

# **ASSESSMENT OF INVENTORY MANAGEMENT PRACTICES FOR ESSENTIAL MEDICINES AT NAIROBI WEST HOSPITAL, KENYA**

Dissertation Submitted to



**The IIHMR University, Jaipur**

for the partial fulfillment for the award of the degree of

Master of Business Administration (MBA)

in

**Pharmaceutical Management**

by

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Under the Supervision and Guidance of

**Dr. Sudhinder Singh Chowhan**

**2025**

REF: TNWH/HRM/REC-025/07/001/2025

3<sup>RD</sup> JULY 2025

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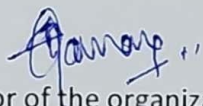
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This is to certify that **Konatham Gowtham Kumar** in partial fulfillment of the requirement for the award of the degree of MBA (Pharmaceutical Management) from the IIHMR University, Jaipur has successfully completed his internship at **The Nairobi West Hospital** during March 24 to June 30, 2025 period.

THE NAIROBI WEST HOSPITAL LTD.  
P. O. Box 43375 - 00100  
NAIROBI

Place: Nairobi, Kenya

Date: 03/07/2025

  
Preceptor of the organization: **Mr. Ashish Raman (COO)**

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## CERTIFICATE

This is to certify that the dissertation titled "Assessment of Inventory Management Practices for Essential Medicines at Nairobi West Hospital, Kenya" is a record of the research work undertaken by Konatham Gowtham Kumar in partial fulfillment of the requirements for the award of the degree of MBA (Pharmaceutical Management) from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.



**Mr. Sudhinder Singh Chowhan**  
Faculty Guide

IIHMR University, Jaipur  
Date

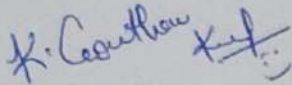


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Date

## DECLARATION BY STUDENT

I hereby declare that this dissertation titled **“Assessment of Inventory Management Practices for Essential Medicines at Nairobi West Hospital, Kenya”** is the Bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.



Konatham Gowtham Kumar

Date: 23/06/2025

# Acknowledgment

At the outset of my thesis, I would like to express my sincere gratitude to all the individuals who have assisted me with this research. Their strong leadership, participation, and encouragement have been instrumental in the completion of this work.

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Thank you.

# Abstract

**Title:** Inventory and Supply Chain Management of Drugs at Nairobi West Hospital, Kenya

**Author Name:** Konatham Gowtham Kumar

**Advisor Name:** Mr. Sudhinder Singh Chowhan

**Keywords:** Inventory Management, Supply Chain, Expiry Drugs, Hospital Pharmacy, Stock Verification, Pharmaceutical Logistics, Drug Availability

## **Background:**

Efficient inventory and supply chain management are critical for maintaining drug availability, minimizing wastage, and ensuring patient safety in hospital settings. Nairobi West Hospital, a leading multi-specialty healthcare provider in Kenya, handles a wide range of pharmaceutical inventory across various departments. However, challenges such as expired medications, delayed procurement, and inconsistent stock levels can impact operational efficiency and patient care outcomes. This internship focused on assessing current inventory practices and supply chain processes to identify areas for improvement.

## **Objective:**

The study aimed to evaluate and enhance the drug inventory and supply chain system at Nairobi West Hospital.

Key objectives included:

- (1) Identifying inefficiencies in stock management practices
- (2) Monitoring and reducing expired drug incidence
- (3) Supporting accurate physical verification processes
- (4) Evaluating internal distribution and supplier coordination
- (5) Recommending practical solutions to optimize inventory control

## **Methodology:**

The study followed an observational and hands-on approach during the internship period from April to June 2025. Data was collected through direct participation in inventory tasks, review of procurement and stock records, and interactions with pharmacy and supply chain staff. Key activities included physical stock checks, expiry drug segregation, drug receipt verification, and documentation audits across departments such as the main pharmacy, central store, OT pharmacy, and casualty unit.

## **Results/Findings:**

The analysis revealed multiple instances of expired stock accumulation due to delayed segregation and lack of proactive tracking mechanisms. Physical verification indicated mismatches between recorded and actual stock levels in some units, especially where manual

documentation was prevalent. Supplier delivery timelines were generally consistent, but internal redistribution delays contributed to stock imbalances. Active involvement in documentation and digital record maintenance contributed to better traceability and real-time availability status.

**Conclusions:**

Strengthening inventory and supply chain management in hospital pharmacies can significantly enhance operational efficiency, reduce wastage, and improve patient outcomes. This study highlighted the importance of timely expiry checks, coordinated inter-departmental distribution, accurate record-keeping, and vendor performance monitoring. The findings support the integration of automated tracking systems and routine inventory audits to establish a more resilient pharmaceutical logistics framework.

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| <b>Abbreviation</b> | <b>Full Form</b>                     |
|---------------------|--------------------------------------|
| ABC                 | Always, Better, Control              |
| VED                 | Vital, Essential, Desirable          |
| HIS                 | Hospital Information System          |
| PIMS                | Pharmacy Inventory Management System |
| EOQ                 | Economic Order Quantity              |

# **CHAPTER: 1 INTRODUCTION**

## **1.1 Background of the Study**

Inventory management is a critical component of healthcare operations, particularly in hospitals like Nairobi West Hospital, where efficient stock control ensures the availability of essential drugs while minimizing costs. Nairobi West Hospital, a key healthcare provider, manages a complex inventory of over 575 drugs, necessitating robust systems to balance cost efficiency with patient care demands. Effective inventory control enhances customer service, reduces financial losses from stockouts or overstocking, and ensures compliance with regulatory requirements. This study focuses on applying inventory control techniques such as ABC and VED Analysis to optimize the hospital's pharmaceutical inventory.

## **1.2 Problem Statement**

The hospital faces challenges in managing its pharmaceutical inventory, including stockouts, overstocking, and inefficiencies in demand forecasting. These issues lead to increased costs, expired drugs, and potential disruptions in patient care. Without a systematic approach to categorize and prioritize drugs based on cost and criticality, the hospital risks financial losses and compromised service delivery.

## **1.3 Research Objectives**

1. To analyze the current demand, consumption patterns, and stock positions of drugs at Nairobi West Hospital.
2. To apply ABC and VED Analysis to categorize drugs and optimize inventory management.
3. To identify strategies for minimizing inventory costs while ensuring timely drug availability.
4. To assess the relationship between sales and inventory to guide future stock planning.

## **1.4 Research Questions**

1. What are the current consumption patterns and stock positions of drugs at Nairobi West Hospital?
2. How can ABC and VED Analysis be used to categorize drugs and improve inventory efficiency?
3. What strategies can reduce inventory costs while maintaining adequate stock levels?
4. How does the relationship between sales and inventory impact future inventory planning?

