



Application of always better control (ABC) analysis to strategic inventory management of health commodities in Tanzania

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ABSTRACT

This paper examined how to properly use ABC analysis to manage health supplies in medical stores across Tanzania. ABC classification helps to organise resources more effectively by grouping items based on their importance. The study aimed to influence of Always, Better, Control (ABC) analysis on strategic inventory management of health commodities in Tanzania. This study used ABC Analysis Theory; the research used various methods, including reviewing inventory data and conducting detailed interviews to gather more information. Secondary data was collected from old records and purchase reports, while primary data came from questionnaires and interviews with people who handle inventory and buying. The study targeted a population of 52 respondents and employed a simple random sampling technique to select the study participants. Slovin's formula was used to determine the sample size. However, at a 5% margin of error, the formula produces approximately 46 respondents. Therefore, the sample size of 40 respondents would require an alternative justification. The study used statistical analysis, key points from interviews, and the ABC method to determine how to prioritise and enhance inventory control. The results show that the ABC method effectively sorts health products based on their importance and usage frequency. The recent decrease in stockouts and the cost of keeping too much stock is because Medical Store Department (MSD) can now focus resources on the most important items, which has also helped plan and manage the supply chain more smoothly. These problems include a weak system for automatically tracking items, poor quality of data, and not enough staff trained to use the tool properly. The paper has already covered these topics and shown that smartly using ABC can improve the management of public health supplies. It has suggested practical steps for lawmakers and supply chain managers, such as using better inventory systems, training staff, and considering how long it takes to get supplies and how important they are when making decisions. These steps could help keep the flow of health resources steady and improve health outcomes.

Keywords; ABC Analysis, Health Commodities, Inventory Management, Strategic, Tanzania

I. INTRODUCTION

Managing inventory is a key part of a good supply chain, especially for health products (Wonginta et al., 2025). How medical centers handle their supplies can significantly affect patient care and costs, as well as ensure that important medical items are always on hand (Ugbebor et al., 2024). The people or groups that buy, produce, store, and distribute health products like medicines and medical supplies are essential in ensuring these vital items are always accessible. However, managing their inventory is difficult due to challenges such as uncertain demand, shifting balances between various factors, and limited financial resources (Ayalew et al., 2025). Management of health products for better purchase and distribution involves using strategies to organise inventory effectively. The ABC (Always Better Control) analysis is a well-known method that many companies use to sort inventory. Wulaningrum et al., (2025), classify inventory into three categories: A, B, and C, based on how often they are used, their value, and their importance. According to Wongintanet al., (2025), the costliest and significant things are in Category A, whilst the least costly and least important items are in Category C. This study examines how ABC analysis is used in managing inventory and distributing health product supplies within businesses. It has assessed how ABC analysis has assisted MSD in its inventory management, stock out avoidance, and cost reduction, highlighting themes deduced from the MSD Price Catalogue 2024/2025 and Company-Wide Stock. The study highlights issues with how the ABC analysis is used and offers suggestions for improvement.

**Table 1***ABC Analysis Chart*

Class of Items	% of Items	% of Value
Class A	15%	80%
Class B	25%	15%
Class C	60%	5%

Source: Ayalew et al., (2025)

Countries like Tanzania, and scores of other low- and middle-income countries, rely heavily on how efficiently they handle the supply chain in healthcare, particularly how they manage their stock to ensure everyone can get what they need. MSD is concerned for health outcomes through its operational and strategic role, whereby everyone can get what they need. If the stock runs out, the healthcare service can experience problems like being unable to give the proper care or sending patients to another hospital. ABC analysis is based on the Pareto Principle, which says that most of the value usually comes from just about 20% of all items. When applied to inventory management, this principle helps firms focus on what matters most and control inventory costs to ensure the smooth flow of critical parts (Prachhai et al., 2025).

Organizations like MSD can use this method to create different rules for each type of inventory. For example, they might check more important items more often, apply stricter rules to key categories, and use simpler rules for less important ones. This method helps achieve the main goals of managing inventory well, which are keeping service quality high while lowering costs, cutting down waste, and making sure patients stay safe (Jelić et al., 2026). In Tanzania, inventory data is becoming easier to see and analyze because of digital systems like ELMIS. Even though starting a process is often the hardest part, and there are challenges like training staff, keeping systems consistent, and making sure data is accurate, using MSD for ABC analysis is still important for better inventory control and less waste.

