



Inventory Management in a Medical Store

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Abstract

This project focuses on developing an efficient inventory management system tailored for a medical store. The primary objective is to streamline the tracking, ordering, and stocking of pharmaceutical products to ensure optimal inventory levels, minimize wastage, and prevent stockouts or overstocking. The system includes modules for product categorization, real-time stock updates, expiry date tracking, automated reordering alerts, and sales monitoring. By integrating these features, the system aims to improve operational efficiency, reduce manual errors, and enhance customer satisfaction. The solution is designed to be user-friendly, secure, and adaptable to the specific needs of small to medium-sized medical stores.

Keywords

Inventory Management, Medical Store, Pharmacy Management.

Introduction

Inventory management in a medical shop refers to the process of efficiently handling the purchase, storage, tracking, and sale of medicines and healthcare products. It plays a vital role in ensuring that the right medicines are available at the right time, in the right quantity, and in good condition. Since pharmacies deal with sensitive and often life-saving products, proper inventory control is essential not only for smooth business operations but also for maintaining public health and safety. An effective inventory system helps in avoiding overstocking, stockouts, and expiry-related losses, while also supporting compliance with legal and regulatory standards. In today's

competitive and regulated pharmaceutical environment, inventory management is a key factor in the success and reputation of a medical shop.

Problems Of Using the Paper Based System

- Most of the medical representatives are making excess orders.
- Most of the customers are facing time consumption when they order through the phone.
- Some medical representatives do delay to make an order with Company. They forget to make the orders.
- When the medical representatives forget or delay to make an order to 9
- Company, this is making delay to deliver the goods to the customers which disappoints them.
- Some of the hand written orders are getting lost from an accountant Some customers are buying the goods themselves which makes time consumption and the delay in arrival of goods.

User Requirements

The following are the user requirements for Medical Stock

- Company wants to avoid the medical sales representative to make an order from the hospitals or pharmacies.
- Company wants to have direct contact with the pharmacies.
- Company wants the medicine to be ordered instantly.
- Pharmacists wants the medicine to be delivered without getting delayed.and want to avoid the medical sales representative from making the order.
- Company and Pharmacies want to save the order as pdf files.
- Company wants to avoid pharmacists from over ordering the stock.
- Our stock details should not be able to edit by the pharmacists.
- Company wants to add and update the stocks.
- Company wants to display the stock available to the pharmacists.

Literature Review

1. Chandra and Raman (2019) emphasize that ABC and VED analyses significantly enhance inventory prioritization, helping pharmacies optimize stock levels and minimize losses. Similarly, Patel and Mehta (2018) demonstrate that applying First Expiry First Out (FEFO) systems can effectively reduce expired drug wastage.

2. Technology plays a crucial role in modern inventory management. Gupta et al. (2020) found that using dedicated pharmacy software improves real-time stock monitoring and reduces errors compared to manual methods. Supporting this, Zhu and Wu (2021) noted that digital inventory solutions increase transparency and allow better demand forecasting.
3. Saha and Roy (2017) suggest that integrating inventory management software with sales systems enhances operational efficiency and regulatory compliance. Reddy (2019) further identified that cloud-based pharmacy management systems help in reducing inventory holding costs.
4. Regulatory compliance is another key factor. World Health Organization (2003) guidelines on Good Storage Practices stress maintaining proper environmental conditions and conducting regular stock audits. Central Drugs Standard Control Organization (2018) and EMA (2013) outline similar standards under Schedule N and GDP norms, respectively.
5. Kumar and Singh (2021) studied small retail pharmacies and found that lack of training, inadequate staff, and poor software adoption are major challenges in inventory management. Narula (2018) suggests that pharmacist training programs can significantly bridge this gap.
6. Risk management through inventory control has also been explored. Sharma and Gupta (2020) emphasize that frequent audits and robust batch tracking are crucial to minimizing financial losses and ensuring patient safety.
7. International perspectives also inform best practices. FIP (2014) recommends systematic documentation to trace pharmaceutical products throughout the supply chain, while WHO (2010) highlights the importance of supply chain integrity through Good Distribution Practices.
8. Specific legal frameworks such as the Drugs and Cosmetics Act (1940) and the Pharmacy Act (1948) in India mandate that licensed pharmacists must manage pharmaceutical inventories according to strict quality and record-keeping norms.
9. Joshi and Verma (2020) reported that predictive analytics in inventory management can forecast seasonal demand, such as increased cold and flu medication needs, thereby minimizing stock-outs.
10. Finally, Patel (2021) emphasized that proper supplier management and diversification are critical for ensuring consistent stock replenishment and negotiating better prices.

