



Approach to Resource Utilization and Cost Control through the Application of ABC and VED Analysis in Hospital Pharmacy Inventory Management

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Introduction

- This project applies ABC and VED analysis to hospital pharmacy inventory at Apex Hospitals.
- The aim is to improve resource use, reduce costs, and ensure availability of critical medicines.

Study Objectives

1. To analyze hospital pharmacy procurement data using ABC analysis :

To categorize pharmaceutical items based on their consumption value and identify the high-cost items that contribute disproportionately to the pharmacy budget, in alignment with the Pareto Principle.

2. To assess the clinical criticality of drugs using VED analysis:

To classify medicines into Vital, Essential, and Desirable categories based on their therapeutic importance, referencing the WHO Essential Medicines List and clinical expert input.

3. To highlight the limitations and suggest future areas of improvement:

To critically evaluate challenges such as ERP system gaps, VED subjectivity, and data inconsistencies, while encouraging the development of standardized inventory practices.

4. To integrate ABC and VED methodologies into a combined ABC-VED matrix:

To develop a comprehensive inventory control system that prioritizes items based on both cost impact and clinical necessity, aiding in more informed procurement decisions.

Research Methodology

1. Research Design: Quantitative descriptive research design.

Suitable for examining and summarizing numerical procurement data without manipulating variables.

2. Setting: Apex Hospitals (Tertiary Care)

3. Study duration: Jan–Apr 2025

☐ Total inventory items analyzed: 4,399

☐ Categories included: Tablets, capsules, injections, IV fluids, disposables

☐ Data fields extracted: Drug name, unit cost, quantity procured, total expenditure, therapeutic class, and clinical relevance

4. Tools & Techniques: : Microsoft Excel Power BI ,ABC, VED, and ABC-VED Matrix Analysis

5. Strengths of the Methodology

- Use of Real-Time Data
- Comprehensive Scope{(n = 4,399 items), }
- Clinical and Financial Integration

Literature Review

Why Inventory Management Matters

- Ensures availability of life-saving drugs & controls cost
- Poor inventory can lead to stock-outs & patient risk [1,2]

ABC Analysis (Based on Cost)

- **A:** High-cost drugs (~10–20% of items, 70–80% of budget)
- **B:** Medium-cost
- **C:** Low-cost
- Helps in focused control & budget planning [5,6]

Global Use

- US (Cleveland Clinic), UK (NHS) use it via ERP systems [8,9]
- WHO & USAID promote it in LMICs like Nigeria, Nepal → cost savings up to 25%

IN Indian Context

- Studies (Mahapatra & Sahoo, 2015; Chopra & Mehta, 2016) show 30% cost reduction
- Barriers: lack of training, poor digitization [13]

Limitations

- Ignores clinical importance
Misses cheap but vital drugs (e.g., atropine)

VED Analysis (Based on Clinical Need)

- **V (Vital)**: Life-saving (e.g., insulin)
- **E (Essential)**: Needed, but replaceable
- **D (Desirable)**: For comfort (e.g., vitamins)

Results from Studies

Better stock availability (35%), less wastage (20%)

WHO Guidelines

- VED + EML = safer drug availability
- Used in Sri Lanka, Bangladesh procurement policy

ABC-VED Matrix: Best of Both Models

Prioritize **AV (High-cost + Vital)** drugs

Helps reduce stock-outs, automate ordering

Other Models for Support

FSN: Usage rate

HML: Price

EOQ: Order quantity

Policy & Tech Gaps

Need for digital tools like ERP, Power BI

Less research in small cities & on surgical/lab items

Framework for the Study

Combines **Cost (ABC) + Criticality (VED)**

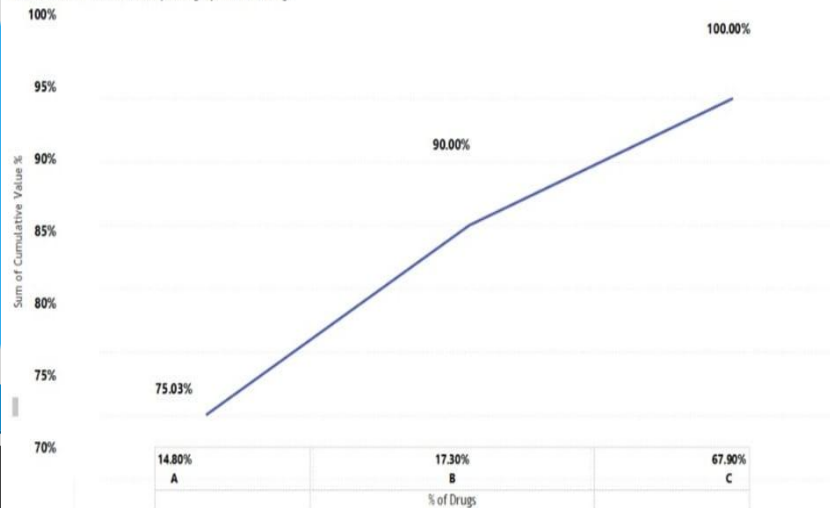
Adds **Tech (Excel, Power BI)** for smart decision-making

