

# Design and Proposed Implementation of an Integrated Information and Inventory System with Monitoring Features for a Clinic

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**Abstract** - Small clinics commonly rely on manual processes or basic spreadsheets to track patient information and medical supplies. While these approaches may be manageable in low-volume settings, they become increasingly problematic as clinics grow, leading to issues such as duplicate records, misplaced files, and unexpected stockouts of critical medical supplies. Existing healthcare information systems are largely designed for large hospital settings, requiring advanced infrastructure that is impractical and financially prohibitive for small to medium-sized clinics. This paper proposes the design and development of an integrated information and inventory management system tailored for Grace Optical Clinic in Tacurong City, Sultan Kudarat. The proposed system aims to centralize patient records and supply tracking into a single, accessible platform and will incorporate monitoring features such as low-stock alerts and summary reports to support decision-making. The system is currently under active development using Python and SQLite, guided by the Software Development Life Cycle (SDLC) Waterfall model. This study addresses a recognized gap in existing literature the absence of lightweight, integrated management systems specifically designed for small clinic environments.

**Index Terms** - Clinic information system, inventory management system, healthcare information system, decision support, system development, integrated management system.

## I. INTRODUCTION

The role of information systems in healthcare has grown tremendously over the years, and for good reason, they help facilities run smoother, serve patients faster, and make better decisions. Most large hospitals have already made the shift, using comprehensive digital systems to manage everything from patient admissions to supply chains. But for smaller clinics, the reality is quite different. Many still rely on handwritten records, scattered files, and basic spreadsheets just to get through the day.

Grace Optical Clinic in Tacurong City, Sultan Kudarat is one such facility. Like many small clinics, it currently manages patient records manually or across multiple disconnected files, and tracks medical supplies either by hand or through a simple spreadsheet. This setup may have worked when the clinic was smaller, but as the number of patients has grown,

so have the problems. Finding a patient's record can take several minutes. Data sometimes gets written down twice or not at all. And on more than one occasion, the clinic has run out of supplies without any prior warning.

What makes this situation frustrating is that solutions already exist but not for clinics like this one. Most healthcare information systems on the market today were built for hospitals. They are expensive, complex, and require dedicated technical staff to maintain. For a small clinic with limited resources and a small team, adopting these systems is simply not realistic.

This is the gap that the present study seeks to fill. The goal is to design and develop a system that brings together patient record management and inventory tracking under one roof something practical, easy to use, and built specifically with small clinics in mind. No unnecessary complexity, no steep learning curve. Just a tool that helps the clinic do its job better.

## II. METHODOLOGY

### A. Research Design

This study employs a developmental research design, focusing on the design and proposed implementation of an integrated information and inventory system for a clinic setting. The development process follows the Software Development Life Cycle (SDLC) Waterfall model, which provides a structured, sequential approach to system development. The Waterfall model was selected for its clarity and suitability for projects with well-defined requirements, making it appropriate for a small clinic environment where stakeholder needs can be clearly identified upfront.

### B. Requirements Gathering

The researchers conducted structured interviews and direct observation sessions with the clinic staff of Grace Optical Clinic. The goal was to document existing workflows, identify operational pain points, and define the functional and non-functional requirements of the proposed system. Key issues identified during this phase included:

- Slow and inconsistent manual data entry processes
- Lack of a centralized repository for patient records
- Inability to receive timely alerts when inventory levels fall below acceptable thresholds
- Difficulty generating summary reports for administrative decision-making

### C. System Design

Based on the gathered requirements, the system was designed with the following architecture and components. The proposed system follows a three-layer architecture consisting of a presentation layer (graphical user interface), a logic layer (application processing), and a data layer (SQLite database). The system design is guided by the principles of simplicity, reliability, and ease of use to ensure successful adoption by non-technical clinic staff.

The technology stack for the proposed system consists of Python as the primary programming language due to its readability, extensive library support, and suitability for rapid application development, and SQLite as the database management system due to its lightweight nature, zero-configuration setup, and portability making it ideal for a local desktop application in a small clinic environment.