Research Gap for the Study

1. Lack of Region-Specific Data:

Most studies on inventory management are focused on large hospitals or pharmaceutical industries. There is limited research specifically addressing the practices, challenges, and needs of small to medium-sized medical shops, especially in semi-urban or rural areas.

2. Technology Adoption Gap:

While inventory software like Marg or Med Assist is available, there is little research on how effectively these tools are being adopted and used by small medical shops, and what barriers exist (cost, training, awareness).

3. Limited Data on Seasonal Demand Forecasting Practices:

There is a gap in understanding how well seasonal demand is predicted and managed in retail medical shops, and what methods or tools are being used for this purpose.

4. Vendor Relationship Impact:

Few studies explore the effect of vendor performance and management on inventory efficiency, medicine availability, and shop profitability in the retail setting.

5. Staff Training and Human Error:

There is insufficient focus on how human error and lack of staff training affect inventory accuracy and compliance, and what cost-effective training models could be implemented.

Methodology

1. Research Design

This study adopts a mixed-method approach to analyze inventory management strategies used in medical stores. It combines qualitative and quantitative data through primary research, secondary research, a case study, and an evaluation of inventory control tools.

2. Primary Research

2.1. Objectives:

To understand the on-ground practices of inventory management in pharmacies.
To identify common challenges like overstocking, expiry, or stockouts.

2.2. Methods:

Surveys and Questionnaires:

Distributed to pharmacists, store managers, and procurement staff to collect data on:

- Inventory turnover rate
- Expired stock ratio
- Ordering frequency
- Use of technology in inventory

Interviews:

Conducted with pharmacy owners and staff to gain insights on:

- Supplier relationships
- Decision-making on stock levels
- Reordering practices

Observations:

- Direct visits to medical stores to observe:
- Storage practices
- Labeling and categorization
- Expiry date monitoring systems

3. Secondary Research

3.1. Sources:

- Academic journals, industry reports, and government guidelines (e.g., FDA regulations).
- Literature on inventory control in the healthcare or pharmaceutical sector.
- Data from pharmacy chains and inventory software vendors.

3.2. Purpose:

- To benchmark best practices in medical inventory management.
- To understand regulations around drug storage and inventory tracking.
- To review past studies on minimizing drug wastage and managing expiry dates.

4. Case Study of an Existing Pharmacy

4.1. Pharmacy Selection Criteria:

A medium-sized, urban-based pharmacy with digital inventory systems.
Willingness to share operational data (anonymously, if needed).

4.2. Data Collected:

- Current inventory processes (manual vs. automated)
- Frequency of stock audits
- Use of expiry tracking systems
- Monthly reports of stockouts and expirations
- Supplier lead times and order accuracy rates

4.3. Analysis:

- Compare actual practices with theoretical models.
- Identify gaps and inefficiencies.
- Recommend improvements based on findings.

5. Use of Inventory Control Tools

5.1. Tools Evaluated:

- ABC Analysis: Categorizing medicines based on consumption value.
- FIFO (First In, First Out): Ensuring older stock is sold first to reduce expiries.
- Reorder Point System: Automating purchase orders when stock hits minimum levels.
- Batch Tracking: Monitoring expiry and recall status.

