Optimizing Inventory Management for Efficient Operations and Profit Maximization in a Pharmacy

Endterm Report for the BDM capstone Project

Submitted by

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1. Executive Summary

Babbar Pharmacy, a small retail pharmacy in Delhi, India, is facing significant challenges in inventory management and profit optimization. The pharmacy deals directly with customers, offering a wide range of prescription and over-the-counter medicines. However, ineffective inventory control has led to issues like excess stock, high holding costs, and frequent stockouts of popular items, which negatively affect customer satisfaction and cash flow. Additionally, a lack of insights into product profitability hampers the pharmacy's ability to optimize pricing and maximize margins.

This project aims to address these challenges by implementing a data-driven approach to inventory and profit management. Through detailed analysis of sales data—including costs, selling prices, quantities sold, and profit margins—I will identify trends and categorize products based on their demand and profitability. Techniques such as ABC analysis and demand forecasting will be used to optimize stock levels, reduce holding costs, and improve stock availability for high-demand items. By leveraging tools like Excel for data visualization and analysis, the project seeks to provide actionable insights to enhance Babbar Pharmacy's operational efficiency and financial performance.

The expected outcome of this project is a systematic inventory management framework, improved profit margins, and data-driven decision-making capabilities for Babbar Pharmacy.

2. Detailed Explanation of Analysis Process/Method

2.1 Data Analysis for Inventory and Sales

2.1.1 Data Collection

The primary analysis was conducted using Microsoft Excel. Inventory and sales data were gathered in CSV format from Babbar Pharmacy over a 30-day period.

- **Inventory Data:**

The initial inventory dataset comprised 2379 rows and 5 columns, covering key fields such as medicine names, maximum retail prices (MRP), selling prices, cost prices, and initial inventory levels. It included data for 2378 unique medicines.

	A	B	C	D	E
1	Name	MRP	Cost Price	Selling Price	Initial Quantity
2	Dytor-5	71.73	51.26	60.9705	112
3	Nefita	132	107.45	112.2	46
4	Cilacar 5	128.24	90.04	109.004	31
5	Ecosprin AV 75	60.65	49.34	51.5525	10
6	Mirago	385	289.38	327.25	7
7	Febutaz 40	225	171.86	191.25	7
8	Renopride-2	275	205.78	233.75	10
9	Sitara 50	99	71.02	84.15	16
10	SederOM	229.5	162.85	195.075	13
11	Gemsoline-D3	122.9	98.12	104.465	16
12	Silodal-D8	449	324.2	381.65	11
13	Broclear	228	181.72	193.8	77
14	Aquazide	11.64	9.53	9.894	44
15	Darolac	135	105.87	114.75	8
16	Amlosafe	79.8	56.38	67.83	65
17	Allegra 180	275.11	208.03	233.8435	41
18	Etoricoxib	200	145.79	170	7
19	Dolo 650	33.6	23.73	28.56	179
20	Sinarest	109.88	88.03	93.398	108
21	Cepodem-O	230.5	173.3	195.925	23
22	Combiflam	50.65	36.07	43.0525	119
23	Digene	24.14	18.96	20.519	55
24	Ondem	57.51	43.27	48.8835	114

Figure 2.1: Babbar Pharmacy Inventory Data

- **Sales Data:**

The sales dataset consisted of 10,185 rows and 7 columns, capturing fields such as date, time, medicine names, MRP, cost price, selling price, and quantities sold. It encompassed transaction data for a 30-day period.

	A	B	C	D	E	F	G	H
1	Date	Time	Name	MRP	Cost Price	Selling Price	Quantity	
2	2024-09-01	11:00	Q Cough-D Syrup	80	57.94	68	1	
3	2024-09-01	11:01	Budamate 400	233.5	175.29	198.475	1	
4	2024-09-01	11:02	Waxnil Ear Drop	119.9	96.61	101.915	1	
5	2024-09-01	11:06	Gabacnx NT 100 Tablet	102	72.33	86.7	1	
6	2024-09-01	11:06	Crocin Advance 500	20.16	16.48	17.136	1	
7	2024-09-01	11:07	Welzin 5mg Tablet	25	18.99	21.25	1	
8	2024-09-01	11:08	Ifimol 500mg Tablet	8.81	6.23	7.4885	1	
9	2024-09-01	11:09	Well 40mg Tablet	55	44.9	46.75	2	
10	2024-09-01	11:09	Zedott	269	211.26	228.65	1	
11	2024-09-01	11:09	Entcof Syrup	132	102.59	112.2	1	
12	2024-09-01	11:10	Panderm + Cream	117.6	91.94	99.96	1	
13	2024-09-01	11:11	Vermisol 50mg Tablet	14.84	12.11	12.614	1	
14	2024-09-01	11:15	Quintor OD 1000mg Tablet	76.5	56.47	65.025	1	
15	2024-09-01	11:21	Zedex Plus Cough Syrup Sugar Free	163.5	131.85	138.975	1	
16	2024-09-01	11:22	Quintor OD 1000mg Tablet	76.5	56.47	65.025	1	
17	2024-09-01	11:23	Health-B12 Capsule	285	212.99	242.25	2	
18	2024-09-01	11:23	Crocin Advance 500	20.16	16.48	17.136	1	
19	2024-09-01	11:24	Amitax 500mg Injection	119	87.67	101.15	1	
20	2024-09-01	11:25	Bro-Zedex Sf	165.5	134.42	140.675	1	
21	2024-09-01	11:25	Ciplox TZ	188.7	141.67	160.395	1	
22	2024-09-01	11:28	Walaphage-G-1 Tablet PR	96.7	69.34	82.195	1	
23	2024-09-01	11:28	Amicline Tablet	13	9.6	11.05	1	
24	2024-09-01	11:31	Ibolib Tablet	45	33.4	38.25	1	

Figure 2.2: Babbar Pharmacy 30-Day Sales Data

2.1.2 Data Pre-Processing

- Overview:
  The inventory data included details for 2379 medicines, while the sales data covered 10,185 transactions.

- Data Cleaning:
  - Spelling errors and inconsistencies in medicine names were corrected.
  - Duplicate entries were removed to ensure accurate calculations.
  - Formats for monetary values and dates were standardized for uniformity.