The system can only function effectively if it is connected to strong data systems, good staff training programs, and a structure that keeps improving the supply chain and handles new challenges. Learning how ABC analysis was created and how MSD has used it helps show how inventory management can greatly improve health systems, even when resources are limited. The study helps NGOs, donors, and development partners by offering a clear, evidence-based framework for health logistics systems and ensuring cost-effective interventions. This paper mainly looked at the inventory management of Tanzania's Medical Stores Department (MSD).

Managing inventory well is very important to make sure that important health supplies are always there, especially in poor and middle-income countries. When the supply chain has issues, it can cause big health problems. In theory, using ABC analysis can help prevent shortages, keep better track of stock, and use money more wisely. Even though this method has been widely studied in business, there isn't much information on how it's applied in public health systems, particularly in MSD. Even though MSD has created many digital tools and strategies to improve how they work, there isn't much research on whether tools like ABC analysis are actually being used regularly in their daily inventory tasks. For example, studies have highlighted ongoing challenges with MSD's ability to predict demand and track stock levels, leading to overstocking and shortages (Lubanga, 2025). Without a clear understanding of how ABC analysis is used in MSD's context, there is a risk that supply chain managers and decision-makers may continue making inventory decisions without using these strategic tools fully could help improve efficiency and the quality of health services, but opportunities to do so are being missed. Moreover, the consequences of poor inventory management on public health are profound. Shortages of important medicines and supplies, especially in remote or underserved areas, can slow treatment, hinder patient recovery, and damage public confidence in the health system (Albury-Mckenzie, 2026). This will help improve supply chain practices and support better health services in Tanzania.

1.1 Statement of the Problem

Managing inventory well is very important to make sure that important health supplies are always there, especially in poor and middle-income countries. When the supply chain has issues, it can cause big health problems. In theory, using ABC analysis can help prevent shortages, keep better track of stock, and use money more wisely. Even though this method has been widely studied in business, there isn't much information on how it's applied in public health systems, particularly in MSD. Even though MSD has created many digital tools and strategies to improve how they work, there isn't much research on whether tools like ABC analysis are actually being used regularly in their daily inventory tasks. For example, studies have highlighted ongoing challenges with MSD's ability to predict demand and track stock levels, leading to overstocking and shortages (UNICEF, 2022; Wiedenmayer et al., 2019). Without a clear understanding of how ABC analysis is used in MSD's context, there is a risk that supplies chain managers and decision-makers may continue making inventory decisions without using these strategic tools fully could help improve efficiency and the quality of health services, but opportunities to do so are being missed.



1.2 Research Objective

To determine the Application of Always, Better, Control (ABC) Analysis on Strategic Inventory Management of Health Commodities in Tanzania

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 ABC Analysis Theory

This study used ABC Analysis Theory, during the middle of the 20th century, an economic concept developed by Vilfredo Pareto known as ABC analysis was adopted for managing inventory and became widely used in many businesses, including General Electric (Chindengwike, 2026). Inventory is divided into three groups—A, B, and C—based on their value, as outlined by Excellent. Category A items are highly valuable but make up a small part of the total inventory, usually between 10 to 20 percent, yet they represent about 70 to 80 percent of the overall value. Category B items have medium value and quantity, while Category C items are less valuable but make up a big part of the inventory. By closely managing Category A items and giving less attention to Category C items, managers can use their resources more effectively and adjust their strategies as needed.

ABC analysis helps make better choices when buying and distributing supplies, by focusing on important items and preventing stock shortages in public health areas, as mentioned by the USAID Project (2011). When looking at the 2024/2025 Price Catalogue of the Medical Store Department (MSD) in Tanzania, it was found that 10 to 15 percent of the items accounted for more than 70 percent of the total stock value, showing how useful the ABC theory is in real-life situations. To build a multi-criteria inventory model, ABC analysis was introduced in 1998, similar to other technologies.

The challenge of classifying items in real time has become easier with the help of modern information technologies like ERP systems and data analysis, which enhance the flexibility of the supply chain (Chindengwike, 2025). In conclusion, ABC analysis is a dependable and practical method that has helped improve inventory management and decision-making, especially in MSDs where resources are limited, as demonstrated by strategic applications that lead to better productivity and planning.