5.2. Technology Used:

- Software like Marg ERP, GoFrugal, or Pharmarack
- Barcode scanners for inventory tracking
- Cloud-based inventory dashboards

Objectives of the study

- To track the orders of the medicine from the pharmacists.
- To make easier for Medi stock to manage the stock of the medicines.

- To prevent the medical sales representatives from making the orders of medicine from the pharmacists.

Data Synthesis and Analysis

The data was collected through a structured questionnaire distributed to 30 medical store owners and pharmacists. The purpose was to evaluate the current inventory management practices and identify common challenges and solutions.

1. Inventory Management Methods

- 40% of respondents use manual methods (registers or Excel).
- 50% use inventory management software.
- 10% use hybrid systems (manual + software).
- Interpretation: Although half use software, a significant portion still relies on manual methods, increasing the risk of human error.

2. Expiry Management Practices

- 70% of stores check for expired medicines monthly.
- 20% check weekly.
- 10% rarely check unless a sale is made.
- Interpretation: Monthly checks are common, but weekly checks are more effective in reducing expired stock accumulation.

3. Use of FEFO System

- 60% of respondents use the First Expiry First Out method.
- 40% do not follow any structured rotation system.
- Interpretation: Lack of FEFO adoption may contribute to higher wastage due to expired products.

4. Use of Inventory Classification (ABC/VED)

- 20% use ABC analysis.
- 10% use VED analysis.
- 70% do not use any inventory classification method.
- Interpretation: There is a major gap in strategic inventory planning; education on these methods could improve cost control.

5. Frequency of Stock Replenishment

- 40% reorder weekly.
- 30% reorder bi-weekly.
- 30% reorder monthly or as needed.
- Interpretation: Frequent reordering helps reduce overstock, but can increase delivery costs and time pressure.

Importance of the Study

- Ensures accurate availability of medicines to meet customer needs.
- Helps in avoiding wastage due to expired stock.
- Supports legal and regulatory compliance in drug storage and record-keeping.
- Maintains cost efficiency through proper ordering and stock rotation.
- Enhances customer satisfaction and trust by reducing stockouts.
- Aids in seasonal forecasting to prepare for demand spikes (e.g., flu season, summer heat).

Challenges

- Overstocking or stockouts due to poor demand forecasting.
- Expiry and wastage from unsold medicines.
- Storage issues for temperature-sensitive drugs (e.g., vaccines).
- Manual errors in counting, record-keeping, and billing.
- Supplier delays leading to unavailability of essential items.
- Lack of software integration between billing and stock systems.

Key Findings

- Regular stock audits help in identifying missing or expired items early.
- Just-in-Time (JIT) inventory reduces holding cost but needs accurate forecasting.
- Vendor performance directly affects stock availability and quality.
- Use of inventory software significantly reduces human error.
- Seasonal demand forecasting improves stock efficiency and customer service.
- Clear roles and training for staff reduce inventory errors.

Suggestions

- Conduct monthly stock audits and maintain audit records.
- Use FIFO/FEFO methods for stock rotation to minimize expiry.
- Adopt inventory management software with system integration.
- Provide regular training to staff on handling, tracking, and software usage.
- Maintain a buffer stock for emergency or high-demand drugs.

- Establish good vendor relations for timely and quality supplies.
- Use data analytics from past sales for better seasonal planning.
- Implement cold storage monitoring for temperature-sensitive drugs.

Conclusion

Efficient inventory management is crucial for the smooth functioning of a medical shop, as it minimizes losses caused by expiry, overstocking, or theft. It ensures the continuous availability of essential medicines, thereby building customer trust and satisfaction. Proper inventory practices also support legal compliance, especially regarding storage conditions, accurate labeling, and proper record-keeping. By investing in suitable technology and staff training, medical shops can significantly enhance the accuracy and efficiency of their operations. A systematic and well-planned inventory system not only reduces unnecessary costs but also improves overall profitability. Therefore, effective inventory management is vital for ensuring the financial health and long-term growth of a medical retail business.

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