## **1.5 Scope of the Study**

The study focuses on Nairobi West Hospital's pharmaceutical inventory, analyzing a sample of 100 drugs from a pool of over 575, using data from the hospital's inventory management software (HIS). The study employs ABC and VED Analysis to categorize drugs and is limited to secondary data collected from hospital records.

## **1.6 Significance of the Study**

This study provides actionable insights for Nairobi West Hospital to optimize inventory management, reduce costs, and improve drug availability. By identifying high-value and critical drugs, the hospital can prioritize resource allocation, enhance patient care, and minimize losses from expired or slow-moving stock. The findings may also guide other healthcare facilities in implementing effective inventory control practices.

## **CHAPTER: 2 REVIEWS OF LITERATURE**

## 2.1 Review of Literature

1. **ABC and VED Analysis:** Jaju et al. (2023) investigate the application of ABC and VED analysis in a newly established pharmacy institute. ABC analysis categorizes drugs based on annual consumption value (A: high-value, B: moderate-value, C: low-value), while VED prioritizes items by criticality (Vital, Essential, Desirable). Their case study found that 22.8% of drugs (Category A) accounted for 69.98% of expenditure, highlighting the need for stringent control of high-value items. The ABC-VED matrix optimizes resource allocation but requires robust data systems, which may be absent in smaller pharmacies. Its strength lies in prioritizing critical medications, but its reliance on historical data limits adaptability to demand fluctuations.
2. **Just-in-Time (JIT):** Fishbowl (2024) discusses JIT as a strategy to align inventory replenishment with demand, reducing carrying costs and waste. However, the approach struggled during the COVID-19 pandemic due to supply chain disruptions, as noted by Jobira et al. (2022). JIT's strength is cost efficiency, but its vulnerability to external shocks limits its reliability in volatile healthcare environments.
3. **Vendor-Managed Inventory (VMI):** Cegedim Rx (2022) highlights VMI, where suppliers manage stock levels, improving fill rates and reducing pharmacy workload. A case study by Jaju et al. (2023) demonstrates VMI's effectiveness in urban settings but notes challenges in rural pharmacies due to inconsistent supplier coordination. VMI's strength is automation, but its success depends on reliable vendor partnerships, which may not be feasible for smaller facilities.
4. **Perpetual Inventory Systems:** Ali (2011) describes perpetual systems that use real-time tracking via Pharmacy Inventory Management Systems (PIMS). These systems integrate with electronic health records (EHRs) and point-of-sale systems to monitor stock levels continuously, reducing errors and improving efficiency. Their strength lies in accuracy and automation, but high implementation costs and training requirements pose barriers for smaller pharmacies.
5. **FSN and XYZ Analysis:** Jobira et al. (2022) explore FSN (Fast, Slow, Non-moving) and XYZ analysis to manage stock obsolescence and value consistency. These methods help identify slow-moving items for clearance and prioritize fast-moving drugs. Their practical application is evident in large hospital pharmacies, but manual implementation in smaller settings is labor-intensive and prone to errors.

## 2.2 Challenges in Pharmacy Inventory Management

- **Stockouts and Overstocking:** Jobira et al. (2022) note that stockouts are prevalent in rural and newly established pharmacies due to poor demand forecasting and supplier issues. Overstocking, often resulting from uncollected prescriptions or inaccurate reorder points, leads to expired drugs and financial losses.
- **Lack of Training:** Jaju et al. (2023) highlight that many pharmacy professionals lack training in advanced techniques like ABC-VED or FSN analysis, limiting adoption in resource-constrained settings.
- **Regulatory Compliance:** Ali (2011) emphasizes the need for precise tracking of controlled substances to meet regulatory requirements, as manual systems often fail to provide accuracy.
- **Manual Processes:** Fishbowl (2024) notes that traditional manual methods, such as visual or periodic counts, are error-prone and time-consuming, struggling to scale with inventory complexity.
- **Supply Chain Disruptions:** Jobira et al. (2022) discuss how the COVID-19 pandemic exposed vulnerabilities in pharmacy supply chains, exacerbating stockouts for critical medications.

| Author(s) & Year | Context/Industry    | Focus Area                                 | Key Findings/Insights                                                                                                                                                                       |
|------------------|---------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ali, 2011        | Pharmacy Practice   | Inventory Management Methods               | Inventory is the largest asset in pharmacies, requiring efficient management to reduce costs and ensure medication availability. Describes visual, periodic, perpetual, and hybrid methods. |
| Cegedim Rx, 2022 | Pharmacy Operations | Role of Technology in Inventory Management | Pharmacy Inventory Management Systems (PIMS) automate stock tracking, reordering, and expiration monitoring, improving efficiency.                                                          |
| Fishbowl, 2024   | Pharmacy Operations | Inventory Optimization Strategies          | Just-in-Time (JIT) and perpetual systems minimize waste and costs. Recommends                                                                                                               |



|                            |                                                 |                                      |                                                                                                                                                                                                                                                                                                          |
|----------------------------|-------------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            |                                                 |                                      | weekly stock checks and monthly expiration reviews to prevent stockouts and expired drugs.                                                                                                                                                                                                               |
| Jaju et al., 2023          | Hospital Pharmacy (Newly Established Institute) | ABC-VED Analysis and VMI             | ABC analysis reveals 22.8% of drugs account for 69.98% of expenditure, necessitating stringent control. VMI is effective in urban settings but challenging in rural areas due to supplier issues.                                                                                                        |
| Jobira et al., 2022        | Pharmacy Professionals (Ethiopia)               | Knowledge, Practices, and Challenges | Identifies stockouts, overstocking, and lack of training as key challenges. FSN and XYZ analysis manage obsolescence but are labor-intensive manually.                                                                                                                                                   |
| Santhi & Karthikeyan, 2016 | Pharmaceutical Inventory Models                 | Inventory Control Models             | Reviews pharmaceutical inventory models, emphasizing the need to balance drug availability and cost reduction. demand, no shortages) are often unrealistic in pharmacies, advocating for dynamic models.                                                                                                 |
| Saha & Ray, 2019           | Healthcare (Hospital Pharmacies)                | Inventory Management Systems         | Models and analyzes inventory systems in healthcare, highlighting the complexity of demand forecasting and supply chain management. Suggests further research into AI-driven forecasting.                                                                                                                |
| McKesson, 2023             | Hospital and Health System Pharmacies           | Asset Management and Technology      | McKesson's Asset Management program uses online order systems and mobile computing to optimize drug purchasing. Achieves higher inventory turns (national average 10.2) by focusing on high-value "A items" and purchase history trends. Reduces duplicate inventory and drug waste, freeing up capital. |
| Langate, 2023              | Pharmacy Operations                             | Features of PIMS                     | Highlights key PIMS features: real-time stock tracking, e-prescription integration, and expiry control. Automation                                                                                                                                                                                       |