2.2 Empirical Review

Some staff members also refuse to move away from old systems and instead stick with ABC-based planning, which slows the adoption and use of the new method (Ugbebor et al., 2024). The lack of real-time information and ways to get feedback further weakens the ability of the system to respond quickly (Alam et al., 2024). ABC analysis and other techniques such as FSN and VEN classification might help better organise supply priorities. Yet MSD has not paid great attention to this area due to issues with compatibility and unclear guidance (Alam et al., 2024). Budget limits and rules for getting supplies can make it difficult to get important items fast, even if they are labeled as top priority "A" items method (Ugbebor et al., 2024).

Using ABC analysis has helped MSD handle health supplies more wisely by making it easier to prioritise resources effectively. However, its effectiveness is still limited because of several challenges, such as bad data quality, uneven standards, insufficient attention to clinical needs, and problems with procurement. To fully benefit from ABC analysis, MSD needs to improve data systems, create standard guidelines, provide regular training, and integrate the method with other approaches that consider both economic and clinical priorities.

ABC analysis is important for good inventory management, especially in places like Tanzania's Medical Stores Department, where resources are limited. This method groups inventory into three categories based on value and how often they are used: A for high-value items, B for items with moderate value, and C for low-value ones. By doing this, managers can focus more on the important items, use resources wisely, and pay more attention to what really matters. It helps make better decisions about buying, storing, and restocking goods. This results in fewer shortages of essential supplies and less waste from holding too much of less important items. When used properly, ABC analysis improves tracking of inventory, assist control costs, and rises the quality of service in the health sector.

H0: *ABC analysis does not significantly affect effective inventory management of health commodities at Tanzania's Medical Stores Department (MSD).*



III. METHODOLOGY

3.1 Research Design

Descriptive research design and mixed-method technology Silaen et al., (2024), were used in this study. The descriptive approach helped explore and document current inventory management practices, patterns, and MSD-related factors.

3.2 Study Area

This study examined the Medical Stores Department (MSD) Central Warehouse and one chosen Regional Depot. These locations play an important role in the supply chain because they handle the receiving, storing, and distribution of essential health products across the country.

3.3 Target Population

The sample includes employees and key MSD personnel responsible for health product procurement, collection, distribution, and inventory management. This group includes Logistics Officers who manage the delivery of medical supplies, Procurement Officers who handle the sourcing of goods, Warehouse staff who take care of storing and managing inventory. Senior-level managers are responsible for controlling stock and making strategic decisions. These actors are pivotal nodes within the public health supply chain, ensuring that health commodities are available and accessible where and when needed.

Table 1

Population Distribution

Sn.	Department/Unit	No. of Staff	Percentage (%)
1	Procurement Management Unit (PMU)	10	19.20%
2	Demand and Supply Planning Unit	8	15.40%
3	Warehouse Normal Programs	14	26.90%
4	Warehouse Vertical Programs	12	23.10%
5	Stock Verification Unit	8	15.40%
TOTAL		52	100%

3.4 Sampling and sample size

A ratified random sampling procedure was used to guarantee that the respondents were proportionally represented in the various sections engaged in inventory management activities. This procedure reduces the chance of sample strategy bias and enhances the generalization of the study results to all the MSD inventory management staff.

$$\text{Sample Size } (n) = N / (1 + N * e^2)$$

Where:

n is the sample size (In this study, 40 Respondents)

N is the total population size (In this study, it is 52)

e is the margin of error (typically set as 0.05 for a 95% confidence level)

By means of this formula, the sample size can be calculated as follows:

$$n = 52 / (1 + 52 (0.05)^2)$$

$$n = 52 / (1 + 52 (0.0025))$$

$$n = 52 / (1 + 0.3)$$

$$n = 52 / 1.3$$

$$n = 40$$

Table 2

Sample size distribution

No.	Respondents Units	Population	Sample Size	% of Sample Size
1	Procurement Management Unit (PMU)	10	8	20.00%
2	Demand and Supply Planning Unit	8	6	15.00%
3	Warehouse Normal Programs	14	11	27.50%
4	Warehouse Vertical Programs	12	9	22.50%
5	Stock Verification Unit	8	6	15.00%
Total		52	40	100%



3.5 Data Collection Instruments and Procedures

This study employs multiple data collection methods to ensure comprehensive coverage and triangulation of findings. These methods include interviews, surveys, and document review, which contribute to capturing quantitative and qualitative data relevant to inventory management practices at the Medical Stores Department (MSD). Using both data collection approaches is important for getting a strong dataset that supports the analysis of ABC classification within health commodity inventory control (Demiray et al., 2024).