Matches WHO and Indian Health Policy goals

Key Results – ABC Analysis

TABLE 1 - ABC ANALYSIS				
CATEGORY	NO. OF DRUGS	% OF DRUGS	4 MONTHS PURC VALUE (INR)	VALUE %
A	651	14.80%	109368511	75.03%
B	761	17.30%	21822150	14.97%
C	2987	67.90%	14575292	10.00%
TOTAL	4399	100.00%	145765953	100.00%

Sum of Cumulative Value % by Category and % of Drugs



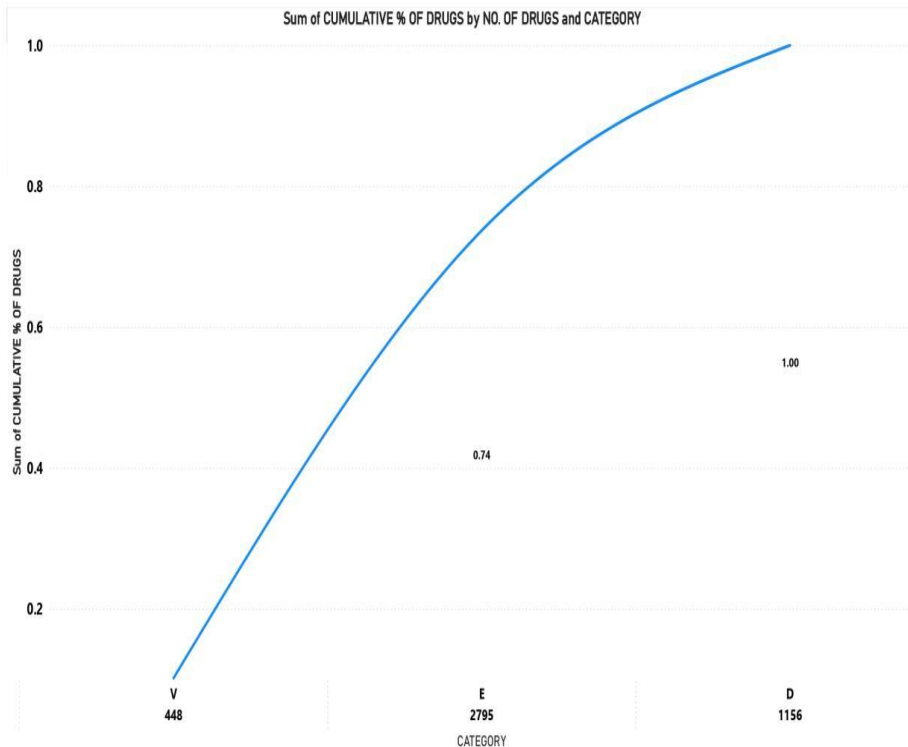
Category A drugs (651 out of 4,399) are the most cost-intensive and should be tightly monitored.

Category C drugs (67.9% of items) account for only 10% of the cost—suggesting potential for cost-saving strategies like bulk procurement.

These patterns are consistent with prior research, reinforcing the effectiveness of ABC analysis in healthcare inventory management.

Key Results – VED Analysis

TABLE 2 - VED ANALYSIS					
CATEGORY	NO. OF DRUGS	% OF DRUGS	4 MONTHS PURC VALUE (INR)	VALUE %	
V	448	10.18%	12260820	8.41%	
E	2795	63.54%	87290303	59.88%	
D	1156	26.28%	46214830	31.70%	
TOTAL	4399	100.00%	145765953	100.00%	



- Vital (V): 10.18% items, life-saving
 - Essential (E): 63.54% items, clinically important
 - Desirable (D): 26.28% items, supportive but not urgent
- Ensure consistent stock of V and E category drugs

ABC-VED Matrix Insights

TABLE 3 - ABC - VED ANALYSIS (V)				
VED ANALYSIS (V)				
(ABC - V)	NO. OF DRUGS	% OF DRUGS	4 MONTHS PURC VALUE (INR)	VALUE %
A (AV)	61	1.39%	9087346	6.23%
B (BV)	61	1.39%	1852253	1.27%
C (CV)	326	7.41%	1321221	0.91%
	448	10.18%		8.41%

