**Pharmacy Inventory Management System**

**MOHAMED ABDI MOHAMED**

**A proposal project submitted for the partial fulfillment of the award in degree in computer science.**

2024

**Declaration**

This proposal project is my original work and has not been presented for a degree in any other universities

--------------- ---------------

Signature Date

This proposal project has been submitted for examination with my approval as university Supervisor

--------------- ---------------

Signature Date

i

**Abstract**

The inefficiencies in pharmacy inventory management, such as stockouts, overstocking, and poor expiration control, pose significant operational and financial challenges. This study aims to develop a Pharmacy Inventory Management System (PIMS) to address these issues by optimizing stock tracking, expiration monitoring, and real-time inventory reporting. Data will be gathered through structured interviews and system observation. Analysis will involve both qualitative and quantitative methods, focusing on identifying inventory management gaps. The findings will provide insights for better decision-making, while the recommendations will propose system improvements to streamline inventory operations and minimize losses.

ii

**Table of Contents**

Declaration..................................................................................................i

Abstract ........................................................................................................ ii

**CHAPTER 1**

* 1. Background ................................................................................................... 1
  2. Introduction ...................................................................................................................... 2
  3. Statement of the Problem ................................................................................................ 3
  4. Proposed Solution ............................................................................................................ 4
  5. Objectives ..........................................................................................................................4

**1.1 Background**

The management of pharmaceutical inventories is a critical issue affecting healthcare providers globally. With the increasing complexity of drug formulations, regulatory requirements, and supply chain logistics, pharmacies face significant challenges in ensuring the availability of essential medications. According to the World Health Organization (WHO), inefficient inventory management can lead to medication shortages, wastage of resources, and compromised patient care. As global health systems strive for efficiency and sustainability, the need for robust inventory management systems becomes paramount.

Globally, the healthcare sector has recognized the importance of effective inventory management. Advanced technologies, such as automated systems and artificial intelligence, are being implemented to enhance tracking, forecasting, and replenishment processes. Countries with developed healthcare infrastructures have reported improved patient outcomes and reduced costs through the adoption of these systems. However, many regions still struggle with outdated practices, resulting in significant challenges, including stockouts, overstocking, and regulatory non-compliance.

In Kenya, pharmacies encounter a unique set of challenges that affect their operational efficiency. The local healthcare landscape is characterized by a high demand for medications, fluctuating supply, and varying levels of access to modern inventory management technologies. Many pharmacies still rely on manual tracking methods, which can lead to significant inventory discrepancies and inefficiencies.

Additionally, issues such as limited access to reliable internet connectivity and a lack of training on advanced inventory management practices further complicate the situation.

As the Kenyan healthcare environment continues to evolve, there is an urgent need for an effective Pharmacy Inventory Management System (PIMS) that addresses these local challenges, improves inventory accuracy, and enhances overall operational efficiency. Implementing such a system can lead to better resource utilization, reduced wastage, and improved patient satisfaction.

1

**1.2 Introduction**

Pharmacy inventory management is a crucial component of the healthcare supply chain, significantly impacting the quality of patient care and the efficiency of pharmaceutical operations. As the demand for medications and healthcare services continues to rise, effective inventory management has emerged as a vital area of focus for pharmacies seeking to enhance their operational efficiency and meet patient needs.

On a global scale, the pharmacy sector is undergoing a transformation driven by technological advancements, evolving patient expectations, and increased regulatory scrutiny. Many countries are adopting sophisticated inventory management systems that leverage automation, data analytics, and artificial intelligence to optimize stock levels and streamline operations. These innovations not only enhance the accuracy of inventory tracking but also enable pharmacies to respond swiftly to changes in demand, thereby minimizing stockouts and reducing waste from expired medications.

In Kenya, the landscape of pharmacy inventory management presents unique challenges and opportunities. The country is home to a diverse array of pharmacies, ranging from large chains to small community outlets, each facing different operational hurdles. While some larger pharmacies have begun to embrace technology-driven solutions, many smaller pharmacies still rely on traditional manual inventory management methods. This reliance on outdated practices often leads to inefficiencies, stockouts, and wasted resources due to expired medications.

