives**

To study how delay in service affect the patients at Kawempe national referral hospital.

To analyze the effects of delay in service to the patients of Kawempe national referral hospital.

To design a queue management application that will improve patient flow.

To develop a queue management application. that will enable appointment booking and a queue entry, health record integration and feedback collection.

To test and validate the develop queue application.

## **1.5 Scope of the study**

### **Geographical Scope**

The study will study will be carried out at Kawempe National Referral Hospital in Kawempe Division Kampala city

### **Timeframe**

The study will be conducted over a period of 4 months.

### **Technological Scope**

Our system shall have the following features:

* Digital ticketing.
* Real-time updates.
* Integration capabilities. Our system will integrate with the hospital CRM, mobile application and other software.

**Methodology Scope**

We will use a combination of both qualitative and quantitative data collection and analysis method to collect information.

## **1.6 Significance**

The application will help patients to reduce on the long wait time, tell the patients where to go, to which Doctor to go, and inform Doctors to which patients to attend to.

## **1.7 Justification.**

The application should be developed because expectant mothers and children don’t need to spend much time before being worked on which may lead to death of both mother and the baby and long term complications.

# **CHAPTER TWO: LITERATURE REVIEW**

## **2.0 Introduction**

Delay in service leads to patient frustration, causes death, and a negative hospital reputation, and sometimes causes death. For example, pregnant mothers when they are delayed to be worked upon leads to loss of both the mother and the child. In addition, the causalities if not attended to in time, lead to death.

Automated queue management system is a system that helps hospitals to manage patients in efficient way. The system eases patient flow management which is useful for the hospital, help in organizing queuing system that can analyze the queue status and take decision which patient to be served first. (Md Nasir Uddm, 2016)

Patients spend a considerable amount of time in hospitals waiting for services to be delivered by physicians and other allied health professionals. Delayed access to health care is assumed to negatively affect health outcomes due to delays in diagnosis and treatment. (Conrad, 2013)

Kawempe Hospital presently receives over 4,000 pregnant women from all over the country and delivers an average of 60 babies per day, the highest in the country. Not managing hospital queues well, leads to long wait times hence delay in service and serving the last patient first. From our assessment, we realized that service delivery at the hospital has been affected by inadequate medical equipment; the patient-to-medical equipment ratio in maternal and child health is low, resulting in long queues and untimely service, ”Kainobwisho said. “In this regard, supplementing the existing equipment will improve service delivery by significantly reducing the amount of time spent in queues, and improving the patient ratios to the accessibility of medical equipment in the maternal and child health unit. (Nilepost.co.ug, 2023)

## **2.1 State of Practice**

Delay in services. There has been effort by certain organizations such as Stanbic Bank Uganda which donated medical mama kits to KNRH, helping to reduce delays in expectant mothers.

Kawempe National Referral Hospital, it plays a crucial role of providing health care services to a large population in central region. However, it faces a significant challenge related to congestion and delays in providing timely services due to overwhelming patient numbers, limited communication to patients limited medical staff, and referrals from underequipped health centers that has resulted into long waiting hours and delay in service delivery, and health workers also are impacted experiencing burnout and stress due to over whelming patient load and limited resources.

Uganda’s healthcare system is burdened with an ever-increasing patient load.(Kiggundu, 2021)

## **2.2 State of Art.**

**1. Manual Patient Management Systems**

In many healthcare settings across Africa, especially in rural or under-resourced areas, manual systems are still commonly used for managing patient information and appointments. These include:

* **Paper-based Records**: Patient information, treatment history, and referrals are often stored in physical files. Although this is increasingly inefficient, it remains widespread in many public health facilities, particularly in remote regions.
* **Manual Appointment Scheduling**: Clinics and hospitals often use paper registers to schedule appointments or track patient visits. This can lead to inefficiencies, such as scheduling errors and difficulty in tracking patient history.

This system is often characterized by inefficiency, as patients do not have any idea of how long they will wait, and the process can be chaotic. (**Mugisha (2019)**

**2. Electronic Health Record (EHR) Systems**

Several African countries including Uganda are working to transition from paper-based systems to **Electronic Health Records (EHR)** to improve patient management. These systems allow hospitals and clinics to digitally store patient data, track appointments, and provide better continuity of care.

## **2.3 Comparative Evaluation**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **EXISTING SYSTEMS** | **Self-Patient Registration and Appointment Scheduling** | **Token generation and queue assistance** | **Real-time Queue Management and Remote Monitoring** | **Integration with Medical Department** | **Emergency case management** | **Multi-language, channel notifications system and accessibility support** | **Data analytics and reporting** | **Feedback and patient satisfaction** |
| **Manual Patient Management Systems** | **No** | **No** | **No** | **No** | **No** | **Yes** | **No** | **No** |
| **Electronic Health Record (EHR) Systems** | **No** | **No** | **No** | **No** | **No** | **Yes** | **No** | **Yes** |
| **Hospital queue management application** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** | **Yes** |

# **CHAPTER THREE: METHODOLOGY**

## **3.0 Introduction**

**3.1 To study how delay in service affect the patients at Kawempe national referral hospital.**

* The researcher will carry out interviews within the patients and staff at Kawempe National Referral Hospital to get clear information regarding the effects of delay in services.
* The researcher will use a questionnaire guide to follow the questions in order during interviews.
* The researcher will use a notebook to write down the information got from patients and staff, a camera will be used to take pictures of necessary events.
* The researcher will use literature from past data.