|                    |                                     |                                             |                                                                                                                                                                                                                                                                                                                  |
|--------------------|-------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    |                                     |                                             | reduces errors, enhances patient safety, and supports multi-location management.                                                                                                                                                                                                                                 |
| LEAFIO AI, 2025    | Pharmacy Chains                     | AI-Driven Inventory Management              | AI-powered systems predict demand, manage expirations, and optimize supplier orders. Features include automated promotion planning and handling of substitute products.                                                                                                                                          |
| Wiisanen, 2021     | Pharmacy Technician Training        | Inventory Control and Regulatory Compliance | Discusses the role of pharmacy technicians in inventory management, emphasizing legal and regulatory considerations. Recommends secure storage for controlled substances and regular cycle counts to maintain accuracy.                                                                                          |
| Matellio Inc, 2024 | Pharmacy Operations                 | AI and Real-Time Analytics                  | Notes the pharmacy inventory management software market grew from \$4.66 billion (2022) to \$5.15 billion (2023), driven by AI and automation. AI forecasting and real-time tracking reduce errors and optimize stock levels. Scalable solutions improve patient outcomes but require significant upfront costs. |
| Datarithm, 2021    | Pharmacy Operations                 | Inventory Management Methods                | Compares visual, periodic, and perpetual methods. Perpetual systems are most effective, using real-time updates and automatic reordering. Manual methods are inefficient and error-prone, missing opportunities for wholesaler returns or transfers, impacting profitability.                                    |
| FreeCE, 2023       | Healthcare and Community Pharmacies | Inventory Management Strategies             | Emphasizes inventory's role in patient safety and operational efficiency.                                                                                                                                                                                                                                        |
|                    |                                     |                                             |                                                                                                                                                                                                                                                                                                                  |

## **CHAPTER:3 RESEARCH METHODOLOGY**

### **3.1 Research Design (Mixed Method Approach)**

The study adopts descriptive research design, primarily relying on quantitative data from secondary sources. While the document does not explicitly describe a mixed-method approach, the use of ABC and VED Analysis suggests a quantitative focus, with potential qualitative insights from understanding hospital operations and vendor relationships. A mixed-method approach could be inferred if interviews or observations were used to complement the data, but the document only mentions secondary data from the Hospital Information System (HIS).

### **3.2 Study Area and Setting**

The study was conducted at Nairobi West Hospital, a healthcare facility managing a pharmaceutical inventory of over 575 drugs. The setting is a hospital pharmacy utilizing an inventory management software (HIS) to track stock levels, consumption, and demand patterns.

### **3.3 Target Population and Sampling Techniques**

**Target Population:** The target population comprises the pharmaceutical inventory of Nairobi West Hospital, specifically the 575+ drugs recorded in the HIS.

**Sampling Techniques:** Purposive sampling was used to select a sample of 100 drugs for analysis. This method was chosen to focus on drugs with significant consumption or criticality, ensuring the sample represents key inventory dynamics.

### **3.4 Data Collection Methods**

**Surveys (Quantitative):** The document does not mention surveys but relies on secondary data extracted from the HIS. This data includes quantity, purchase value, sales value, and consumption patterns for the sampled drugs.

**Interviews (Qualitative):** No interviews are explicitly mentioned in the document. However, qualitative insights could be inferred from interactions with hospital staff or management to understand operational challenges, though this is not detailed.

### **3.5 Data Analysis Methods**

**Quantitative Data Analysis:** The study employed ABC Analysis to categorize drugs based on their consumption value (A: 10% of items, 70% of expenditure; B: 20% of items, 20% of expenditure; C: 70% of items, 10% of expenditure) and VED Analysis to classify

drugs by criticality (Vital, Essential, Desirable). Data was analyzed using inventory management software tools to compute cumulative sales values and percentages.

### **3.6 Ethical Considerations**

**Informed Consent:** Not applicable, as the study used secondary data from hospital records, not involving human participants directly.

**Confidentiality:** The document does not address confidentiality, but it can be assumed that data from the HIS was handled with care to protect hospital and patient information, adhering to standard data privacy protocols.

## **CHAPTER 4: RESULTS**

## Results

The study analyzed 100 drugs from Nairobi West Hospital's inventory using ABC and VED Analysis. Key findings include:

- **ABC Analysis:** Drugs were categorized based on cumulative sales value:
  - **Class A (0–80%):** Includes high-value items like HUMAN ALBUMIN 20% 100ML (11.57% of total expenditure) and MERROBE 1G INJ (14.84%). These items (10% of total) account for ~70% of expenditure, requiring stringent control.
  - **Class B (80–95%):** Includes items like ITOPRIDE SR 150MG TABS (79.93%) and ZYTIGA 250MG TABS (80.54%), representing moderate-value items.
  - **Class C (95–100%):** Includes low-value items like RILIF MR TABS (95.47%) and BEECOX PLUS CAPS (96.40%), constituting 70% of items but only 10% of expenditure.

## ABC Analysis Table

| S.N<br>O | ITEMS                    | QTY   | P.VALUE      | S.VALUE       | Cumulati<br>ve % | AB<br>C<br>Clas<br>s |
|----------|--------------------------|-------|--------------|---------------|------------------|----------------------|
| 432      | HUMAN ALBUMIN 20% 100ML  | 907   | 7,972,530.00 | 11,799,344.40 | 11.57%           | A                    |
| 114      | MERROBE 1G INJ           | 4817  | 2,167,650.00 | 3,338,181.00  | 14.84%           | A                    |
| 75       | ABIRATERONE 250MG TABS   | 7055  | 2,057,713.63 | 3,292,356.85  | 18.07%           | A                    |
| 556      | TIGGY 50MG INJ           | 529   | 1,851,500.00 | 2,740,220.00  | 20.76%           | A                    |
| 1048     | IMMUNOGLOBULIN 5% INJ.   | 79    | 1,738,000.00 | 2,572,240.00  | 23.28%           | A                    |
| 102      | PANTOCID 40MG INJ.       | 5355  | 1,579,725.00 | 2,527,560.00  | 25.76%           | A                    |
| 257      | PIPZO 4.5G INJ           | 2097  | 1,509,840.00 | 2,325,153.60  | 28.04%           | A                    |
| 17       | PARACETAMOL 1G INJ       | 16690 | 1,276,558.00 | 2,318,180.10  | 30.31%           | A                    |
| 736      | KLACID 500MG INJ.        | 259   | 1,495,942.56 | 2,213,994.16  | 32.48%           | A                    |
| 1045     | ZOLADEX DEPOT 10.8MG INJ | 81    | 1,381,621.05 | 2,044,799.39  | 34.49%           | A                    |
| 431      | PALBOCICLIB              | 912   | 1,231,200.   | 1,822,176.0   | 36.27%           | A                    |