- AV items (1.39%) consume 6.23% of budget

TABLE 4 - ABC -VED ANALYSIS (E)				
VED ANALYSIS (E)				
(ABC - E)	NO. OF DRUGS	% OF DRUGS	4 MONTHS PURC VALUE (INR)	VALUE %
A (AE)	532	12.09%	62634416	42.97%
B (BE)	550	12.50%	16552607	11.36%
C (CE)	1713	38.94%	8103280	5.56%
	2795	63.54%		59.88%

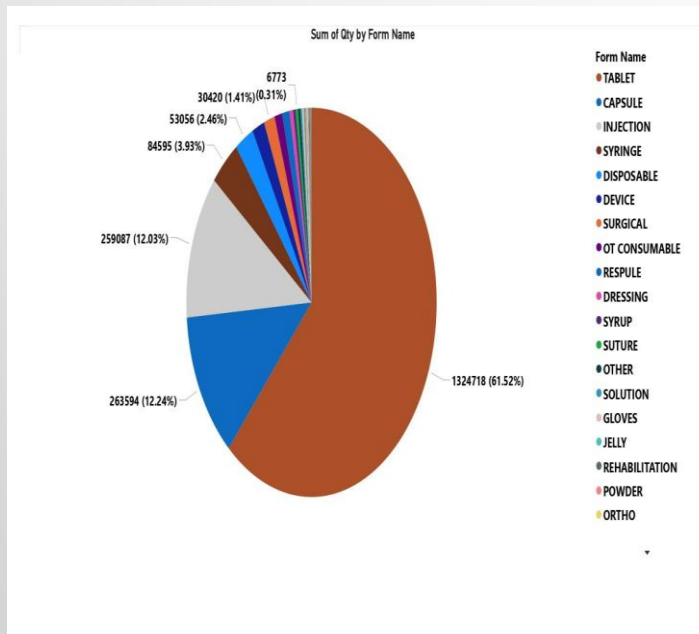
- AE & AD account for 68.8% of total costs

TABLE 5 - ABC -VED ANALYSIS (D)				
VED ANALYSIS (D)				
(ABC - D)	NO. OF DRUGS	% OF DRUGS	4 MONTHS PURC VALUE (INR)	VALUE %
A (AD)	58	1.32%	37646749	25.83%
B (BD)	150	3.41%	3417290	2.34%
C (CD)	948	21.55%	5150791	3.53%
	1156	26.28%		31.70%

- CV & CD can be considered for annual purchase or delisting
→ Prioritize AV, AE, and BV categories for control
- High-priority zone (AV, AE, BV): Comprising ~15% of items and >60% of cost, these require frequent stock reviews, tight reorder levels, and preferential procurement.
- Moderate-priority zone (AD, BE, CE): These can be managed via quarterly reviews and usage trend monitoring.
- Low-priority zone (BD, CD, CV): Representing low-cost and low-criticality drugs, these should be assessed for annual ordering or potential delisting .

Formulation-wise Distribution

Formulation	% of Total Quantity
Tablets	61.5%
Capsules	12.2%
Injections	12.0%
Others	14.3%



Tablets

High in volume, low in cost

Mostly in C and E categories

Common in outpatient settings

Injections

Low in volume, high in cost

Many fall under AV and AE categories

Frequently used in ICUs and oncology

Need tight procurement control

Strategic Recommendations

1. Strategic Actions

- Monthly ABC-VED Review
- → Keeps drug priorities updated (e.g., seasonal diseases like dengue).
- → Helps avoid stock-outs and ensures critical drugs are available.

2. Procurement Priority Framework

- → AV: Strict monitoring, buffer stock, single vendors
- → AE: Bi-monthly with tenders
- → AD: Limited reorders
- → CV/CD: Annual purchase or remove if unused

3. Operational Actions

- Upgrade ERP/PIS System
- → Auto-classify drugs
- → Set stock alerts, expiry warnings, reorder points

4. Vendor Management

- → Bulk contracts for A and V items
- → Fewer vendors for D items
- → Create a Preferred Vendor List (PVL) for reliable supply

Conclusion

- The ABC-VED analysis proved to be a powerful tool for strategic inventory management in hospital pharmacies. By identifying high-cost and high-criticality drugs, hospitals can optimize resource allocation, reduce wastage, and ensure availability of life-saving medications. This data-driven approach supports cost-effective, patient-centered care and aligns with national healthcare goals. Implementing such models is essential for building resilient and responsive hospital systems.



THANK YOU