- Data Organization:
  - Additional columns were added for calculated metrics such as revenue, cost, and profit.
  - Products were sorted based on sales volume and profitability for deeper analysis.

	A	B	C	D	E	F	G	H	I	J
1	Date	Time	Name	MRP	Cost Price	Selling Price	Quantity	Revenue	Cost Incurred	Profit
2	2024-09-01	11:00	Q Cough-D Syrup	80	57.94	68	1	68	57.94	10.06
3	2024-09-01	11:01	Budamate 400	233.5	175.29	198.475	1	198.475	175.29	23.185
4	2024-09-01	11:02	Waxnil Ear Drop	119.9	96.61	101.915	1	101.915	96.61	5.305
5	2024-09-01	11:06	Gabacnx NT 100 Tablet	102	72.33	86.7	1	86.7	72.33	14.37
6	2024-09-01	11:06	Crocin Advance 500	20.16	16.48	17.136	1	17.136	16.48	0.656
7	2024-09-01	11:07	Welzin 5mg Tablet	25	18.99	21.25	1	21.25	18.99	2.26
8	2024-09-01	11:08	Ifimol 500mg Tablet	8.81	6.23	7.4885	1	7.4885	6.23	1.2585
9	2024-09-01	11:09	Well 40mg Tablet	55	44.9	46.75	2	93.5	89.8	3.7
10	2024-09-01	11:09	Zedott	269	211.26	228.65	1	228.65	211.26	17.39
11	2024-09-01	11:09	Entcof Syrup	132	102.59	112.2	1	112.2	102.59	9.61
12	2024-09-01	11:10	Panderm + Cream	117.6	91.94	99.96	1	99.96	91.94	8.02
13	2024-09-01	11:11	Vermisol 50mg Tablet	14.84	12.11	12.614	1	12.614	12.11	0.504
14	2024-09-01	11:15	Quintor OD 1000mg Tablet	76.5	56.47	65.025	1	65.025	56.47	8.555
15	2024-09-01	11:21	Zedex Plus Cough Syrup Sugar Free	163.5	131.85	138.975	1	138.975	131.85	7.125
16	2024-09-01	11:22	Quintor OD 1000mg Tablet	76.5	56.47	65.025	1	65.025	56.47	8.555
17	2024-09-01	11:23	Health-B12 Capsule	285	212.99	242.25	2	484.5	425.98	58.52
18	2024-09-01	11:23	Crocin Advance 500	20.16	16.48	17.136	1	17.136	16.48	0.656
19	2024-09-01	11:24	Amitax 500mg Injection	119	87.67	101.15	1	101.15	87.67	13.48
20	2024-09-01	11:25	Bro-Zedex Sf	165.5	134.42	140.675	1	140.675	134.42	6.255
21	2024-09-01	11:25	Ciplox TZ	188.7	141.67	160.395	1	160.395	141.67	18.725
22	2024-09-01	11:28	Walaphage-G-1 Tablet PR	96.7	69.34	82.195	1	82.195	69.34	12.855
23	2024-09-01	11:28	Amicline Tablet	13	9.6	11.05	1	11.05	9.6	1.45
24	2024-09-01	11:31	Ibolib Tablet	45	33.4	38.25	1	38.25	33.4	4.85

Figure 2.3: Processed Sales Data

2.1.3 Revenue, Expenditure and Profit Calculations

Pivot tables can be used to find the daily revenue, expenditure and profit. This will help us to get the total revenue that the Pharmacy has earned in the month of September.

Using the selling price and quantity sold of each sale we can find the revenue for the given sales data using the formula

$$\text{Revenue} = \text{Selling Price} \times \text{Quantity Sold}$$

Total Revenue = Summed daily revenues across all medicines.

Similarly, expenditure for each sale can be calculated using, Cost price and Quantity sold using the given formula

$$\text{Expenditure} = \text{Cost Price} \times \text{Quantity Sold}$$

Total Expenditure = Summed expenditure for all SKUs.

Profit for each SKU were calculated using the formula

$$\text{Profit} = \text{Revenue} - \text{Expenditure}$$

Total Profit = Summed profit for all SKUs.

Date	Revenue_	Expenditure	Profit_
2024-09-01	62195.4945	55799.49	6396.0045
2024-09-02	55397.8405	49735.33	5662.5105
2024-09-03	67325.5505	60618.28	6707.2705
2024-09-04	67427.0575	60989.58	6437.4775
2024-09-05	54260.855	48816.99	5443.865
2024-09-06	61725.3255	55413.72	6311.6055
2024-09-07	68655.673	61777.9	6877.773
2024-09-08	53239.835	47461.04	5778.795
2024-09-09	68732.9125	61896.33	6836.5825
2024-09-10	53086.0275	47610.32	5475.7075
2024-09-11	46304.4045	41848.73	4455.6745
2024-09-12	74577.827	66582.3	7995.527
2024-09-13	61586.903	55417.71	6169.193
2024-09-14	56756.9225	51156.31	5600.6125
2024-09-15	60327.288	53953.56	6373.728
2024-09-16	64345.7225	57654.8	6690.9225
2024-09-17	62589.2315	56102.78	6486.4515
2024-09-18	60460.6785	54272.21	6188.4685
2024-09-19	60179.558	54296.25	5883.308
2024-09-20	61425.658	55284.84	6140.818
2024-09-21	64657.477	58070.6	6586.877
2024-09-22	55149.887	49680.27	5469.617
2024-09-23	67992.316	60762.25	7230.066
2024-09-24	63838.111	57550.71	6287.401
2024-09-25	62050.6545	55521.43	6529.2245
2024-09-26	64149.1005	57592.59	6556.5105
2024-09-27	60260.002	53461.38	6798.622
2024-09-28	64365.6465	57456.59	6909.0565
2024-09-29	76249.2585	68485.46	7763.7985
2024-09-30	51183.447	46207.54	4975.907
Grand Total	**1850496.665**	**1661477.29**	**189019.375**

Figure 2.4: Daily Revenue, Expenditure, Profit

2.1.4 Analysis of Aggregate Metrics

Inventory Analysis

Performing inventory analysis will help understand how effective is the current inventory management system used by Babbar Pharmacy. Pivot tables are used to perform analysis on the data.