Local pharmacies also contend with issues such as fluctuating demand for medications, limited access to reliable supply chains, and regulatory compliance challenges. The increasing prevalence of both communicable and non-communicable diseases necessitates a more strategic approach to inventory management, ensuring that essential medicines are consistently available to meet patient needs.

As the Kenyan healthcare landscape evolves, there is a pressing need for tailored Pharmacy Inventory Management Systems (PIMS) that address these local challenges and improve the overall efficiency of pharmaceutical operations. This research aims to explore existing gaps in

2

inventory management practices within Kenyan pharmacies and identify innovative solutions to enhance their operational effectiveness, ultimately improving patient care.

**1.3 Statement of the Problem**

Despite the critical role that effective inventory management plays in ensuring the availability of essential medications, Kenyan pharmacies continue to face significant challenges that compromise their operational efficiency and patient care. The primary problem is the persistent issue of stockouts and overstocking of medications in pharmacies across the country. A study conducted in Nyamira County revealed a stockout rate of 52.12% for antiretroviral medicines, while stock wastage stood at 43.2%. Such statistics highlight a systemic issue in managing inventory, which not only compromises patient care but also leads to financial losses.

The challenges associated with inventory management are multifaceted. On one hand, stockouts of essential medications can lead to delayed treatments, increased morbidity, and in severe cases, preventable fatalities. Patients relying on chronic medications or those requiring urgent care may face dire consequences when essential drugs are unavailable. This not only affects individual health outcomes but also strains the broader healthcare system, leading to increased hospital admissions and extended treatment times.

On the other hand, overstocking poses its own set of challenges. Pharmacies often find themselves with excessive inventory that may exceed demand, resulting in wastage from expired medications. This not only represents a significant financial loss but also contributes to environmental concerns related to the disposal of expired pharmaceutical products. The inability to effectively manage inventory thus impacts both the economic viability of pharmacies and the sustainability of healthcare practices.

Furthermore, the lack of advanced inventory management systems exacerbates these issues. Many local pharmacies rely on manual tracking methods, which are prone to human error and inefficiencies. Additionally, limited access to technology and training prevents pharmacies from adopting more effective inventory management practices,

3

leading to a cycle of inefficiency.

**1.4 Proposed Solution**

This research seeks to develop a modern Pharmacy Inventory Management System (PIMS) aimed at tackling the critical issues of stockouts and wastage in Kenyan pharmacies. The solution will draw from advanced inventory management models globally, incorporating real-time data analytics, demand forecasting, and cloud-based inventory tracking. Recent innovations, such as artificial intelligence in predictive ordering and global supply chain integration, will be studied to enhance the system's efficiency.

Best practices from countries like South Africa and Rwanda, which have adopted technology-driven healthcare solutions, will be compared and analyzed. The research will identify the most effective strategies used in these systems, such as optimizing supply chain responsiveness and improving medication availability, and tailor them to the Kenyan context.

This research aims to deliver a solution that responds to the challenges of fluctuating medication demand, unreliable supply chains, and manual inventory errors. The research will emphasize addressing local needs while utilizing the most current and effective inventory management practices from global case studies, contributing to both operational efficiency and better patient outcomes in Kenya’s pharmaceutical sector.

* 1. **Objectives**

General Objectives:

To develop a Pharmacy Inventory Management System (PIMS) that improves medication availability and reduces wastage in Kenyan pharmacies.

Specific Objectives:

1. To investigate the current inventory management practices in pharmacies in Kenya.
2. To design and develop a data-driven inventory management model based on global best practices.
3. To implement and test the PIMS within select pharmacies to assess its operational effectiveness.

4

1. To evaluate the impact of PIMS on reducing stockouts, minimizing wastage, and improving overall pharmacy efficiency.
   1. **Research Questions**
2. What current inventory management practices are prevalent among pharmacies in Kenya, and how do they affect medication availability?
3. In what ways can global best practices in pharmacy inventory management be tailored to meet the specific needs of Kenyan pharmacies?
4. What essential features should a Pharmacy Inventory Management System (PIMS) include to effectively address local challenges in inventory management?
5. How does the implementation of a PIMS influence stockout rates and medication wastage in selected pharmacies?
6. What role does training and capacity building of pharmacy staff play in the successful adoption of a new inventory management system?

5