3.6 Data Analysis

Data analysis is important for understanding the data collected and getting useful information that matches the goals of the research. In this study, data analysis was done using both quantitative and qualitative methods to ensure a complete understanding of inventory management techniques in the Medical Stores Department (MSD). Quantitative data from inventory records, sales information, and handwritten reports were input into Microsoft Excel and analyzed using the ABC analysis method. ABC analysis is a common way to classify inventory items based on how much they are used. Category A items normally denote around 70-80% of the total usage value and are considered very important; Category B items account for roughly 15-25%, while Category C items are the least important and make up 5-10% (Ashika et al., 2026).

This classification helps identify the most valuable items, allowing more attention and effort to be directed toward managing them effectively. Excel spreadsheets were used to calculate the total consumption values and the percentage each item contributes, which helped determine their ABC category. Descriptive figures, such as average, median, mode, standard deviation, and variations, were also used to understand the patterns and stock levels of health goods consumption distribution. These steps helped identify irregularities or inaccuracies in inventory methods. Along with ABC analysis, charts and graphs were used to show the results and any patterns noticed, which helped in making better conclusions. The qualitative information from interviews and document reviews was used together with quantitative results to ensure the findings are reliable and detailed.

3.7 Ethical Considerations

It's also important to think about ethics in any research, especially when the study deals with sensitive operational information and involves human participants, as is the case with this examination of strategic inventory management of health goods within the Department of Medical Stores (MSD). During the data collection and analysis process Nguyen, et al., (2022), ethical guidelines set by research was followed, ensuring the rights, dignity, and confidentiality of all stakeholders. First and foremost, information was obtained from all participants involved in the informed consent interview or from whom data was indirectly contributed to the study. The research protocol, including data collection instruments, was reviewed to ensure compliance with ethical standards regarding non-maleficence, benefits, and justice (Munyaka & Yadavalli (2022). Researchers also took ethical responsibility to make sure the data is accurate and trustworthy.

IV FINDINGS & DISCUSSION

4.1 Demographic Variables

The gender analysis returns 62.50% of respondents who were male and 37.50% female. The gender analysis indicates that 62.50% of the respondents are male and 37.50% are female. This suggests there are more men working in the Medical Stores Department (MSD) and might also point to gender imbalances in other parts of the health logistics and supply chain. The age distribution shows that the largest group of respondents, at 30%, was between 41 and 50 years old. This was followed by 27.5% who were aged 20 to 40, 22.5% aged 51 to 60, 12.5% aged 61 to 70, and 7.5% aged 71 to 80. This indicates that a significant proportion of the workforce is relatively young to middle-aged, suggesting a potentially dynamic and adaptable workforce. The educational profile indicates that most respondents held at least a bachelor's degree (40%), with a significant number also possessing diplomas (25.00%) and master's degrees (30.00%). The lack of people with PhDs and the presence of those with certificate-level qualifications indicate a workforce that is varied but still well-educated, making it appropriate for positions in strategic inventory and supply chain management.

Respondents were from different departments, with the highest number coming from the Warehouse Normal Programmes (27.50%), then the Warehouse Vertical Programmes (22.50%), followed by PMU (15.00%) and the Stock Verification Unit (15.00%). This blend allows for a broader range of perspectives from various parts of MSD, which makes the analysis more complete and detailed. Most people surveyed (40%) had between 11 and 20 years of experience. About 30% had either 1 to 3 years or 4 to 6 years. 20% had 6 to 10 years of experience. Ten per cent had 1 to 5 years. This means having a mix of people at different stages in their careers, including those who are just starting out, those with more experience, and those who are very senior.



These findings are consistent with those of Alam et al. (2024), who reported that demographic and professional characteristics, including gender, age group, level of education, position, and work experience, influence strategic inventory management practices. The findings suggest that differences in employees' demographic and professional backgrounds may affect their knowledge, skills, decision-making, and ability to effectively implement inventory management strategies. The evidence from this study also reflects the findings reported by Ashika et al. (2026), Ilango et al. (2026), and Wulaningrum et al. (2025). These researchers highlighted the importance of inventory classification in supporting managerial decisions. The use of ABC analysis allows organizations to differentiate commodities based on their relative consumption or financial importance, thereby creating a basis for differentiated monitoring, procurement, and inventory control practices.