- Total Initial Stock:
  The total initial stock at the beginning of the period was 19,322 units, representing the sum of inventory across all medicines.
- Total Quantity Sold:
  A total of 13,773 units were sold during the analysis period, accounting for approximately 71.3% of the initial stock. This indicates strong demand across most SKUs.

Revenue and Cost Analysis

- Total Revenue:
  The total revenue generated from sales was ₹18,50,496.67, computed as the sum of revenue contributions from all SKUs.
- Total Cost Incurred:
  The total cost incurred, calculated as the sum of expenditure across all SKUs, amounted to ₹16,61,477.29.

Profit Analysis

- Total Profit: The overall profit for the period was ₹1,89,019.38, determined by subtracting the total cost incurred from the total revenue. This translates to a profit margin of 10.2%.

Pricing Analysis

- **Average Selling Price (ASP)**:
  The average selling price per unit was **₹134.36**, calculated as:

$$\text{ASP} = \frac{\text{Total Revenue}}{\text{Total Quantity Sold}}$$

- **Mean Cost Price (MCP)**:
  The mean cost price per unit was **₹ 120.63**, determined as:

$$\text{MCP} = \frac{\text{Total Cost Incurred}}{\text{Total Quantity Sold}}$$

Total Initial Stock	19322
Total Quantity Sold	13773
Total Revenue	₹ 18,50,496.67
Total Cost Incurred	₹ 16,61,477.29
Total Profit	₹ 1,89,019.38
Average Selling Price	₹ 134.36
Mean Cost Price	₹ 120.63

Figure 2.5: Analysis of Aggregate Metrics

2.2 Identifying Key Revenue and Profit Generators

Pareto Principle Application

The Pareto Principle, also known as the 80/20 rule, was applied to identify the key revenue and profit-generating SKUs. This involved classifying medicines into three categories (A, B, and C) based on their contribution to total revenue.

Using **ABC Analysis**, SKUs were categorized based on their contribution to total revenue:

1. **Category A**: Top 70% of revenue (high-priority medicines).
2. **Category B**: Next 20% of revenue (moderate-priority medicines).
3. **Category C**: Remaining 10% (low-priority medicines).

Steps Involved:

1. To perform ABC analysis, the first step is to identify total units sold, total revenue and total profit for each SKU. These SKUs are then ranked by their revenue contribution.
2. The next step is to calculate cumulative revenue and cumulative percentages for each SKU using the following formulas:

   Cumulative Revenue (ith) = Cumulative Revenue (i-1th) + Profit (ith)

   So the cumulative revenue of the ith SKU is the sum of cumulative revenue of i-1th SKU and the profit due to the current SKU.

   Cumulative Percentage = Cumulative Revenue / Total Revenue

   Cumulative Percentage for ith SKU shows the revenue percentage of top *i* revenue generating SKUs.

Name	Total Units	Total Revenue	Total Profit	Cumulative Revenue	Cumulative Percentage	ABC Category
Lacne	59	24372.9	1531.64	24372.9	1.32%	A
Foxtum 300mg Tablet	21	23829.75	3210.06	48202.65	2.60%	A
Betadine Gargle	86	22222.4	1482.64	70425.05	3.81%	A
Jupicef 500mg/125mg Tablet	69	19647.75	2883.51	90072.8	4.87%	A
Allegra 180	80	18707.48	2065.08	108780.28	5.88%	A
WE-Sita D Tablet	75	15873.75	2376	124654.03	6.74%	A
Sitara-D 100/10 Tablet	84	15547.35	655.83	140201.38	7.58%	A
Oxyspray Nasal Spray	66	14754.3	535.26	154955.68	8.37%	A
Drotin DS	65	13635.1475	978.9975	168590.8275	9.11%	A
Allegra M	58	13598.912	1233.312	182189.7395	9.85%	A
Ciplox TZ	84	13473.18	1572.9	195662.9195	10.57%	A
Oflox oz	83	12836.5725	481.1925	208499.492	11.27%	A
Clingen Forte	75	12431.25	495.75	220930.742	11.94%	A
Drotin-M	65	11765.4875	1982.3375	232696.2295	12.57%	A
Zedex Cough Syrup	77	11404.6625	842.5725	244100.892	13.19%	A
Ellepra-M Tablet	79	11341.635	1838.725	255442.527	13.80%	A
Broclear	58	11240.4	700.64	266682.927	14.41%	A
Seroflo 250 Synchrobreathe	13	11162.931	1170.871	277845.858	15.01%	A

Figure 2.6: ABC Analysis

3. Results and Findings

3.1 Volume Analysis (Sales, Purchase)

The below graph is generated for the Revenue (Sales) generated for the month.