|      |                               |      |              |              |        |   |
|------|-------------------------------|------|--------------|--------------|--------|---|
|      | 125MG TABS                    |      | 00           | 0            |        |   |
| 1501 | ACTILYSE 50MG INJ             | 13   | 1,060,683.00 | 1,569,810.84 | 37.81% | A |
| 532  | LANTUS SOLOSTAR 3ML           | 589  | 1,017,625.94 | 1,506,087.40 | 39.29% | A |
| 50   | NERVOPLEX TABS                | 8852 | 827,662.00   | 1,489,770.00 | 40.75% | A |
| 1339 | ENFIERA 500MG INJ             | 28   | 932,400.00   | 1,379,952.00 | 42.10% | A |
| 552  | NOVORAPID FLEXPEN 100U/ML 3ML | 543  | 901,488.60   | 1,334,204.10 | 43.41% | A |
| 320  | ABIRATERONE 500MG TABS        | 1569 | 784,500.00   | 1,208,130.00 | 44.59% | A |
| 901  | HEXAXIM INJ                   | 128  | 785,296.64   | 1,155,410.40 | 45.73% | A |
| 42   | CEFTRIAZONE 1GM INJ           | 9780 | 631,125.00   | 1,146,262.50 | 46.85% | A |
| 703  | PABAL 100MCG/ML INJ           | 296  | 720,121.68   | 1,132,665.92 | 47.96% | A |

|      |                               |       |            |              |        |   |
|------|-------------------------------|-------|------------|--------------|--------|---|
| 1173 | ERBITUX 100MG INJ             | 54    | 760,500.00 | 1,125,540.00 | 49.06% | A |
| 32   | CARTIL SUPER FORTE CAPS       | 12195 | 621,945.00 | 1,119,501.00 | 50.15% | A |
| 34   | NEUROCARE PLUS CAPS           | 11378 | 606,447.40 | 1,091,605.32 | 51.22% | A |
| 300  | LMW ENOX 40MG INJ             | 1775  | 692,250.00 | 1,066,065.00 | 52.27% | A |
| 11   | PREGNACARE PLUS CAPS          | 18540 | 561,984.48 | 1,039,723.20 | 53.29% | A |
| 409  | LEVE Q 500MG INJ              | 1038  | 674,700.00 | 1,039,038.00 | 54.31% | A |
| 9    | GLIPITA M 50/1G TABS          | 19443 | 546,931.59 | 1,011,813.72 | 55.30% | A |
| 499  | RIBOCICLIB 200MG TABS         | 680   | 647,618.40 | 997,335.60   | 56.28% | A |
| 929  | UTRYP 100,000 IU INJ          | 119   | 666,400.00 | 986,272.00   | 57.25% | A |
| 53   | NERVILIN-NT TABS              | 8193  | 541,966.95 | 975,540.51   | 58.21% | A |
| 10   | EMANZEN FORTE TABS            | 19164 | 511,103.88 | 945,551.76   | 59.13% | A |
| 708  | XEVIROL 10MG TABS             | 290   | 638,000.00 | 944,240.00   | 60.06% | A |
| 24   | ESOPRIDE 40MG CAPS            | 14038 | 477,292.00 | 882,990.20   | 60.92% | A |
| 1104 | AZACITIDINE 100MG INJ         | 65    | 600,480.00 | 881,952.00   | 61.79% | A |
| 383  | PABIJECT 1 & 2 INJ            | 1223  | 562,580.00 | 866,373.20   | 62.64% | A |
| 414  | VORICONAZOLE 200MG TABS       | 1022  | 562,100.00 | 865,634.00   | 63.49% | A |
| 166  | AUGMENTIN 1GM TABS            | 3411  | 505,568.63 | 865,427.65   | 64.34% | A |
| 449  | NORADRENALINE INJ. 1:1000 INJ | 839   | 552,100.00 | 837,914.00   | 65.16% | A |

