Evaluation of Inventory and Supply Management in a Retail Pharmacy

Midterm report for the BDM capstone Project

Submitted by

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Declaration Statement

I am working on a Project titled "**Evaluation of Inventory and Supply Management in a Retail Pharmacy**". I extend my appreciation to **Bhagavan Medicals**, for providing the necessary resources that enabled me to conduct my project.

I hereby assert that the data presented and assessed in this project report is genuine and precise to the utmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analysed to assure its reliability.

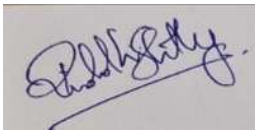
Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through thorough analytical procedures.

I am dedicated to adhering to the principles of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfilment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate:



Name: Riddhi Shetty

Date : 6th January 2026

1. Executive Summary

This report details, 'Bhagavan Medicals', a community pharmacy, owned by Mr. Satish P.V, located in Yelahanka, Bengaluru, which has been operating since 2011.This business is primarily a B2C model and generates revenue through medicine and cosmetics.

In the proposal report, key problems identified included unorganized sales data, which leads to overstocking or understocking of products. This disorganized data, also leads to inability to identify medicines that are going to expire, leading to significant loss in the business. This project aims to analyse the data of the sales in the pharmacy and provide an insight on an ideal inventory, to minimize the losses and ensure appropriate product levels based on the sales trends.

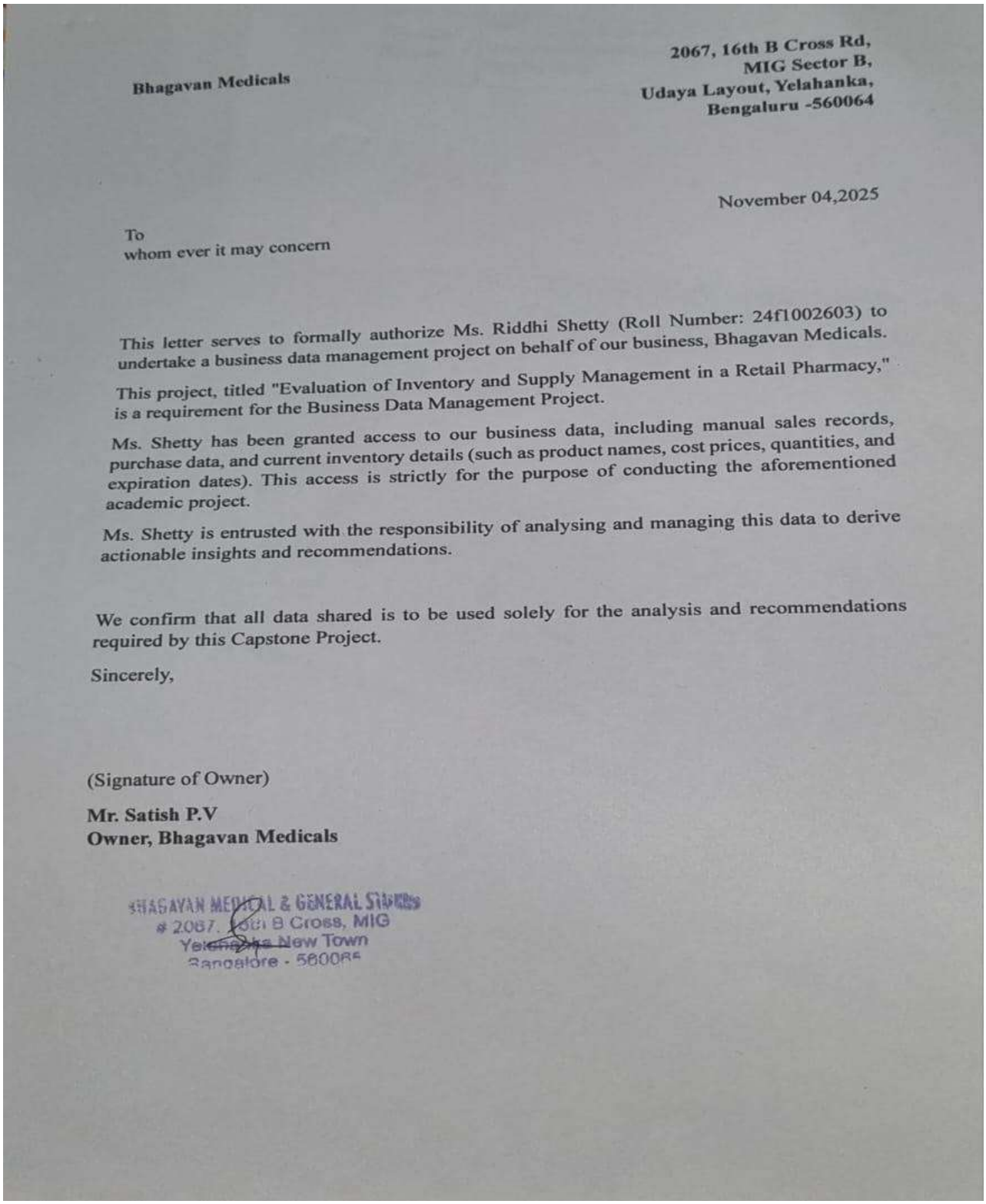
To get a better understanding of these problems, data was collected in the form payment invoices and receipts from 1st October to 30th October 2025, and products nearing expiry dates were identified during the bimonthly check. All these records were digitalized by manually entering the data from the bills into excel sheets, named Raw Data Sales (16 columns and 583 rows) and Raw Data Expiry Date (6 columns and 46 rows). Metadata documents column names, data types, units of measurement, and source formats. For data cleaning, the raw data was cleaned by correcting the item descriptions, creating columns by combining columns (e.g.: selling price= MRP+CGST+ SGST), computing key fields like Net Value and Net profit from previously existing columns, also creating new columns like Category which group the medicines into their respective broad category, 14 broad categories have been chosen for this data analysis.