Table 2*Demographic Variables*

S/N	Gender	Frequency	Percentage (%)
1	Male	25	62.50
2	Female	15	37.50
	Total	40	100
Age Group			
1	20–40 years	11	27.50%
2	41–50 years	12	30.00%
3	51–60 years	9	22.50%
4	18–25	5	12.50%
5	56 and above	3	7.50%
		40	100
Level of Education			
1	Certificate	2	5
2	Diploma	10	25
3	Bachelor's Degree	16	40
4	Master's Degree	12	30
5	PhD	0	0
		40	100
Position (Unit)			
1	Procurement Management Unit	6	15.00%
2	Demand and Supply Planning Unit	8	20.00%
3	Warehouse Normal Programs	11	27.50%
4	Warehouse Vertical Programs	9	22.50%
5	Stock Verification Unit	6	15.00%
		40	100
Experience Level			
1	1–5 years	4	10
2	6–10 years	8	20
3	11–20 years	16	40
4	Other (1–3 or 4–6 yrs)*	12	30
		40	100

Source: SPSS Output, 2025

4.2 Cronbach's Alpha

Table 3 represents the reliability analysis of the study's variables using Cronbach's Alpha (α). A score of 0.7 or higher is seen as good, which means the questions consistently measure what they are intended to measure. The Application of ABC Analysis has a higher α of 0.879 across eight items, showing strong consistency in how ABC categorisation is used, and this matches the National Supply Chain Strategy for Health Commodities (2020 - 2025). The results further agree with Ashika et al. (2026), who demonstrated that ABC analysis provides a systematic basis for identifying inventory items that require greater managerial attention. Similarly, Ilango et al. (2026) and Wulaningrum et al. (2025) emphasized the role of inventory classification in strengthening monitoring and control. These findings suggest that applying ABC analysis can assist health facilities in concentrating financial and managerial resources on commodities of greater significance.

These results are consistent with Albury (2026), who emphasized the importance of Cronbach's Alpha in assessing the internal consistency and reliability of measurement variables in a study. Cronbach's Alpha helps determine



whether items measuring the same construct produce consistent responses and therefore provides evidence regarding the reliability of the research instrument.

Table 3

Cronbach's Alpha of the Variables in this Study

S/N	Variable	Cronbach's Alpha (α)	Number of Items (N)	Reference Law/Framework
2	Application of ABC Analysis	0.879	8	National Supply Chain Strategy for Health Commodities (NSCS-HC), 2020–2025

Source: Research Findings (2025)

4.3 Application of ABC Analysis for Strategic Inventory Management of Health Commodities at MSD

Field data was collected through interviews with procurement officers, inventory managers, and pharmacists at the Medical Stores Department (MSD). The results in Table 4 demonstrate that MSD has a number of challenges when it comes to correctly classifying and prioritising medical supplies using ABC analysis. The main issue found was the different ways people consume the product (Mean = 4.09, SD = 0.69), which shows that demand is not consistent, making it hard to choose and concentrate on the right approach. The inventory system has problems (Mean = 3.83, SD = 0.78), and the focus on cost rather than medical requirements is excessive (Mean = 3.81, SD = 0.86). This reveals more serious systemic issues that make decision-making more difficult.

The findings of this study are consistent with the findings reported by Ashika et al. (2026), Ilango et al. (2026), and Wulaningrum et al. (2025), who highlighted the importance of ABC analysis in improving strategic inventory management. Their studies indicate that ABC analysis supports the classification and prioritization of inventory items according to their relative value and importance, enabling organizations to allocate resources, strengthen inventory control, and improve stock management decisions. Therefore, the findings of the present study suggest that the application of ABC analysis can contribute to more effective strategic inventory management of health commodities by helping organizations prioritize critical items, reduce unnecessary inventory costs, and improve the availability of essential commodities.

The findings obtained in this study are in agreement with the studies conducted by Ashika et al. (2026), Ilango et al. (2026), and Wulaningrum et al. (2025), which demonstrate the usefulness of ABC analysis in managing inventories strategically. ABC analysis helps organizations distinguish commodities according to their financial significance and management priority, allowing greater attention to high-value and critical items. In the context of health commodities, this approach can enhance stock monitoring, improve purchasing and storage decisions, minimize overstocking and shortages, and promote more efficient utilization of available resources.