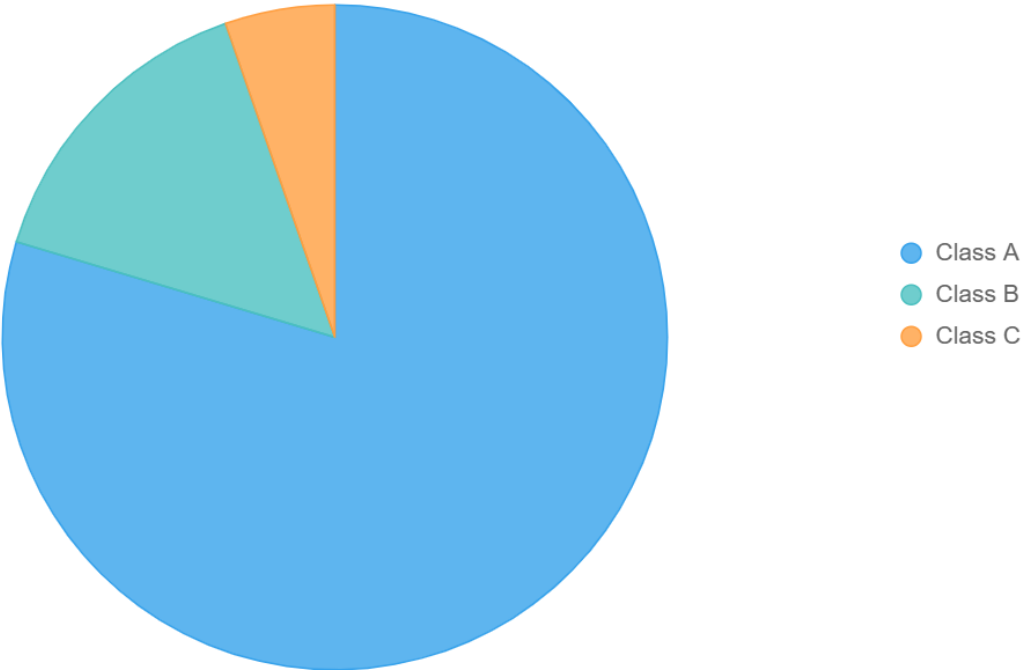


|      |                                          |       |            |            |        |   |
|------|------------------------------------------|-------|------------|------------|--------|---|
| 627  | PALBOCICLIB 100MG TABS                   | 400   | 553,269.72 | 818,840.30 | 65.96% | A |
| 30   | ONDEX 4MG INJ                            | 12314 | 430,990.00 | 797,331.50 | 66.74% | A |
| 101  | IVADIN 5MG TABS                          | 5390  | 440,093.50 | 792,168.30 | 67.52% | A |
| 39   | LEVE Q 500MG TABS                        | 10519 | 420,760.00 | 778,406.00 | 68.28% | A |
| 105  | PARAGEN 1G INJ                           | 5273  | 421,840.00 | 759,312.00 | 69.03% | A |
| 289  | HEPAMERZ SACHETS 5GM                     | 1838  | 473,468.80 | 757,550.08 | 69.77% | A |
| 73   | CATAPRESS 100MCG TABS                    | 7148  | 404,424.75 | 747,627.30 | 70.51% | A |
| 19   | ZERODOL-P TABS                           | 15952 | 399,326.42 | 738,737.12 | 71.23% | A |
| 316  | XELODA 500MG TABS                        | 1630  | 459,710.17 | 735,537.50 | 71.95% | A |
| 1546 | BEVAAS 400MG INJ                         | 11    | 495,000.00 | 732,600.00 | 72.68% | A |
| 63   | DAFLON 500MG TABS                        | 7631  | 404,290.38 | 727,692.16 | 73.39% | A |
| 110  | AUGMENTIN 625MG TABS                     | 5143  | 376,552.70 | 709,719.76 | 74.07% | A |
| 176  | FENTANYL 100MCG/2ML INJ                  | 3179  | 410,091.00 | 697,154.70 | 74.75% | A |
| 402  | NOREPINEPHRINE 1MG/ML INJ                | 1077  | 440,490.00 | 690,900.00 | 75.43% | A |
| 299  | BRILINTA 90MG TABS                       | 1794  | 417,714.96 | 668,336.76 | 76.09% | A |
| 477  | LENVANIX 4MG TABS                        | 750   | 432,300.00 | 665,745.00 | 76.74% | A |
| 38   | MEBUX 40MG TABS                          | 10809 | 356,697.00 | 659,889.45 | 77.39% | A |
| 525  | LANOMYCIN 500MG INJ                      | 606   | 426,018.00 | 656,067.72 | 78.03% | A |
| 46   | AMLOZAAR H TABS                          | 9288  | 353,872.80 | 655,913.75 | 78.67% | A |
| 209  | CLAXY 1.2GM INJ                          | 2720  | 380,800.00 | 653,520.00 | 79.31% | A |
| 124  | ITOPRIDE (GIT) SR 150MG TABS             | 4446  | 351,456.30 | 632,621.34 | 79.93% | B |
| 487  | ZYTIGA 250MG TABS                        | 715   | 402,187.50 | 619,368.75 | 80.54% | B |
| 216  | BOSENTAS 62.5MG TABS                     | 2598  | 363,720.00 | 618,324.00 | 81.15% | B |
| 625  | ENZALUTAMIDE 40MG CAP.inverse colon;CAPS | 403   | 417,378.64 | 617,718.40 | 81.75% | B |
| 441  | TOLVAT 15MG TABS                         | 868   | 387,345.00 | 596,506.96 | 82.31% | B |
| 565  | VENETOCLAX 100MG TABS                    | 503   | 386,304.00 | 594,908.16 | 82.89% | B |
| 580  | LMW ENOX 80MG INJ                        | 478   | 382,400.00 | 588,896.00 | 83.49% | B |
| 159  | SERRAZEN PLUS TABS                       | 3761  | 319,685.00 | 575,433.00 | 84.05% | B |
| 12   | GULAIR TABS                              | 18159 | 290,544.00 | 572,371.68 | 84.61% | B |
| 562  | ACYCLOVIR 250MG INJ                      | 509   | 356,300.00 | 566,202.00 | 85.17% | B |
| 20   | MICROMOL 1GM TABS                        | 15373 | 280,557.25 | 552,659.35 | 85.71% | B |
| 493  | SABEZOLE 20MG INJ                        | 705   | 352,500.00 | 542,850.00 | 86.25% | B |
| 23   | MYOSPAZ TABS                             | 14055 | 274,072.50 | 539,993.10 | 86.78% | B |
| 323  | CEREGARD PLUS TABS                       | 1548  | 334,368.00 | 534,988.80 | 87.31% | B |
| 666  | GLANDIN E2 VAGINAL TABS                  | 340   | 340,000.00 | 523,600.00 | 87.82% | B |

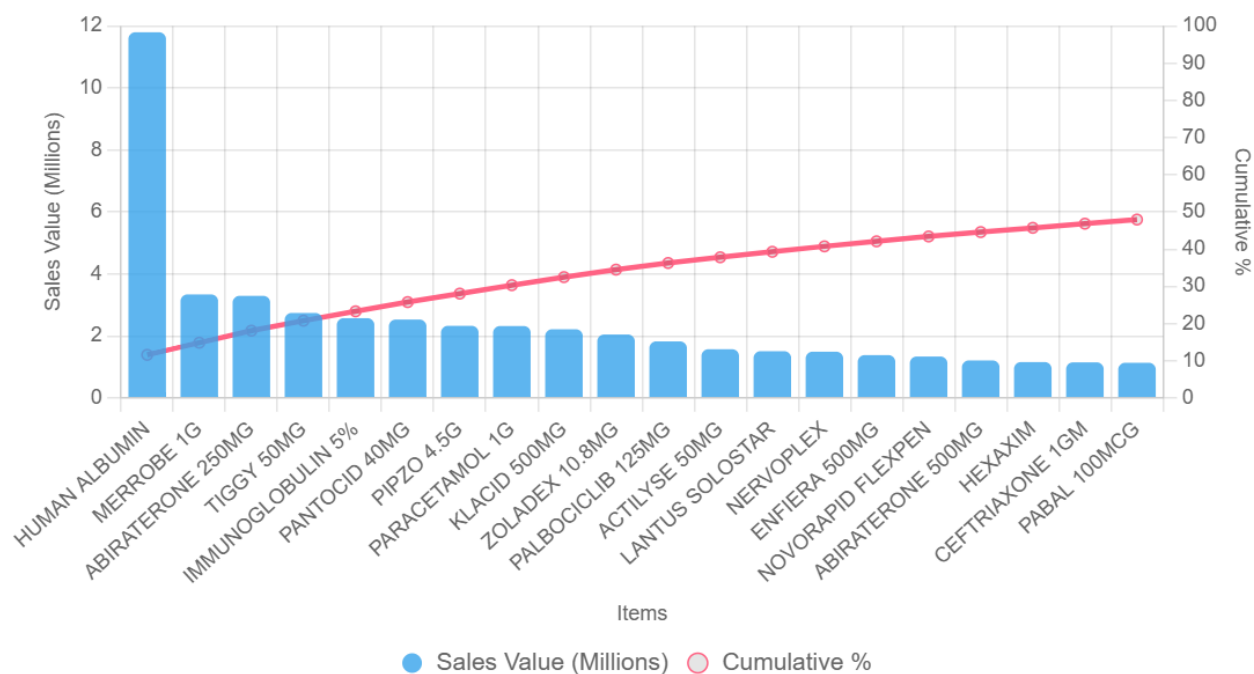
|      |                           |       |            |            |        |   |
|------|---------------------------|-------|------------|------------|--------|---|
| 92   | VONAPRO 20MG TABS         | 5733  | 280,823.94 | 519,473.99 | 88.33% | B |
| 435  | TALGENTIS 20MG TABS       | 895   | 335,625.00 | 516,862.50 | 88.84% | B |
| 415  | ALTACEF 750MG INJ         | 1010  | 319,160.00 | 510,656.00 | 89.34% | B |
| 119  | TALGENTIS 5MG TABS        | 4641  | 273,354.90 | 492,038.82 | 89.82% | B |
| 137  | DUPHASTON 10MG TABS       | 4162  | 270,364.96 | 489,076.76 | 90.30% | B |
| 828  | CRIZONIX 250MG CAPS       | 180   | 329,999.94 | 488,399.40 | 90.78% | B |
| 41   | ESOPRIDE 20MG CAPS        | 10019 | 263,499.70 | 487,524.54 | 91.26% | B |
| 13   | SPIRONOLACTONE 25 MG TABS | 17319 | 246,899.66 | 486,321.43 | 91.74% | B |
| 271  | LETROZ 2.5 MG TABS        | 1979  | 283,986.50 | 482,777.05 | 92.22% | B |
| 387  | CLINDAMYCIN 600MG INJ     | 1154  | 301,160.00 | 481,856.00 | 92.69% | B |
| 84   | NEUROCARE CAPS            | 6006  | 260,059.80 | 481,080.60 | 93.16% | B |
| 523  | KONAKION 2MG INJ(PAED)    | 619   | 297,374.00 | 477,485.04 | 93.63% | B |
| 582  | CEFICAD 1 GM INJ          | 476   | 309,400.00 | 476,476.00 | 94.10% | B |
| 218  | ZINNAT 500MG TABS         | 2573  | 312,905.53 | 475,255.32 | 94.56% | B |
| 1110 | FOSTIMON 150 IU INJ       | 64    | 320,000.00 | 473,600.00 | 95.01% | B |