Multiple quantitative methods have been used to understand the inventory performance, like Pareto principle (80/20) was checked and it was found that 20% of the items contribute to 67.5% revenue, which is not the ideal 80%, but still a significant part of the revenue. FSN analysis was done to classify the items based on the sales velocity, ABC analysis to identify the significant revenue contributing categories.

The result shows that Skincare contributes, approximately 31% of the pharmacy's revenue, whereas Anti-Microbial contribute to maximum sales volume towards the pharmacy. One of the key observations through this analysis, is that Immunosuppressants contributes less than 5% of the revenue, but lead to 42.5% of the losses due to expiring of the product, indicating it is one of the most overstocked products in the pharmacy.

2. Proof of Originality

2.1 Letter from the owner of the business



Bhagavan Medicals

2067, 16th B Cross Rd,
MIG Sector B,
Udaya Layout, Yelahanka,
Bengaluru -560064

November 04,2025

To
whom ever it may concern

This letter serves to formally authorize Ms. Riddhi Shetty (Roll Number: 24f1002603) to undertake a business data management project on behalf of our business, Bhagavan Medicals.

This project, titled "Evaluation of Inventory and Supply Management in a Retail Pharmacy," is a requirement for the Business Data Management Project.

Ms. Shetty has been granted access to our business data, including manual sales records, purchase data, and current inventory details (such as product names, cost prices, quantities, and expiration dates). This access is strictly for the purpose of conducting the aforementioned academic project.

Ms. Shetty is entrusted with the responsibility of analysing and managing this data to derive actionable insights and recommendations.

We confirm that all data shared is to be used solely for the analysis and recommendations required by this Capstone Project.