**3.2 To analyze the effects of delay in service to the patients of Kawempe national referral hospital**.

* The researcher will use graphical analysis such as pie chart.
* The researcher will use data analysis software such as Microsoft Excel.

**3.3 To design a queue management Application that will improve patient flow.**

* The researcher will use software for developing the application.
* The researcher will use computers.
* The researcher will use Entity Relationship Diagrams (ERD).

3.4 **To develop a queue management application that will enable appointment booking**

**and a queue entry, health record integration and feedback collection.**

* The researcher will use HTML and Java script to design the use interface and enhancing interaction and user experience.
* The researcher will use Database management system like MySQL for storing and managing data,

**3.5 To test and validate the develop queue application.**

* The researcher will observation methods to find out if the developed application works fully.
* Interviews will be used among the patients and staff.

## **4.1 System Study**

## **Interviews**

Interviews will be conducted with the most affected people for example, patients, healthcare providers in Kawempe national referral hospital, community leaders, and regulatory bodies. These interviews will help us to gather qualitative data on the current challenges and requirements for the streamlined service delivery and reducing congestion in the hospital.

**Observations**

Direct observations will be carried out in various departments in Kawempe national referral hospital; this will provide insights into the operational processes and identify any gaps in the current system of the hospital.

**Document Review**

Relevant documents such as policy papers, project reports, and existing literature on hospital queue management systems will be reviewed. This will help understand the regulatory framework, best practices, and previous efforts and identify the gaps in the current system in the Kawempe national referral hospital

## **4.2 System Analysis**

## **Use-Case Diagrams**

Use-case diagrams will be created to visualize the interactions between users (Kawempe national referral patients, healthcare providers, community members, and regulators) and the proposed system. This will help identify the key functionalities and user requirements.

**Flow Charts**

Flow charts will be used to map out the processes involved to get service delivery at Kawempe national referral hospital. This will aid in understanding the workflow and identifying any potential areas for improvement.

## **4.3 System Design**

### **Data Flow Diagrams**

Data flow diagrams (DFDs) will be used to depict the flow of information within the system. These diagrams will illustrate how data is processed and exchanged between different components of the system.

Entity Relationship diagram will be used.

## **5.1 System Development**

The system will be developed as a hospital queue management system that will enhance patient flow, reduce waiting times, and improve service delivery.

**Front-End Tools:**

- HTML/CSS for designing the user interface.

- JavaScript for enhancing interactivity and user experience.

- Frameworks like React or Angular for building dynamic web applications.

**Back-End Tools:**

- Server-side programming languages like Python and Java script.

- Database management systems like MySQL or MongoDB for storing and managing data.

- RESTful APIs for enabling communication between the front-end and back-end.

## **5.2 System Testing**

System testing will be conducted to verify that all components work together as intended. This will involve testing the complete application for any defects or issues.

**User Acceptance Test**

User Acceptance Testing (UAT) will involve key stakeholders for example the hospital administration and health workers and patients testing the system in a real-world scenario. This will ensure that the system meets their needs and expectations before final deployment.

## **6.0 References.**

*HEALTH LEAVING*. (2019, 08 04). Retrieved from DAILY MONITOR: https://www.monitor.co.ug/uganda/magazines/healthy-living/biogas-solution-to-unclean-kitchen-smokes-1841184

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# **APPENDIXES**

## Appendix i

## **Time Frame.**

## Appendix A: **Time Frame.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ACTIVITIES | NOVEMBER | | | | DECEMBER | | | | JANUARY | | | | FEBRUARY | | | | MARCH | | | |
| Week | | | | Week | | | | Week | | | | Week | | | | Week | | | |
| 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Project identification and concept note presentation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Project Proposal presentation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Gathering information and analysis |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System Analysis |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System Design |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System Development and testing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System review/ Maintenance |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Appendix ii

## **Budget.**

|  |  |  |  |
| --- | --- | --- | --- |
| **ITEM** | **QUANTITY** | **UNIT COST(SHS)** | **AMOUNT(SHS)** |
| Laptop | 1 | Catered for |  |
| Travel/Transport | 5 | 50,000 | 250,000 |
| Internet Bundles | 40GB | 5,000 | 200,000 |
| Sim Card | Catered For |  |  |
| Firewall | 1 | 250,000 | 250,000 |
| Software and Tools | 2 | 150,000 | 300,000 |
| Presentation / Distribution | 5 | 10,000 | 50,000 |
| Contingency (Emergencies) |  | 200,000 | 200,000 |
| Miscellaneous |  | 100,000 | 100,000 |
| **TOTAL AMOUNT** |  | | **1,350,000** |