Table 4

Examination of the Application of ABC Analysis for Strategic Inventory Management of Health Commodities at MSD

Sn.	Variable & Sub-Variables	Minimum	Maximum	Mean	Std. Dev.
1	Inconsistent or Incomplete Data Records	2.51	4.93	3.65	0.7
2	Variability in Consumption Patterns	2.54	4.98	4.09	0.69
3	Lack of Standardised Classification Criteria	2.56	4.94	3.57	0.72
4	Criticality vs. Consumption Value Conflict; Dynamic Changes in Healthcare Priorities; Limited Staff Capacity	2.54	4.89	3.66	0.68
5	Technical Limitations of Inventory Management Systems	2.55	4.98	3.83	0.78
6	Fragmentation of Supply Chain Actors	2.53	4.88	3.72	0.78
7	Overemphasis on Cost over Clinical Importance	2.53	4.98	3.81	0.86
8	Difficulty in Capturing Indirect Costs and Wastage	2.57	4.97	3.93	0.76
9	Resistance to Change Among Staff	2.57	5	3.95	0.71
10	Lack of Real-Time Data and Feedback Mechanisms	2.54	4.95	3.59	0.71
11	Challenges in Integrating ABC with Other Inventory Control Techniques	2.59	4.8	3.54	0.66
12	Budgetary Constraints and Procurement Regulations	2.55	4.97	3.6	0.72
Overall Mean		2.55	4.94	3.75	0.73

Source: Research Findings (2025)

4.4 Regression Analysis

The regression results illustrate how the independent variables relate to effective inventory management (Y). The Intercept ($\beta_0 = 0.532$, $p = 0.102$) is not statistically significant, meaning the model's starting point does not strongly predict the outcome. Current Strategic Inventory Management Practices (X1) have a positive and significant effect ($\hat{1}^2$



= 0.215, $p = 0.045$), indicating that better inventory practices lead to more effective inventory management. Application of ABC Analysis (X2) shows a strong positive and significant effect ($\beta_1 = 0.312$, $p = 0.017$), showing that using ABC analysis greatly improves inventory results.

Without reliable data, the classification of commodities becomes prone to error, undermining the effectiveness of the ABC methodology. The standard ABC classification does not adequately account for items with low consumption rates but are clinically critical, such as antivenoms or rare blood products. To address this, some institutions, including MSD, have begun exploring hybrid classification systems such as the ABC-VEN (Vital, Essential, Non-essential) matrix, which integrates consumption value and clinical importance method (Ugbebor et al., 2024). Practical ABC analysis becomes more difficult because there aren't enough trained individuals available to carry it out. These discrepancies might result in problems like stock shortages or excesses, impairing the accuracy of inventory choices. These challenges show the importance of investing in better data systems that can do fast and detailed analysis and training programs that teach inventory management concepts. Incorporating financial and clinical considerations into inventory classification frameworks is essential to optimising resource allocation and service delivery at MSD.

The findings of this study are consistent with the findings reported by Ashika et al. (2026), Ilango et al. (2026), and Wulaningrum et al. (2025), who highlighted the importance of ABC analysis in improving strategic inventory management. Their studies indicate that ABC analysis supports the classification and prioritization of inventory items according to their relative value and importance, enabling organizations to allocate resources, strengthen inventory control, and improve stock management decisions. Therefore, the findings of the present study suggest that the application of ABC analysis can contribute to more effective strategic inventory management of health commodities by helping organizations prioritize critical items, reduce unnecessary inventory costs, and improve the availability of essential commodities.

The results of this study correspond with the evidence presented by Ashika et al. (2026), Ilango et al. (2026), and Wulaningrum et al. (2025), which demonstrates the relevance of ABC analysis in strategic inventory management. The application of ABC analysis enables organizations to categorize health commodities based on their relative value and level of importance, thereby facilitating better prioritization, monitoring, and control of inventory. The findings therefore indicate that ABC analysis can strengthen inventory management practices by supporting efficient resource allocation, minimizing excess stock, and ensuring that important health commodities are adequately managed and available when required.