Sincerely,

(Signature of Owner)

Mr. Satish P.V
Owner, Bhagavan Medicals

BHAGAVAN MEDICAL & GENERAL STORES
2067, 16th B Cross, MIG
Yelahanka New Town
Bangalore - 560064

2.2 Images related to organization

Figure 2.2.1: Owner standing in pharmacy in 2011

Figure 2.2.2: Owner standing in pharmacy in 2025

2.3 A look inside the pharmacy

2.4 Business Description

- Business Name : Bhagavan Medicals
- Address: MIG Sector B, Udaya Layout, Yelahanka, Bengaluru-64
- Owner's Name: Mr. Satish P.V
- Phone Number : +91 9900307888
- The picture attached in proposal report was the look of the pharmacy in 2011, as that was the only photo, which I could get access to. In this report I have attached the current look of 2025, along with picture taken in 2011, to give an insight on the evolution of the pharmacy in a span of 10 years

2.5 Video of interaction with owner

https://drive.google.com/file/d/1-aeP-75bRT0GQMm_RilVicv7oaXRNY_C/view?usp=drive_link

3. Data Collection

3.1 Receipt Invoices collected over a month

https://drive.google.com/drive/folders/1ZZcLbeW1-OnEhPnggzz95Y4IA17IS7E8?usp=drive_link

3.2 Expired products details of the pharmacy collected every 2 months

https://drive.google.com/drive/folders/1UywKcCtxXpLU1jxz7wEfaLSO26eO-17y?usp=drive_link

4. Metadata

Data collected from Bhagavan Medicals include daily sales data from 1st October to 30th October 2025, which gives insightful information regarding the stock management of the pharmacy. There is a discrepancy in the name of the business on the board of the pharmacy and online platforms and the bills. The board of the pharmacy is Bhagavan Medicals and, in the Bills, and Online platforms the name is Bhagawan Medicals, is due to lack of standardized spelling during initial business setup.

Data Collection: The data has been collected in the form sales receipts of the products from 01-10-2025 to 30-10-2025, for the total of one month has been procured, for the analysis of the sales data. Each row in the table represents single line item in a bill, not just total bill values. The products that are nearly expiring or expired were manually separated during the checking that occurs every 2 months by the owner and kept separately in a box, to be returned to the

seller. The item description, expiry date, prices and quantities of the products were collected in the form of pictures for subsequent analysis.

To start the analysis of the data, an excel dataset is created named ‘BDM project dataset’, and the sales data from the receipts is entered into the excel sheet named, ‘Raw Data Sales’, which contain 14 columns and 539 rows. Details of expired products are added into a sheet named ‘Raw Data Expiry Date’ which contain 6 columns and 46 rows.

Raw Sales Data

Number: Serial No, Quantity

T**ext:** Item Description, Batch, Supplier

Date: Date of Sale, Expiration Date

Float: Cost Price, M.R.P, Selling Price, Taxable Value, SGST Amount, CGST Amount, Net Value **Percentage:** SGST %, CGST %

Raw Data Expiry Date

Number: Serial No, Quantity

Text: Item Description

Date: Manufacture Date, Expiry Date

Float: MRP

All the above data has been provided directly from the pharmacy owner, through daily invoice bills, which I have manually compiled and digitized into Excel sheets. This datasheet provides an extensive understanding of the sales patterns and revenue generating products

Data Cleaning: Since the raw data has been collected directly from physical receipts, it consists of detailed breakdown of initial costs and taxes, which is unwanted for analysis, and since the data has been filled manually, it may consist of repeated information which will be a hindrance in the analysis.

In the cleaned data, the relevant column names from the original table, which will give a clearer understanding on the analysis of the data, has been used

Cleaned Sales Data

Original Table: Serial No, Item Description, Quantity, Supplier, Date of Sale, Cost Price, Selling Price

Derived: Category (from Item Description), Net Value (Selling Price × Quantity), Profit Per Product (Selling Price − Cost Price), Total Profit (Profit Per Product × Quantity)

Cleaned Expiry Dates Data

Original Table: Serial No, Item Description, Quantity, Expiry Date, MRP **Derived:** Category (from Item Description), Total (Quantity × MRP)

Steps taken to clean the data

1. Combining the tax values with the MRP columns to form the new column named Selling Price
2. Standardize the date columns and remove duplicates
3. Add a new column named Category, which group the items of the pharmacy into 14 broad categories according to their descriptions
4. Calculated the net value of the products sold and the Net Profit and Profit per product
5. Removing the irrelevant tax percentage and value column