### D. Functional Requirements

The proposed system will fulfill the following functional requirements:

- Patient Registration Module: Allows staff to register new patients and maintain a complete profile including personal information and contact details.
- Medical Records Module: Enables the creation, retrieval, updating, and archiving of patient medical records, including visit history and prescribed treatments.
- Inventory Management Module: Provides tools for adding, updating, and removing inventory items, with tracking of stock quantities and item descriptions.
- Low-Stock Alert Module: Automatically notifies clinic staff when the quantity of any inventory item falls below a predefined minimum threshold.
- Reports and Dashboard Module: Generates summary reports on patient records, visit trends, and inventory status to support administrative decision-making.

### E. Non-Functional Requirements

The system is also designed to meet the following non-functional requirements:

- Usability: The interface must be intuitive and navigable by clinic staff with minimal technical training.
- Reliability: The system must maintain data integrity and perform consistently without unexpected failures during normal clinic operations.
- Performance: The system must respond to user inputs and database queries within an acceptable time frame to avoid disrupting clinic workflows.
- Security: Access to the system will be protected by a login mechanism to prevent unauthorized use or data exposure.
- Maintainability: The codebase will be structured and documented to allow future updates and modifications with minimal effort.

### F. Development Phase

The system is currently under active development. Using Python and SQLite, the development team is building each module sequentially in accordance with the Waterfall model. Initial prototypes of the patient registration and inventory tracking modules have been completed and are undergoing internal review. The development process includes code documentation, version control, and iterative internal testing at each module stage before proceeding to the next.

### G. Planned Evaluation

Upon completion of the system, a formal evaluation will be conducted to assess its effectiveness and usability. The evaluation plan includes the following components:

- System Usability Scale (SUS) Survey: Clinic staff will complete the standardized 10-item SUS questionnaire to evaluate the perceived usability of the system. SUS scores will be interpreted using established benchmarks.
- Performance Benchmarking: Key performance indicators will be measured before and after system deployment, including average time to retrieve a patient record, frequency of stockout incidents, and rate of data entry errors.
- Stakeholder Interviews: Qualitative feedback will be collected from clinic administrators and staff to identify areas for improvement and assess satisfaction with the system's features.
- Accuracy Testing: The system's data output and alert mechanisms will be tested against known datasets to verify correctness and reliability.

## III. RESULTS

The development of the proposed system is still ongoing, but some of its core parts have already been created and tested at a basic level. These include the patient registration and inventory tracking modules. From the early stages of testing, it can be seen that the system is able to store and

organize data in a more structured way compared to the clinic's current manual and spreadsheet-based methods.

Based on the requirements gathered from the clinic staff, the system was designed to directly address their common problems such as slow data entry, difficulty in finding patient records, and lack of proper inventory monitoring. The initial results show that having a centralized database can reduce repeated encoding and make information easier to access.

In terms of inventory, the system shows potential in helping monitor stock levels more effectively. The planned low-stock alert feature is expected to notify staff before supplies run out, which could help prevent unexpected shortages.

Although the system is not yet fully completed or deployed, the current progress suggests that it is on the right track. The design and initial outputs indicate that the system can improve workflow, reduce errors, and make daily clinic operations more organized once fully implemented.

#### IV. CONCLUSION

This study focused on designing a system that can manage both patient information and inventory in a small clinic setting. The goal was to create a solution that is simple, practical, and suited to the actual needs of clinics like Grace Optical Clinic.

Based on the findings from interviews, observation, and initial development, it is clear that the current manual and semi-digital processes of the clinic have several limitations. These include slow record retrieval, possible data duplication, and lack of proper monitoring of medical supplies. The proposed system was designed to address these issues by bringing everything into one platform.

Even though the system is still under development, the early results show that it has strong potential to improve how the clinic handles its data and inventory. By organizing information in one place and adding features like alerts and reports, the system can help staff work more efficiently and make better decisions.

This study is limited by the fact that the system is still under active development and has not yet undergone full deployment in an actual clinic environment. Additionally, the proposed system is currently designed specifically for small clinic operations and may require further scalability improvements for larger healthcare facilities. Future work will focus on completing the remaining system modules, conducting comprehensive usability and performance evaluations, and exploring additional features such as cloud-based backup, appointment scheduling, and multi-user access control.

Overall, the study shows that small clinics do not necessarily need complicated or expensive systems to

improve their operations. A simple and well-designed system can already make a big difference. Future work will focus on completing the system and testing it in an actual clinic setting to see how effective it is in real use.

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