|      |                        |      |            |            |         |   |
|------|------------------------|------|------------|------------|---------|---|
| 47   | RILIF MR TABS          | 9102 | 255,311.10 | 472,302.78 | 95.47%  | C |
| 1150 | LUPRODEX 3.75MG INJ    | 58   | 319,000.00 | 472,120.00 | 95.94%  | C |
| 108  | BEECOX PLUS CAPS       | 5175 | 255,127.50 | 471,960.00 | 96.40%  | C |
| 1866 | ELAXIM 50MG INJ        | 3    | 315,000.00 | 466,200.00 | 96.85%  | C |
| 217  | VINGRAF 2MG CAPS       | 2584 | 258,400.00 | 465,120.00 | 97.31%  | C |
| 58   | VEROXIB 60MG TABS      | 7924 | 246,991.08 | 456,897.84 | 97.76%  | C |
| 88   | BRONCHOWIN 400MG TABS  | 5888 | 243,368.70 | 450,254.29 | 98.21%  | C |
| 246  | TERPYNTA 100MG TABS    | 2214 | 263,466.00 | 447,892.20 | 98.65%  | C |
| 803  | NOVOMIX 30 FLEXPEN 3ML | 196  | 302,410.59 | 447,567.96 | 99.09%  | C |
| 748  | LIZOLID 600MG INJ      | 249  | 298,800.00 | 442,224.00 | 99.52%  | C |
| 514  | IMANIX 400MG TABS      | 639  | 285,420.21 | 439,548.93 | 99.95%  | C |
| 933  | NOVAPRESSIN 1MG INJ    | 118  | 295,000.00 | 436,600.00 | 100.37% | C |

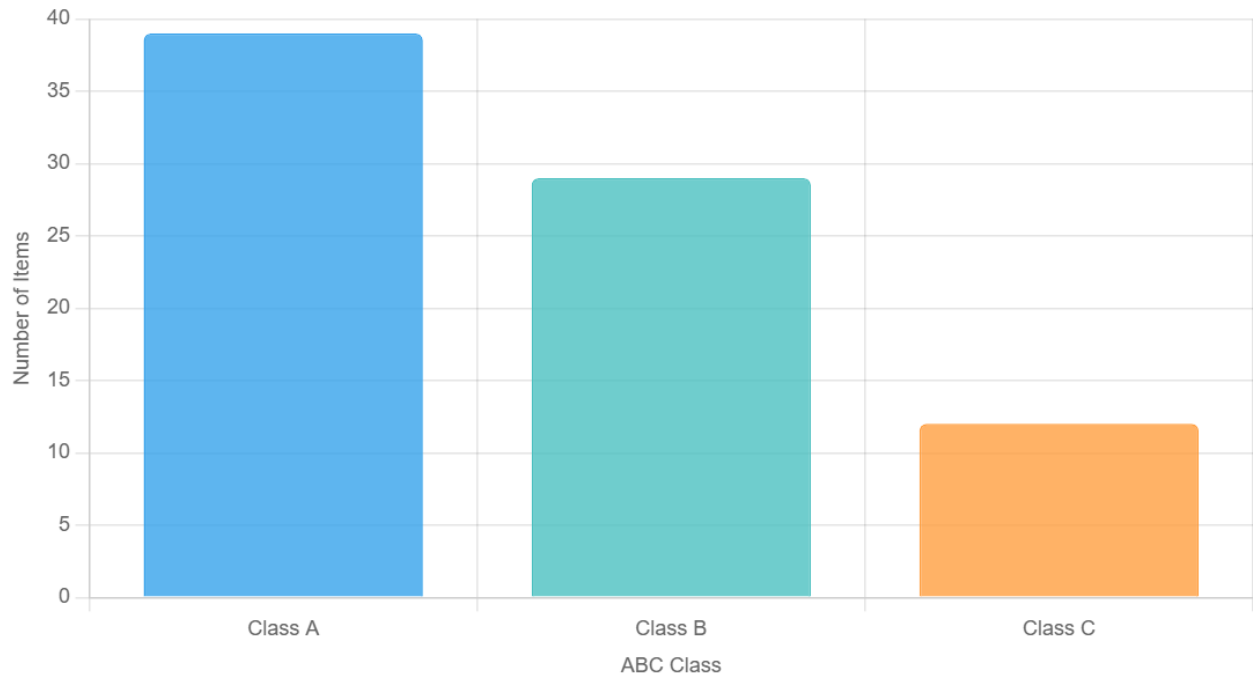
Sales Value Contribution by ABC Class (Tablets, Capsules, Injections)



Top 20 Tablets, Capsules, and Injections: Sales Value and Cumulative %



**Number of Tablets, Capsules, and Injections by ABC Class**



**VED Analysis:** Drugs were classified based on criticality:

- **Vital (V):** Includes critical drugs like HUMAN ALBUMIN 20% 100ML and MERROBE 1G INJ, essential for life-saving treatments.
- **Essential (E):** Includes drugs like PANTOCID 40MG INJ and PARACETAMOL 1G INJ, necessary but less critical.
- **Desirable (D):** Includes drugs like ZERODOL-P TABS and DAFLON 500MG TABS, with lower priority.