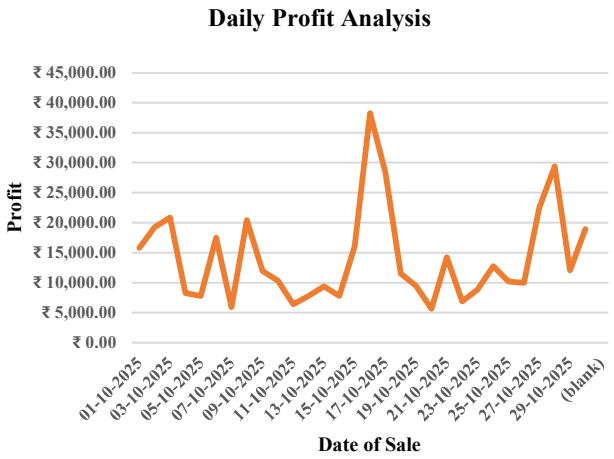
Link to Sheet for manually entered and cleaned data:

https://docs.google.com/spreadsheets/d/16LK-hUriwJOYo7FmOtkfEzPzjyEI37tH/edit?usp=sharing&ouid=113355199225184563753&rtpof=true&sd=true

5. Descriptive Statistics

Analyzing the sales data in October 2025, it has been noted that maximum number of products being sold is Anti-microbial, even though it is not the maximum revenue generating product.

1. Total revenue (October 2025): ₹ 4,24,224.86
2. Total profit generated (October 2025): ₹36,507.35
3. Average daily sale: ₹ 14140.83
4. Maximum revenue generated in one day: ₹ 38237.30 (16/10/25)
5. Minimum revenue generated in one day: ₹ 5640.07 (20/10/25)
6. Total cost price of expired products: ₹ 97457.38(23 % of the Total Revenue Generated)
7. Percentage of Loss due to expired products :22.97%



5.2: Daily Profit Trend (October 2025)

Graph shows daily profit generated in October 2025, highlighting sharp fluctuations and identifying high profit and low profit days. The daily profit trend shows highly irregular fluctuations, with major peaks on specific days and long stretches of low-profit periods, indicating unstable demand

patterns and reinforcing the need for structured inventory control methods.

6. Detailed Explanation of Analysis Process/Methods

The data shared from the owner in the form of payment receipts has been able to give in-depth information to analyze the data thoroughly. Since these receipts were numerous and disorganized, the process of compiling and digitalizing the data was time-consuming and cumbersome.

After entering the raw data, a thorough cleaning of data is necessary to ensure that the spreadsheet has only relevant information needed to analyze the data. Additional new columns were computed to get a deeper understanding of the sales trends.

(For example: Categorizing for medicines and other products sold in the pharmacy)

Since the owner usually gives the receipts to an auditor, as told by the supplier, only 1 month of data could be acquired.

Using pivot tables and incorporating its functions, data has been grouped based on the category of the medicines, to get an understanding on what kind of products is most profitable to the owner.

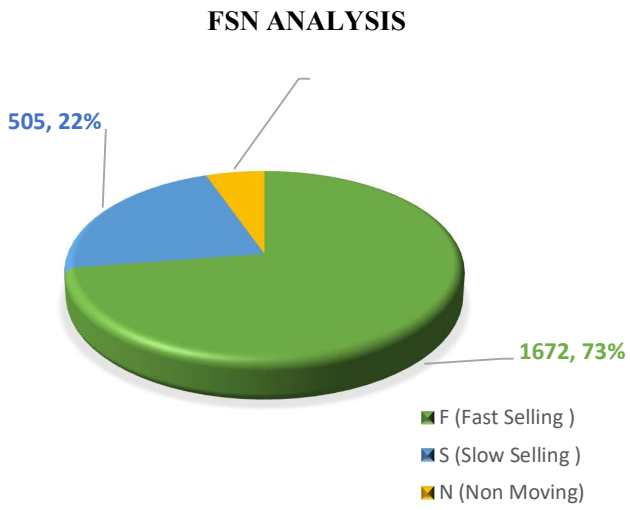
I, have also observed that the products which are least profitable to owner are the ones that get overstocked and has led to significant loss to the owner, since the product usually get expired.