Table 5

Regression Analysis

Sn.	Predictor (Independent Variable)	Coefficient (β)	Std. Error	t-value	p-value	95% Confidence Interval
1	Intercept	0.532	0.301	1.77	0.102	[-0.129, 1.193]
2	Application of ABC Analysis (X1)	0.312	0.094	3.32	0.017	[0.082, 0.543]

R-squared = 0.78 (78% of the variance explained by the model)

F-statistic p-value < 0.001 (The model is statistically significant)

4.5 Testing Hypothesis

The hypothesis examined whether factors such as technology used, rules in place, and how well those rules are followed actually influence how effectively ABC classification works for managing health supplies at the Medical Stores Department. The data was gathered from official stock records and interviews with staff members. The results indicated that the leading causes of issues with accurate classification and priority setting were weak technology systems and difficulties in adhering to the rules. This supported the study's main point, showing that the overall environment of the department significantly affects how well ABC analysis functions.

The findings of this study are consistent with those reported by Ashika et al. (2026), Ilango et al. (2026), and Wulaningrum et al. (2025), who highlighted the importance of ABC analysis for improving strategic inventory management. Their studies indicate that ABC analysis supports the classification and prioritization of inventory items according to their relative value and importance, enabling organizations to allocate resources, strengthen inventory control, and improve stock management decisions. Therefore, the findings of the present study suggest that the application of ABC analysis can contribute to more effective strategic inventory management of health commodities by helping organizations prioritize critical items, reduce unnecessary inventory costs, and improve the availability of essential commodities.

**Table 6**

Testing Hypothesis: Examination of the Application of ABC Analysis for Strategic Inventory Management of Health Commodities at MSD

Hypothesis Statement	Data Source	Key Findings	Conclusion
Environmental factors significantly influence the effectiveness of ABC classification.	MSD inventory reports; Key informant interviews	Systems infrastructure and policy compliance were identified as primary environmental factors affecting classification.	Hypothesis Supported

Source of Data: Extracted from MSD inventory reports and key informant interviews with MSD personnel (2025).

V CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study found that MSD currently uses several different systems to manage its inventory. However, problems like missing records, changing usage patterns, and poor tracking lower the effectiveness of the supply chain. Second, the study found that MSD understands the meaning and purpose of ABC analysis when organising supplies. Still, these methods are not fully or consistently applied. Important items are not monitored properly, while low-value items get too much attention, leading to wasted time and money. Third, this study looked at how ABC analysis impacts inventory management. ABC analysis can help set priorities, plan better purchases, and focus on the most important supplies when appropriately used. But a lack of training, skills, and clear guidelines stops MSD from using ABC analysis effectively. The study shows that MSD manages the supplies it already has well. To improve further, ABC analysis needs to be used more carefully, tracking methods should be better, and the rules should be followed more closely. This helps handle healthcare smarter, more dependably, and affordably.

5.2 Recommendations

The study recommends that MSD should use flexible restocking plans with digital tools that consider delivery times and how quickly items are used. This will ensure that health supplies are available on time and used efficiently. MSD should also check their storage areas often to prevent shortages, products from going bad, and items from being wasted. MSD should also work on making their storage areas better and check them regularly to avoid shortages, expired items, and waste. This approach helps identify which items are most important and used, so MSD can use this information in their buying, tracking, and reporting processes. This will give them more control over the important supplies they need and help them use their resources more efficiently. This will increase overall knowledge within the organisation, reduce errors, and support compliance with rules and procedures. MSD should often include employees in the current systems, how data is handled, and the ABC analysis. There should also be better monitoring and regular checks to ensure resources are correctly used and responsibilities are clear. MSD should make sure to regularly check its inventory systems to ensure its inventory methods are effective and up to date.

Declaration of Interest

The author declares that he does not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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REFERENCES

- Alam, M. K., Thakur, O. A., & Islam, F. T. (2024). Inventory management systems of small and medium enterprises in Bangladesh. *Rajagiri Management Journal*, 18(1), 8–19. <https://doi.org/10.1108/RAMJ-09-2022-0145>
- Albury-McKenzie, L. (2026). *An assessment of centralized pharmaceutical inventory management strategies in the public health sector of New Providence, The Bahamas* [Doctoral dissertation, University of Technology, Jamaica].
- Ashika, D., Parameshwari, V., Francis, A. M., & Marla, A. P. (2026). ABC analysis for surgical inventory management in a corporate hospital pharmacy. *International Journal for Healthcare Quality, Patient Centeredness & Safety*, 7(2), 73–78. https://doi.org/10.4103/IJHQPSC.IJHQPSC_35_25
- Ayalew, A. B., Alemu, A. G., & Worku, A. M. (2026). The application of ABC-VED with multi-criteria analysis for drug inventory management. *Scientific Reports*, 16, Article 2328. <https://doi.org/10.1038/s41598-025-32068-w>