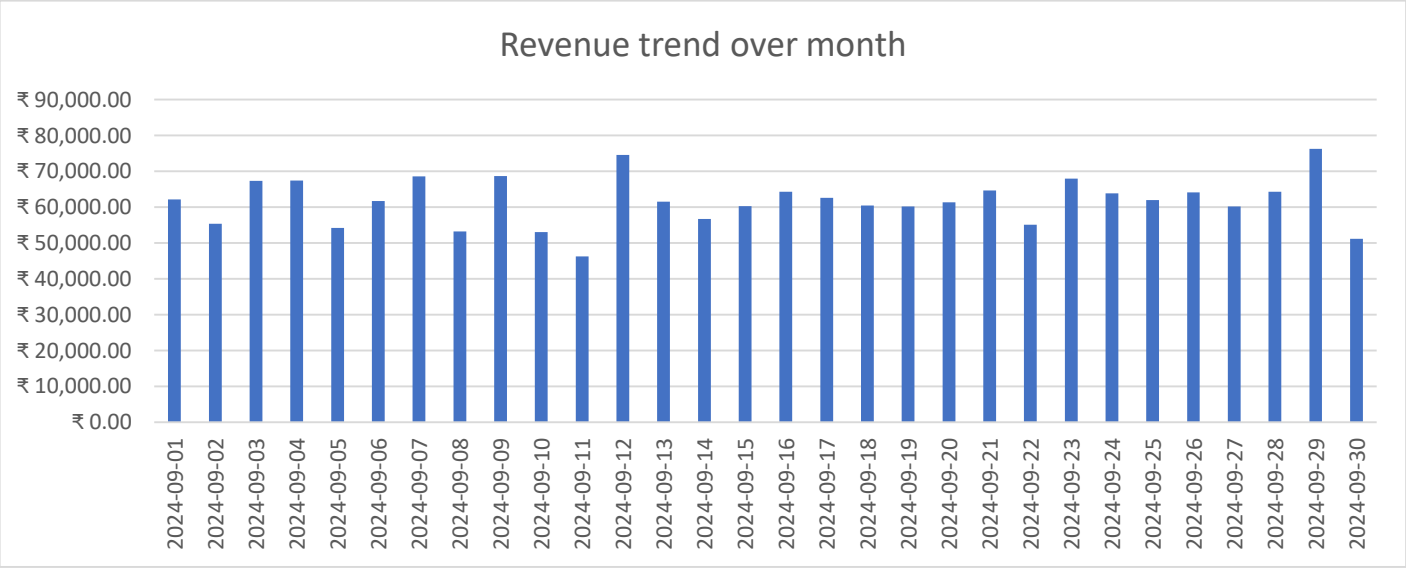

Figure 3.1: Column Chart Depicting Revenue trend over month

- **Overall Performance:**
  - The pharmacy's daily revenue in September 2024 showed noticeable fluctuations, with the revenue ranging between ₹46,304.40 (on September 11) and ₹76,249.26 (on September 29).

- **Key Trends**
  - Weekly Variations: Certain weeks exhibited a dip in revenue, such as around mid-month (September 10–12), possibly due to reduced demand or operational factors.
  - Peaks in Revenue: Significant peaks were observed on September 12 (₹74,577.83) and September 29 (₹76,249.26). These peaks may indicate promotional events, seasonal demand, or specific health trends.
- **Average and Consistency**
  - The average daily revenue for the month was approximately ₹61,625.82.
  - The data showed moderate variability, with standard deviations indicating some fluctuation but no extreme irregularities.
- **Outliers and Anomalies**
  - Lowest Revenue: September 11 recorded the lowest revenue of ₹46,304.40. Investigating this anomaly might reveal potential causes like operational disruptions, inventory shortages, or a drop in customer footfall.
  - Highest Revenue: September 29 marked the highest revenue of ₹76,249.26, which may correlate with a weekend effect or other promotional strategies.
- **Patterns Across Days**
  - Consistent Days: Revenues on days like September 16, 21, and 28 hovered around ₹64,000, indicating a stable demand pattern.
  - Weekend Effect: While not strongly pronounced, slight increases in revenue were observed on weekends, suggesting higher customer activity during these periods.

3.2 ABC Analysis Findings

- **Category A** (Top 17.45% of items): These items contribute to 70% of revenue, underscoring their critical role in the pharmacy's financial performance. Items in this category are high-priority, requiring close inventory management to prevent stock outs and ensure customer satisfaction.

- **Category B** (Next 26.06% of items): Contributing to 20% of revenue, Category B items provide moderate revenue and support overall business stability. Regular stock reviews and controlled replenishment are recommended to maintain availability without over-investing in inventory.

- **Category C** (Remaining 56.52% of items): Though these items comprise the majority of the inventory, they contribute only 10% to revenue, making them low-priority. Periodic stock checks are sufficient to ensure these items do not occupy unnecessary storage or capital.

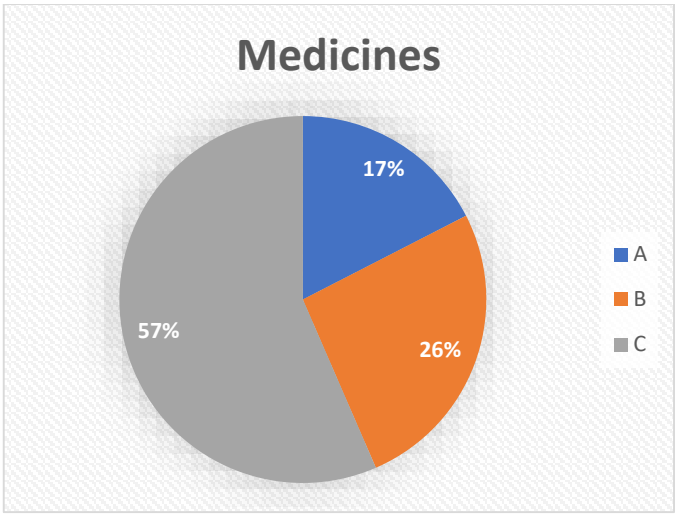

Figure 3.2: ABC analysis

3.3 Profit Distribution by ABC Categories

The bar chart illustrates the distribution of total profit across the three categories: A, B, and C. Below are the detailed findings:

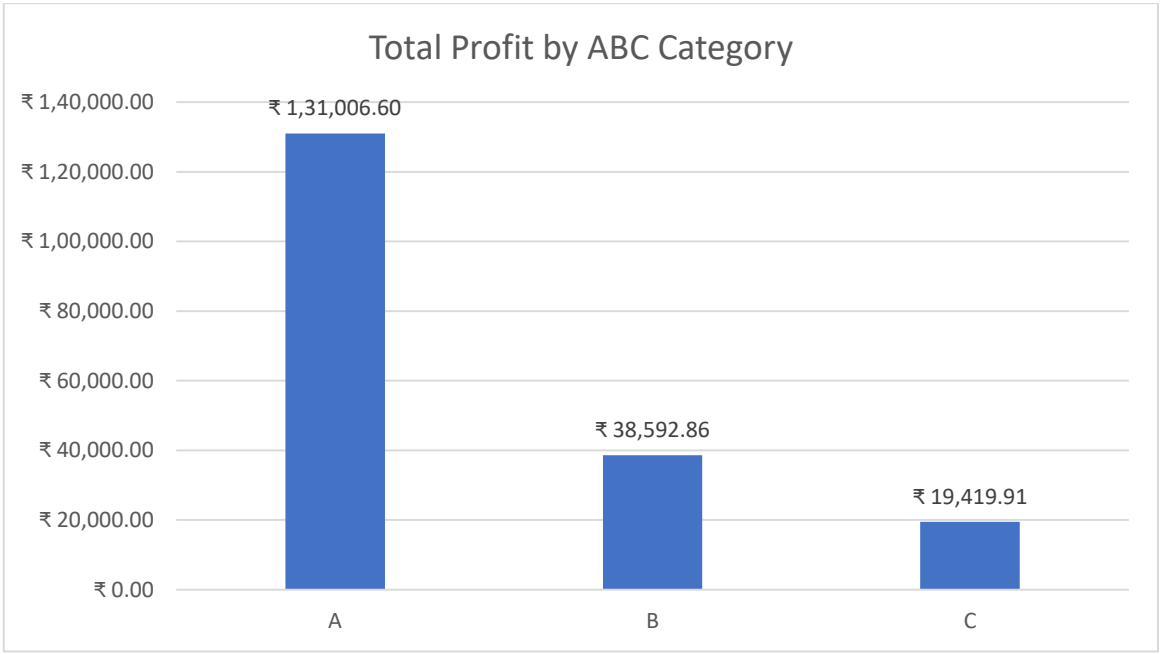

Figure 3.3: Total Profit by ABC Category

1. Dominance of Category A

Category A accounts for the largest share of total profit, contributing ₹1,31,006.60. This is approximately 68% of the total profit, significantly overshadowing Categories B and C.

2. Moderate Performance of Category B

Category B contributes ₹38,592.86, which is approximately 20% of the total profit. While Category B is not as dominant as Category A, it represents a secondary profit driver. These

medicines may benefit from targeted strategies to improve their contribution, such as promotions or strategic pricing.

3. Minimal Contribution of Category C

Category C contributes only ₹19,419.91, which is approximately 10% of the total profit. This category generates the least profit. These medicines may be less in demand, have lower margins, or include niche items. A review is needed to determine if they justify their inclusion in the inventory.

3.4 Total Profit vs. Units Sold

The scatter plot visualizes the relationship between the total profit and units sold for various medicines. Below are the detailed findings based on the plot:

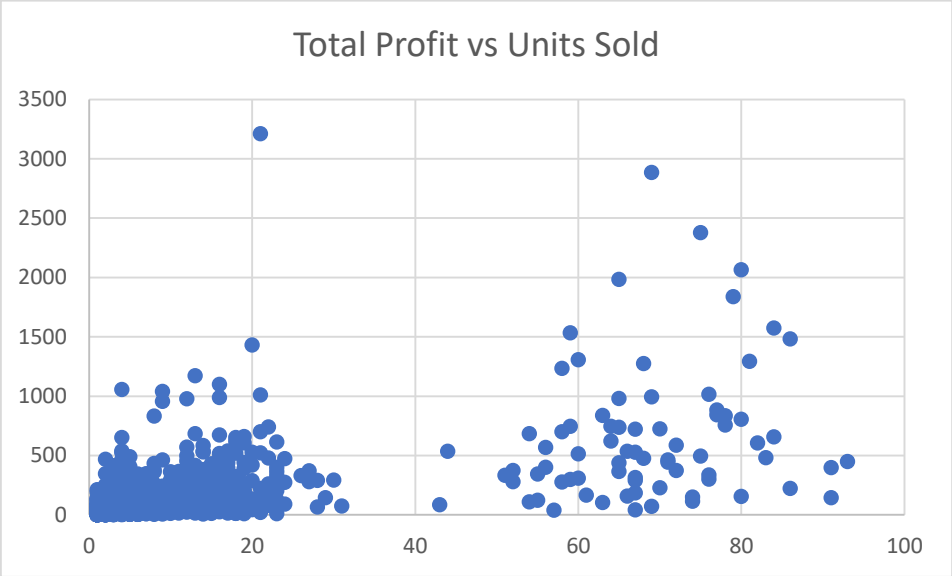

Figure 3.4: Scatter Plot of Total Profit Vs Units Sold

1. General Trend

- There is no strict linear relationship between units sold and total profit. While some medicines with high units sold also yield high profits, others show disproportionate results.
- A clustering of data points near the lower-left corner indicates that most medicines are low-volume and low-profit contributors.

2. High-Volume, Low-Profit Medicines

- Some medicines exhibit high units sold but relatively low profit margins.
- These could be essential or frequently purchased medicines with controlled prices or slim profit margins. For example, OTC products like “Zedex Cough Syrup” and “Clingen Forte” belong to this category.

3. Low-Volume, High-Profit Medicines

- A few products “Foxtum 300mg Tablet” show significant profits despite lower sales volumes. These are high-margin products like specialized drugs (e.g., prescription-only medicines or new launches).

4. High-Volume, High-Profit Medicines

- Outliers in the upper-right quadrant represent medicines that achieve both high sales volumes and high profits.
- These are the top-performing medicines contributing significantly to the pharmacy's revenue. Examples include commonly prescribed high-margin drugs like "Jupicef 500mg/125mg Tablet" and “WE-Sita D Tablet”.

5. Low-Volume, Low-Profit Medicines

- A majority of medicines fall into this category. They generate minimal revenue and may not justify their shelf space or inventory costs.

3.5 Revenue Distribution Across Medicines

The Pareto chart illustrates the distribution of total revenue across 1,928 medicines, highlighting the cumulative revenue contribution of individual medicines. Below are the detailed findings:

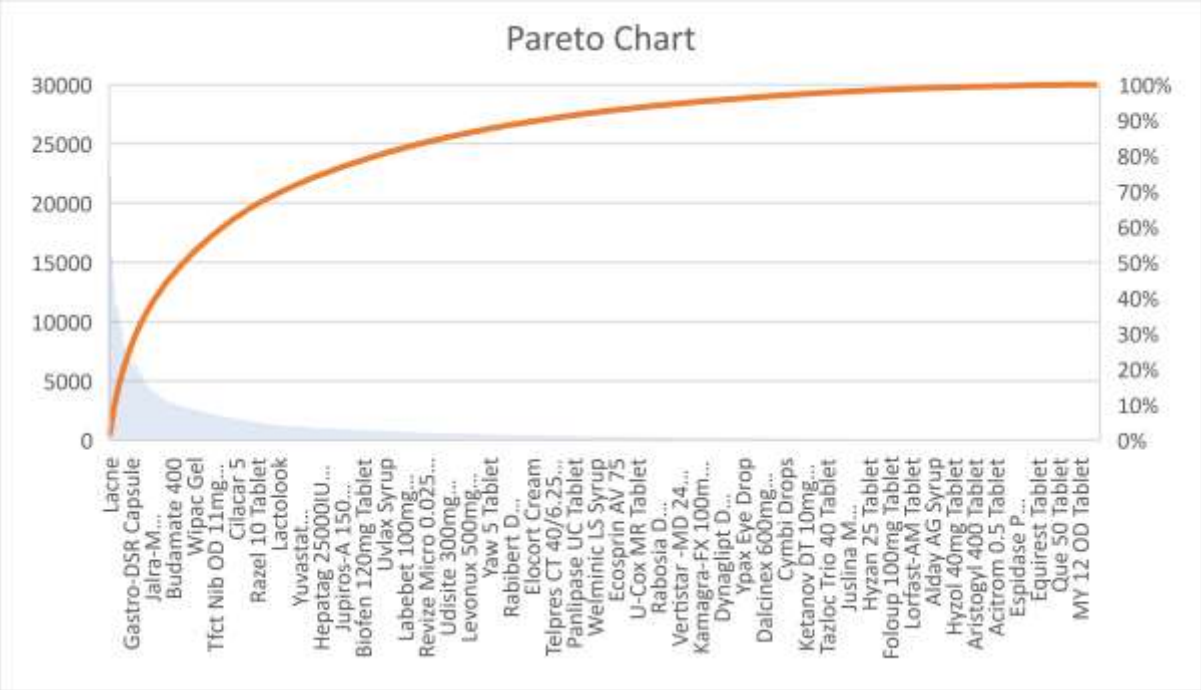

Figure 3.5: Pareto Chart: Medicines Vs Total Revenue

1. 80/20 Rule Observation

- The Pareto chart confirms the 80/20 principle, where a small subset of medicines (top 23%) generates the majority of the revenue (approximately 78%).
- These top-performing medicines are the core contributors to the pharmacy's financial success.

2. High Concentration of Revenue

- A steep curve in the first section of the chart shows that revenue is heavily concentrated in a limited number of medicines. By prioritizing these top-performing medicines in inventory management and marketing campaigns the pharmacy can improve their revenue.

3. Long Tail of Low Revenue Generators

- A flatter curve toward the right indicates that the majority of medicines (lower 80%) contribute minimally to the total revenue. Medicines in the long tail includes niche or slow-moving products.

3.6 Daily Sales by Category (Quantities Sold)

This line chart displays the daily quantities sold for medicines categorized under A, B, and C over time. The trends reveal the following:

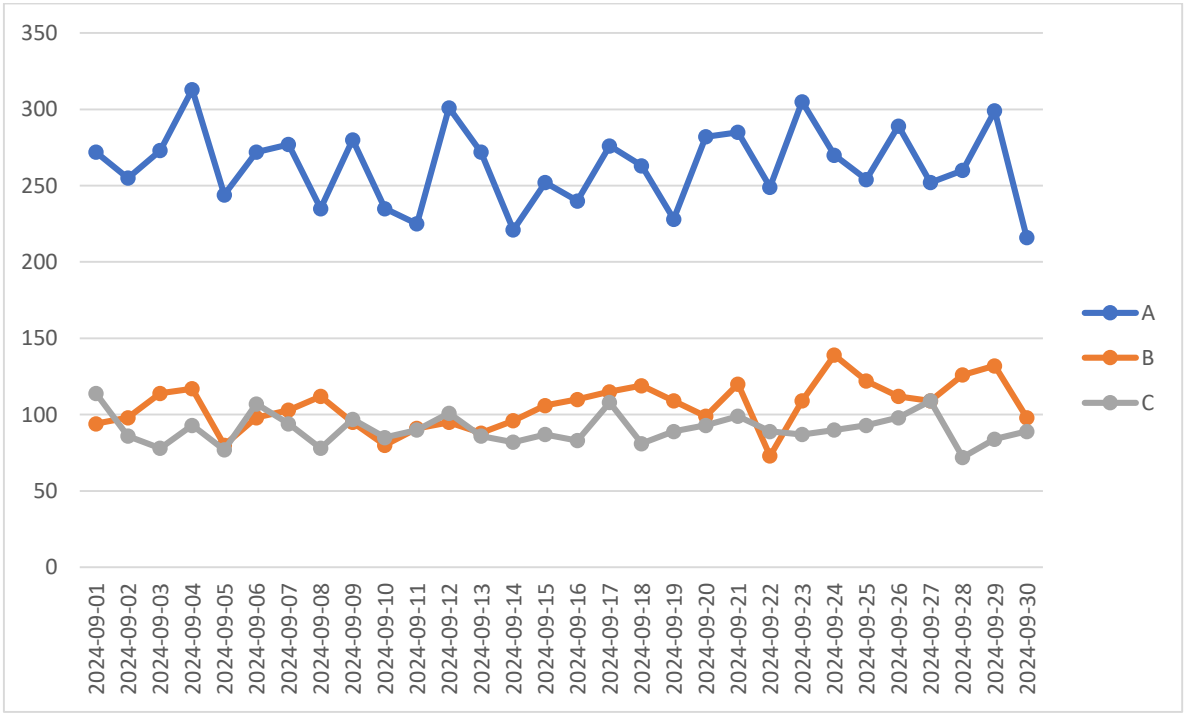

Figure 3.6: Line Chart for Daily Sales (Category A, B, C) vs. Quantities Sold

1. Category A Dominance

- Consistently High Sales: Category A medicines maintain the highest quantities sold on most days.
- Stable Demand: The sales pattern exhibits less fluctuation, indicating steady demand for high-revenue, essential medicines.

- Insights: Prioritize inventory for these medicines to avoid stock outs and capitalize on their consistent demand.

2. Category B Performance:

- Moderate Sales: Category B medicines exhibit relatively lower but consistent sales volumes compared to Category A.
- Occasional Spikes: Certain days show noticeable increases, possibly linked to promotions or seasonal demand.
- Insights: Consider strategic pricing or promotions to boost regular sales of Category B medicines.

3. Category C Trends:

- Low and Fluctuating Sales: Category C medicines show irregular and the lowest sales volumes.
- Insights: These medicines may cater to niche markets or have lower demand. Evaluate their profitability and consider promotional strategies to increase their visibility.