The functions like SUM and AVERAGE in the pivot tables has been used extensively to give visual insights and graphs, which make sales pattern understanding, much easier.

To get a detailed understanding, few Inventory performance and control methods have been applied to the data:

6.1 FSN Analysis

In the FSN Analysis, we get an insight of the kind of items stored in the inventory. 73% of the inventory consists of fast selling products, which should be never be understocked. The slow selling products consists of 22% of the products, these products get sold, but take time, so they need to be stocked, but not in bulk. Non-moving items, are items that do not sell and usually end up overstocked, and since they do not get sold, stay in the shelf and end up expiring, this product should either be discontinued or purchased in

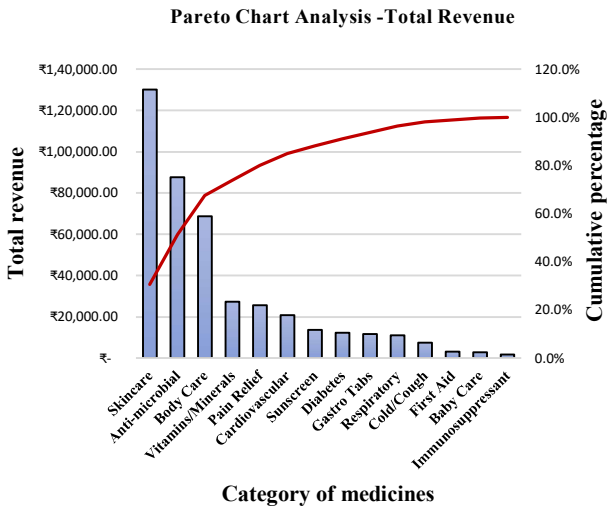


6.1: FSN Analysis of the Category of items

limited quantity. These products are a classic case of dead stock.

6.2 ABC Analysis with Pareto Chart

The ABC analysis shows that Class A categories Skincare, Anti-microbial, Body Care, Pain Relief, and Vitamins & Minerals contribute nearly 80% of the pharmacy's revenue, while Class C categories such as Respiratory, Baby Care, and Immunosuppressants contribute less than 5%. The Pareto analysis shows that 20% of items account for 67.5% of revenue, confirming that a small number of categories drive most of the sales despite deviating from the ideal 80/20 rule

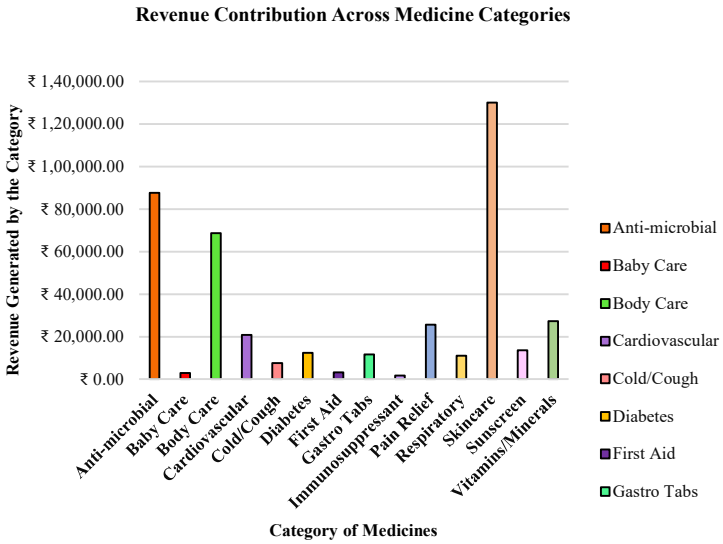


6.2: Pareto Chart based on ABC Analysis of Total Revenue/Category

7. Results and Findings

From this graph, it can be easily understood that Skincare products are the highest revenue generating items sold in the pharmacy, contributing to almost 31% of the pharmacy revenue and Immunosuppressant are the least sold products in the pharmacy. Other products which contribute to revenue of the pharmacy include Anti-Microbial medicines and Body care products.