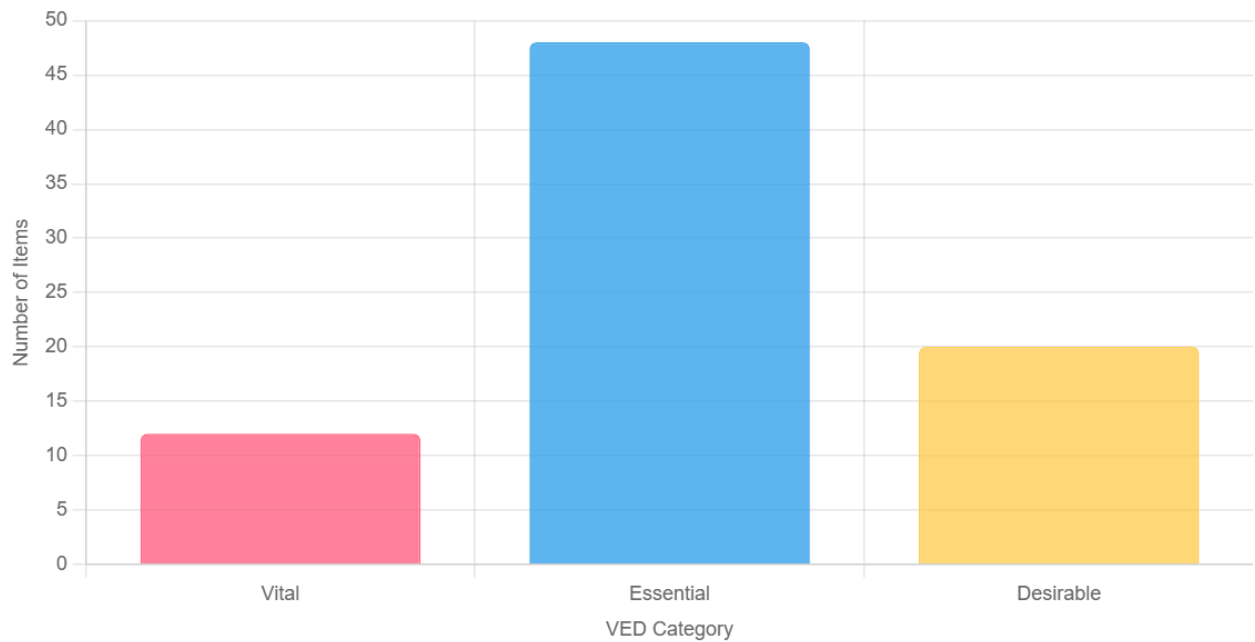
| S.NO             | ITEMS                    | QTY  | P.VALUE      | S.VALUE       | VED Category |
|------------------|--------------------------|------|--------------|---------------|--------------|
| <b>Vital (V)</b> |                          |      |              |               |              |
| 432              | HUMAN ALBUMIN 20% 100ML  | 907  | 7,972,530.00 | 11,799,344.40 | V            |
| 114              | MERROBE 1G INJ           | 4817 | 2,167,650.00 | 3,338,181.00  | V            |
| 556              | TIGGY 50MG INJ           | 529  | 1,851,500.00 | 2,740,220.00  | V            |
| 1048             | IMMUNOGLOBULIN 5% INJ.   | 79   | 1,738,000.00 | 2,572,240.00  | V            |
| 257              | PIPZO 4.5G INJ           | 2097 | 1,509,840.00 | 2,325,153.60  | V            |
| 736              | KLACID 500MG INJ.        | 259  | 1,495,942.56 | 2,213,994.16  | V            |
| 1045             | ZOLADEX DEPOT 10.8MG INJ | 81   | 1,381,621.05 | 2,044,799.39  | V            |
| 1501             | ACTILYSE 50MG INJ        | 13   | 1,060,683.00 | 1,569,810.84  | V            |
| 1339             | ENFIERA 500MG INJ        | 28   | 932,400.00   | 1,379,952.00  | V            |

|      |                                     |       |              |              |   |
|------|-------------------------------------|-------|--------------|--------------|---|
| 1173 | ERBITUX 100MG INJ                   | 54    | 760,500.00   | 1,125,540.00 | V |
| 166  | AUGMENTIN 1GM<br>TABS               | 3411  | 505,568.63   | 865,427.65   | V |
| 1104 | AZACITIDINE<br>100MG INJ            | 65    | 600,480.00   | 881,952.00   | V |
| 75   | ABIRATERONE<br>250MG TABS           | 7055  | 2,057,713.63 | 3,292,356.85 | E |
| 102  | PANTOCID 40MG<br>INJ.               | 5355  | 1,579,725.00 | 2,527,560.00 | E |
| 17   | PARACETAMOL 1G<br>INJ               | 16690 | 1,276,558.00 | 2,318,180.10 | E |
| 431  | PALBOCICLIB<br>125MG TABS           | 912   | 1,231,200.00 | 1,822,176.00 | E |
| 532  | LANTUS SOLOSTAR<br>3ML              | 589   | 1,017,625.94 | 1,506,087.40 | E |
| 50   | NERVOPLEX TABS                      | 8852  | 827,662.00   | 1,489,770.00 | E |
| 552  | NOVORAPID<br>FLEXPEN 100U/ML<br>3ML | 543   | 901,488.60   | 1,334,204.10 | E |
| 320  | ABIRATERONE<br>500MG TABS           | 1569  | 784,500.00   | 1,208,130.00 | E |
| 901  | HEXAXIM INJ                         | 128   | 785,296.64   | 1,155,410.40 | E |
| 42   | CEFTRIAZONE 1GM<br>INJ              | 9780  | 631,125.00   | 1,146,262.50 | E |
| 32   | CARTIL SUPER<br>FORTE CAPS          | 12195 | 621,945.00   | 1,119,501.00 | E |
| 34   | NEUROCARE PLUS<br>CAPS              | 11378 | 606,447.40   | 1,091,605.32 | E |
| 19   | ZERODOL-P TABS                      | 15952 | 399,326.42   | 738,737.12   | D |
| 63   | DAFLON 500MG<br>TABS                | 7631  | 404,290.38   | 727,692.16   | D |
| 110  | AUGMENTIN 625MG<br>TABS             | 5143  | 376,552.70   | 709,719.76   | D |
| 38   | MEBUX 40MG TABS                     | 10809 | 356,697.00   | 659,889.45   | D |
| 46   | AMLOZAAR H TABS                     | 9288  | 353,872.80   | 655,913.75   | D |
| 124  | ITOPRIDE (GIT) SR<br>150MG TABS     | 4446  | 351,456.30   | 632,621.34   | D |
| 487  | ZYTIGA 250MG<br>TABS                | 715   | 402,187.50   | 619,368.75   | D |
| 216  | BOSENTAS 62.5MG<br>TABS             | 2598  | 363,720.00   | 618,324.00   | D |
| 47   | RILIF MR TABS                       | 9102  | 255,311.10   | 472,302.78   | D |
| 108  | BEECOX PLUS CAPS                    | 5175  | 255,127.50   | 471,960.00   | D |
| 58   | VEROXIB 60MG<br>TABS                | 7924  | 246,991.08   | 456,897.84   | D |
| 88   | BRONCHOWIN<br>400MG TABS            | 5888  | 243,368.70   | 450,254.29   | D |