3.7 Daily Profit by Category

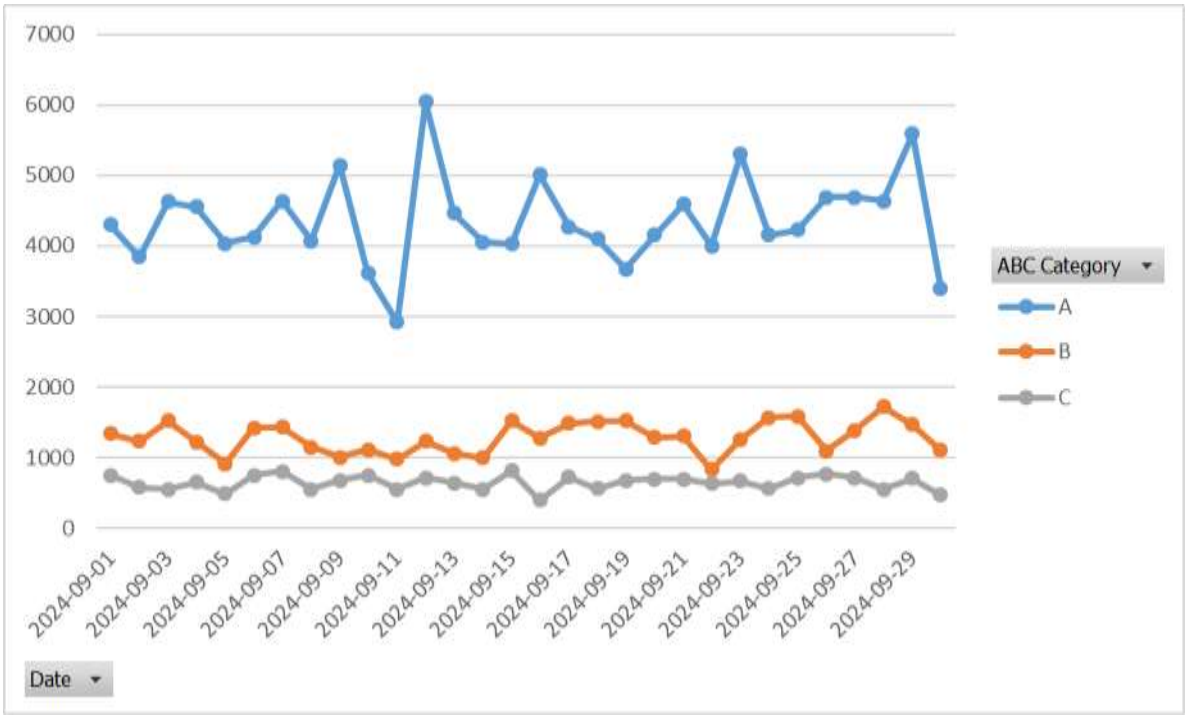

Figure 3.7: Line Chart for Daily Sales (Category A, B, C) vs. Profit

This line chart illustrates the daily profits generated by medicines in categories A, B, and C over time. The trends highlight the following:

- Highest Profit Contribution: Category A consistently generates the highest profits, closely mirroring its quantity trends.

- Moderate Profits: Profits for Category B medicines align closely with their sales volumes, but the margin appears narrower compared to Category A.
- Minimal Profits: Category C medicines contribute the least to daily profits, reflecting both low sales and potentially low margins. The inconsistent profit pattern suggests challenges in sustaining demand or maintaining profitability.

3.8 Top 10 Medicines by Quantity, Revenue, and Profit

The following are the top-performing medicines across three dimensions: quantity sold, revenue generated, and profit earned.

Medicine Name	Sum of Quantity
Dolo 650	93
Grilinctus-LS Syrup	91
Diclowin Plus	91
Betadine Gargle	86
Ciplox Eye/Ear Drop	86
Sitara-D 100/10 Tablet	84
Ciplox TZ	84
Oflox oz	83
Nephtor 10	82
Zerodol Spas Tablet	81

Figure 3.8.1: Top 10 Medicines by Quantity Sold

- Dominant Performers:
    - Dolo 650 leads with 93 units sold, followed closely by Grilinctus-LS Syrup (91 units) and Diclowin Plus (91 units).
    - These medicines are likely high-demand, frequently prescribed products.
- Insights:
    - The top-selling medicines include both over-the-counter (OTC) and prescription drugs.
    - Regular monitoring is crucial to prevent stockouts and ensure steady supply for these high-demand products.

Medicine Name	Sum of Revenue
Lacne	24372.9
Foxtum 300mg Tablet	23829.75
Betadine Gargle	22222.4
Jupicef 500mg/125mg Tablet	19647.75
Allegra 180	18707.48
WE-Sita D Tablet	15873.75
Sitara-D 100/10 Tablet	15547.35
Oxyspray Nasal Spray	14754.3
Drotin DS	13635.1475
Allegra M	13598.912

Figure 3.8.2: Top 10 Medicines by Revenue

- Revenue Drivers:
    - Lacne generated the highest revenue at ₹24,372.90, with Foxtum 300mg Tablet closely following at ₹23,829.75.
    - Medicines like Betadine Gargle (₹22,222.40) and Jupicef 500mg/125mg Tablet (₹19,647.75) also contributed significantly.
- Insights:
    - High-revenue medicines are likely priced higher and may belong to premium or specialized categories.
    - These products should be prioritized for marketing and strategic stock replenishment.

Medicine Name	Sum of Profit
Foxtum 300mg Tablet	3210.06
Jupicef 500mg/125mg Tablet	2883.51
WE-Sita D Tablet	2376
Allegra 180	2065.08
Drotin-M	1982.3375
Ellepra-M Tablet	1838.725
Ciplox TZ	1572.9
Lacne	1531.64
Betadine Gargle	1482.64
Xoxe-CV Tablet	1430.25

Figure 3.8.3: Top 10 Medicines by Profit

- Profit Leaders:
    - Foxtum 300mg Tablet leads with a profit of ₹3,210.06, followed by Jupicef 500mg/125mg Tablet (₹2,883.51) and WE-Sita D Tablet (₹2,376).
    - These medicines are high-margin products, making them critical to overall profitability.
- Insights:
    - Medicines with high profits but lower sales volumes, such as Foxtum 300mg Tablet, should be promoted to drive higher sales.
    - Identifying and leveraging such high-margin medicines can improve overall profitability.