When we compare the above graph to graph 7.1, we can observe that Anti-microbial medicines are highest sold in terms of quantity, despite the fact that it contributes to only 20.66% of revenue as compared to skincare products which contribute to 31% of revenue while not being the highest quantity of products sold.



7.1: Sales generated by each category vs Category

It can also be observed that Immunosuppressant products are some of the least sold products, which could have

been predicted with the help of graph 7.1, even baby care and sunscreens do not sell out fast from the pharmacy as compared to Anti-microbial or Skincare products

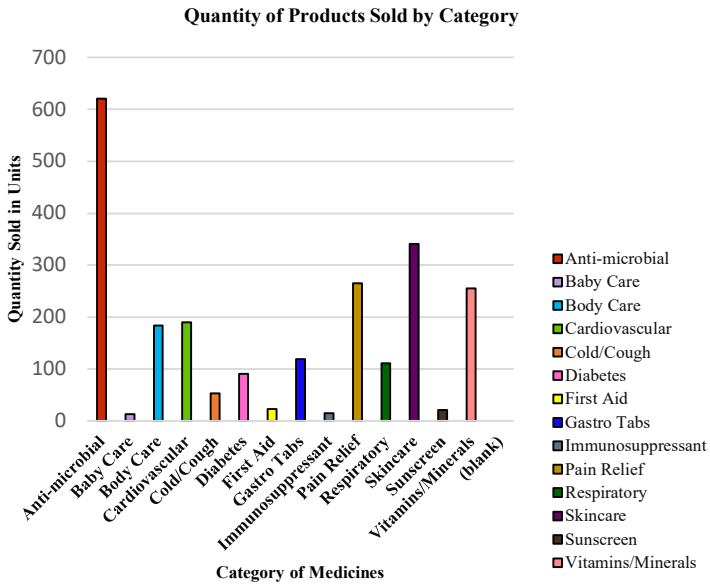
From these 2 graphs we can conclude:

~ Skincare is a low volume, high revenue generating product

~Anti-Microbial is high volume, medium revenue generating product

~Immunosuppressants is low volume, low revenue generating product

~Pain relief is a high volume, low revenue generating product



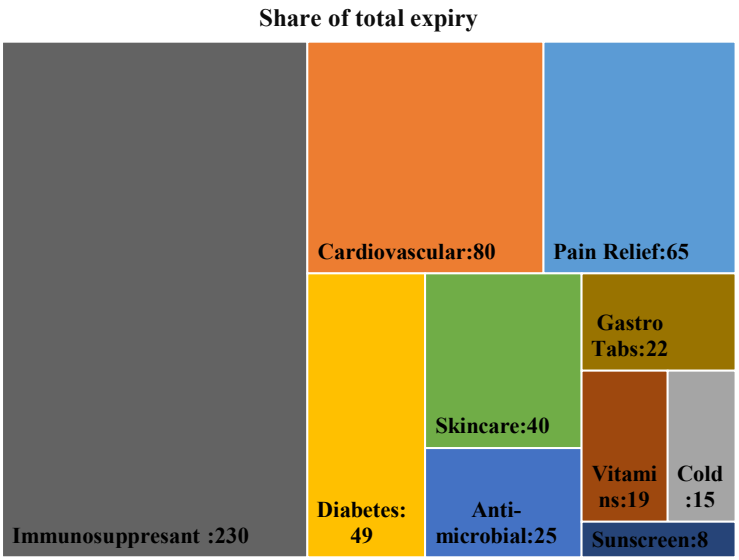
7.2: Quantity of products sold vs Category

We can conclude from the graphs that

~Immunosuppressant is the least sold category, both in terms of quantity and revenue, and also is heavily overstocked in the pharmacy (230 products unsold and expired)

~Skincare products are highest revenue generating but it is also overstocked, approximately 12% more than its demand

~ Pain relief medications are observed to be fast-moving products, with large number being sold and least amount of overstocking, but it doesn't contribute significantly to the revenue.



7.3: Tree map showing the quantity of products expired based of the category of medicines