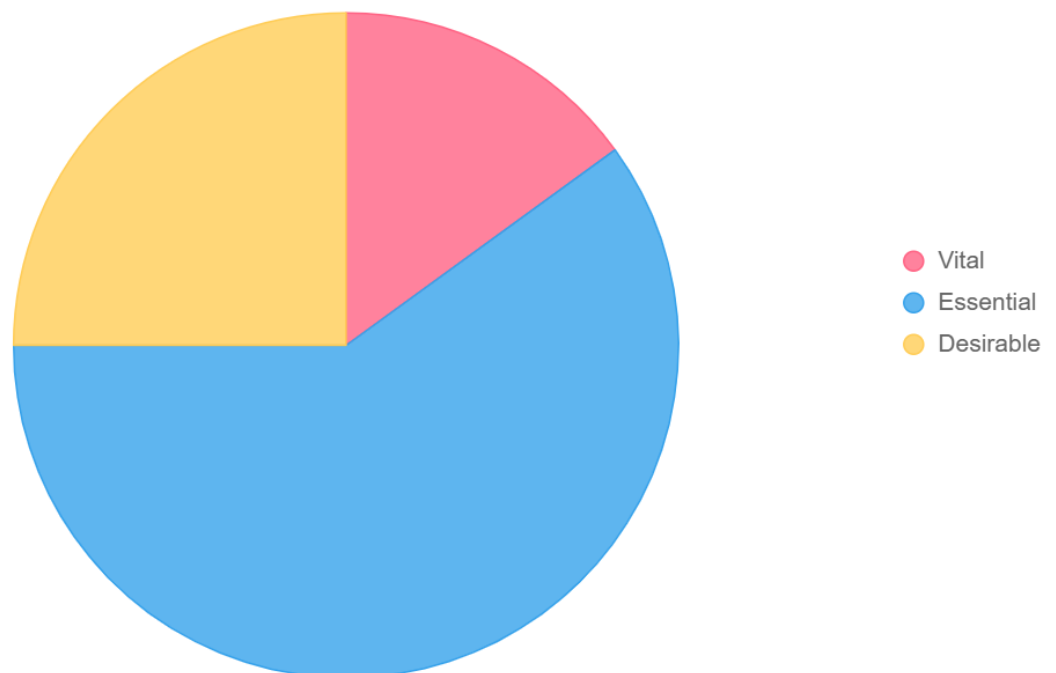
### Sample VED Analysis Table:

- **Correlation:** A positive correlation was found between sales and inventory levels, indicating that higher sales necessitate increased stock to meet demand.
- **Vendor Relationships:** The hospital maintains strong relationships with distributors, facilitating efficient supply chains.

**Number of Tablets, Capsules, and Injections by VED Category**



**Distribution of Tablets, Capsules, and Injections by VED Category**



## **CHAPTER 5: DISCUSSIONS**

## **5.1 Interpretation of Results**

The ABC Analysis indicates that a small percentage of drugs (Class A, ~10%) account for the majority of expenditure (~70%), necessitating strict control to avoid overstocking. VED Analysis highlights the importance of maintaining adequate stock of Vital and Essential drugs to ensure patient care. The positive correlation between sales and inventory suggests that future demand increases will require proportional inventory investments.

## **5.2 Comparison with Previous Literature**

The findings align with Jaju et al. (2023), who noted that Category A drugs dominate expenditure, requiring robust inventory systems. The challenges of stockouts and overstocking echo Jobira et al. (2022), emphasizing the need for accurate demand forecasting. Unlike JIT systems discussed by Fishbowl (2024), which faltered during supply chain disruptions, Nairobi West Hospital's reliance on strong vendor relationships mitigates some risks.

## **5.3 Opportunities through Technological Advancements**

The use of HIS for inventory tracking aligns with Ali (2011)'s advocacy for perpetual inventory systems. Implementing advanced PIMS or integrating with EHRs could enhance real-time tracking, reducing errors and stockouts. Technologies like automated reorder systems or VMI could further streamline operations, though high costs may pose challenges.

## **5.4 Limitations of the Study**

The study is limited to secondary data from Nairobi West Hospital's HIS, lacking primary data (e.g., interviews) to provide qualitative insights. The purposive sampling of 100 drugs may not fully represent the entire inventory. The reliance on historical data limits adaptability to sudden demand changes.

## **5.5 Strengths of the Study**

The study provides a robust analysis using ABC and VED techniques, offering clear insights into inventory prioritization. The use of HIS data ensures accuracy, and the findings are actionable for improving hospital operations.



## **CHAPTER 6: CONCLUSION & RECOMMENDATIONS**

## **6.1 Summary of Key Findings**

The study found that ABC Analysis effectively categorizes drugs by expenditure, with Class A items requiring stringent control. VED Analysis ensures prioritization of Vital and Essential drugs. A positive sales-inventory correlation indicates the need for increased stock to support future sales growth. Strong vendor relationships enhance supply chain efficiency.

## **6.2 Strategic Recommendations**

1. Implement regular ABC and VED Analysis to monitor and adjust inventory levels.
2. Invest in advanced PIMS to enhance real-time tracking and reduce manual errors.
3. Strengthen vendor partnerships to ensure reliable supply chains, especially for Vital drugs.
4. Train staff on inventory management techniques to improve adoption of ABC and VED Analysis.
5. Conduct periodic reviews of fast-moving and non-moving items to prevent overstocking or stockouts.

## **6.3 Suggestions for Future Research**

1. Explore primary data collection (e.g., interviews with pharmacy staff) to complement secondary data.
2. Investigate the impact of technological interventions (e.g., AI-based forecasting) on inventory efficiency.
3. Extend the study to other hospitals to compare inventory management practices.
4. Assess the applicability of ABC and VED Analysis to diagnostic inventory management.

## **Conclusion**

The study provides valuable insights into optimizing pharmaceutical inventory at Nairobi West Hospital using ABC and VED Analysis. By prioritizing high-value and critical drugs, the hospital can reduce costs, improve service delivery, and prepare for future demand growth. The findings underscore the importance of robust inventory systems and vendor relationships, offering a foundation for further research and practical applications in healthcare.

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