General findings:

- Correlation: Some medicines, such as Lacne and Foxtum 300mg Tablet, rank high across all three categories, highlighting their dual role as volume and revenue drivers.
- Strategic Focus: Medicines that consistently appear across these lists should be prioritized for inventory, marketing, and customer awareness campaigns.
- Optimization Opportunities: Low-profit yet high-volume medicines like Dolo 650 may need price reviews or supply chain optimization to improve margins.

4. Interpretation of Results and Recommendation

Based on the findings and analysis of Babbar Pharmacy's sales and profit data, the following recommendations are proposed to address the challenges of inventory management and profit optimization:

Recommendation 1: Implement Inventory Prioritization Using ABC Analysis

- **Observation**: ABC analysis shows that Category A medicines contribute significantly to revenue (approximately 80%) and profit (68%). Categories B and C, though less critical, still require monitoring.
- **Action Plan**:
    - Maintain adequate stock levels for Category A medicines to prevent stockouts and customer dissatisfaction. These medicines are critical for cash flow and profitability.
    - For Category B medicines, target these with promotions, such as occasional discounts or bundled offers, to drive sales. Consider reviewing their cost structure to improve profitability.
    - Evaluate Category C medicines for demand and profitability, considering removing underperforming items from the inventory.
- **Expected Outcome**: Reduced stockouts for critical medicines, improved customer satisfaction, and reduced holding costs for low-demand items.

Recommendation 2: Optimize Stock Levels Through Demand Forecasting

- **Observation**: Frequent stockouts of high-demand medicines and overstocking of low-demand items are causing inefficiencies.
- **Action Plan**:
    - Use historical sales data and monthly trends to predict demand for each medicine more accurately.
    - Introduce a simple Excel-based tracking system to monitor sales and inventory levels and set reorder thresholds for each product.
    - Collaborate with suppliers to secure flexible supply arrangements, ensuring faster replenishment of top-selling products like Dolo 650 and Grilinctus-LS Syrup.
- **Expected Outcome**: Improved cash flow, reduced holding costs, and enhanced availability of popular medicines.

Recommendation 3: Focus on High-Profit and High-Revenue Medicines

- **Observation**: Certain medicines like *Foxtum 300mg Tablet* and *Jupicef 500mg/125mg Tablet* show high profitability but moderate sales volumes, while others like *Dolo 650* have high volumes but low profit margins.
- **Action Plan**:
    - Promote high-margin medicines through in-store marketing or discounts for bulk purchases.
    - Evaluate pricing strategies for low-margin, high-volume products to enhance their profitability.
    - Identify medicines with both high profit and revenue potential and give them priority in marketing campaigns.
- **Expected Outcome**: Improved profitability and revenue growth by leveraging high-margin and high-revenue medicines.

Recommendation 4: Introduce Data-Driven Pricing Strategies

- **Observation**: Ineffective pricing strategies are reducing profit margins for certain medicines.
- **Action Plan**:
    - Regularly review and adjust selling prices for medicines based on demand, market trends, and competition.
    - Introduce tiered pricing for bulk purchases to encourage higher sales volumes.
    - Monitor profit margins for each product category and refine pricing policies to maximize profitability.
- **Expected Outcome**: Increased profit margins and better alignment of pricing strategies with customer demand.

Recommendation 5: Enhance Customer Engagement Through Targeted Promotions

- **Observation:** Medicines in Category B and C often show inconsistent demand and low profitability, and customers respond to price incentives.
- **Action Plan:**
    - Seasonal Promotions: Introduce periodic promotional offers tied to seasonal demand, such as discounts on cold and flu medicines during winter months.

    - Bundling Strategy: Bundle high-margin products with commonly purchased items to encourage sales of underperforming products. For example, pair OTC medicines like *Grilinctus-LS Syrup* with prescription medicines at a discounted rate.
    - Loyalty Program: Implement a basic loyalty program where customers earn points for every purchase, redeemable for discounts on future purchases.
    - Local Outreach: Partner with nearby clinics or wellness centers to promote specific products, particularly those in Category B.
- **Expected Outcome:** Increased footfall, higher sales of underperforming products, and improved customer retention.

5. Conclusion

In conclusion, the analysis of Babbar Pharmacy's sales and profit data has provided actionable insights and practical recommendations to address its key challenges in inventory management and profitability. The findings highlight opportunities for optimization in areas such as demand forecasting, pricing strategies, and targeted promotions.

The analysis revealed that Category A medicines are the pharmacy's most significant contributors to revenue and profit, emphasizing the need to maintain adequate stock levels and avoid stockouts. Similarly, high-demand but low-margin medicines, like Dolo 650, present opportunities to enhance profit margins through refined pricing strategies and cost reduction initiatives. On the other hand, low-performing items in Category C require strategic evaluation to determine their viability in inventory.

The findings also underscored the importance of leveraging historical sales data for demand forecasting, which can prevent overstocking or stockouts, improving operational efficiency and cash flow. Additionally, implementing targeted promotions, such as bundling high-margin products with fast-moving items, and reviewing the current 15% discount policy can help drive sales and improve profitability.

Enhancing customer engagement through loyalty programs, seasonal promotions, and partnerships with local clinics or wellness centers can increase customer retention and encourage repeat purchases. Simple yet effective measures, like an Excel-based inventory tracking system, can also enable better inventory control for this small-scale pharmacy without the need for expensive software solutions.

By implementing these recommendations, Babbar Pharmacy can optimize its inventory management, improve profit margins, and establish a stronger market presence. These strategies will not only enhance operational efficiency but also position the pharmacy for long-term growth and sustainability in a competitive market. Regular monitoring and adjustments to these approaches will ensure continued success.

6. Important Links

The excel sheet used for Data Analysis:
https://docs.google.com/spreadsheets/d/1KLGT8HMksG79OsSLpRgqbPkw4QU21fRp/edit?usp=sharing&ouid=105676261282610959382&rtpof=true&sd=true

All the relevant material related to the project can be found in the folder:
https://drive.google.com/drive/folders/1uREp96zlQX3swImW5OVSt0SM8q9SlseJ?usp=sharing