- Chindengwike, J. (2025). Relationship between profitability and dividend payout from industrial companies listed at Dar es Salaam Stock Exchange, Tanzania. *Journal of Management Analytical and Solution*, 5(1), 28–37. <https://doi.org/10.32734/jomas.v5i1.19889>
- Chindengwike, J. D. (2026). Influence of alternative banking channels on customers' satisfaction among Tanzanian commercial banks. *EuroEconomica*, 45(1), 34–45.
- Demiray Kırmızı, S., Ceylan, Z., & Bulkan, S. (2024). Enhancing inventory management through safety-stock strategies—A case study. *Systems*, 12(7), Article 260. <https://doi.org/10.3390/systems12070260>
- Ilango, G., Nishanthi, A., Navabalan, V., Ananthi, V., Manickam, S., Suryakumar, C., & Chandrakumar, S. (2026). Drug inventory management in a pharmacy store of a tertiary care hospital using Always Better Control (ABC) and Vital, Essential, and Desirable (VED) analysis. *Cureus*, 18(6), Article e110514. <https://doi.org/10.7759/cureus.110514>
- Jelić, A. G., Vučenović, V. T., Vučenović, S., Marković-Peković, V., Kurdi, A., Godman, B., Meyer, J. C., & Škrbić, R. (2026). Balancing public health needs and economic sustainability: A dual-matrix model for community pharmacy inventory management. *Exploratory Research in Clinical and Social Pharmacy*, 22, Article 100727. <https://doi.org/10.1016/j.rcsop.2026.100727>
- Lubanga, D. N. (2025). *Developing predictive analytics for ABC-VEN matrix inventory management in Kenyan hospitals* [Master's thesis, Strathmore University]. Strathmore University Repository.
- Munyaka, J.-C. B., & Yadavalli, S. V. (2022). Inventory management concepts and implementations: A systematic review. *The South African Journal of Industrial Engineering*, 33(2), 15–36. <https://doi.org/10.7166/33-2-2527>
- Nguyen, P. H., Dang, T. V. K., Nguyen, P. T., Vo, T. M. H., & Nguyen, T. T. M. (2022). 5-year inventory management of drug products using ABC-VEN analysis in the pharmacy store of a specialized public hospital in Vietnam. *Pharmacia*, 69, 517–525. <https://doi.org/10.3897/pharmacia.69.e84348>
- Prachhai, D. B., Dawadi, S., Kharel, S., Lamichhane, B., Shakya, A., Dhakal, P., Bhandari, K. R., & Pandey, B. (2025). Strategic inventory control in hospital pharmacies: An ABC-VED approach in a hospital of developing country, Nepal. *International Journal of Silkroad Institute of Research and Training*, 3(1), 1–8. <https://doi.org/10.3126/ijst.v3i1.81804>
- Silaen, B. R., Nasution, M., & Muti'ah, R. (2024). Implementation of the ABC analysis to the inventory management. *International Journal of Science, Technology & Management*, 5(4), 816–825. <https://doi.org/10.46729/ijstm.v5i4.1144>
- Ugbebor, F., Adeteye, M., & Ugbebor, J. (2024). Automated inventory management systems with IoT integration to optimize stock levels and reduce carrying costs for SMEs: A comprehensive review. *Journal of Artificial Intelligence General Science*, 6(1), 306–340. <https://doi.org/10.60087/jaigs.v6i1.257>
- Wonginta, T., Pholsook, T., & Saechew, C. (2025). Improvement of inventory management system: Chemical raw materials for healthcare and personal care products manufacturer. *Suranaree Journal of Science and Technology*, 32(6), Article 010386, 1–11. <https://doi.org/10.55766/sujst9969>
- Wulaningrum, R., Lawindra, R. D., & Permana, D. (2025, October). Drugs supply control using the always better control method. In *AIP Conference Proceedings*, 3334(1), Article 110008. AIP Publishing.