

Inventory Reordering Practices and Health Commodity Security in Public Health Facilities in Nyamira County, Kenya

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ABSTRACT

Health commodity security is essential to effective public healthcare because it ensures that medicines and other health products are available in the right quantities and at the required time. However, public health facilities continue to experience stock-outs, delayed replenishment, inadequate forecasting and supply chain weaknesses. This study examined the influence of inventory reordering practices on health commodity security in public health facilities in Nyamira County, Kenya. The study focused on inventory control systems, quantification practices and ABC-VEN analysis. A pragmatic philosophy and analytical cross-sectional design were adopted using a mixed-methods approach. A sample of 89 healthcare workers was targeted, with 86 completing questionnaires, representing a 96.6% response rate. Data were collected using structured questionnaires and key informant interviews and analyzed using descriptive statistics, Pearson correlation, multiple linear regression and thematic analysis. Consumption-based forecasting recorded a mean of 3.71 (SD = 1.027), ABC-VEN analysis 3.44 (SD = 1.080), continuous review 3.37 (SD = 1.218), and standard ordering systems 3.38 (SD = 1.076). The forced order system recorded the lowest mean of 2.19 (SD = 0.819). Reordering practices were positively associated with preventing stock-outs (M = 4.06, SD = 1.033). Correlation analysis established a positive and significant relationship between inventory reordering practices and health commodity security ($r = 0.352$, $p = 0.001$). Regression analysis showed that inventory reordering practices significantly predicted health commodity security ($\beta = 0.302$, $p = 0.005$). Qualitative findings confirmed that stock monitoring, reorder levels, timely ordering and accurate quantification support adequate supplies, although approval delays, inadequate funding and supplier delays may undermine replenishment. The study concludes that inventory reordering practices are important determinants of health commodity security and recommends strengthening stock monitoring, forecasting, ABC-VEN analysis and timely order processing.

Keywords: Inventory reordering practices, health commodity security, essential medicines, stock-outs, forecasting, public health facilities, Nyamira County.

INTRODUCTION

Health commodities are fundamental to the delivery of effective healthcare services because they enable healthcare providers to diagnose, prevent and treat different health conditions. Essential medicines, medical supplies and other health products need to be continuously available in health facilities to ensure that patients receive appropriate treatment when required. The World Health Organization (WHO) recognizes access to essential medicines as an important component of functional health systems, while the Sustainable Development Goals emphasize universal health coverage and access to quality healthcare services. In this context, health commodity security is concerned with ensuring that required health products are available in appropriate quantities, of assured quality and at the time they are needed.

Despite efforts by governments and health sector stakeholders to improve the availability of essential medicines, stock-outs remain a challenge in many public health systems, particularly in developing countries. The problem may arise from weaknesses at different stages of the health commodity supply chain, including forecasting,

quantification, procurement, ordering, transportation, storage and distribution. When health facilities fail to reorder commodities on time, available stock may be exhausted before new supplies arrive. Such shortages can interrupt treatment, force patients to purchase medicines from private outlets and place additional pressure on healthcare providers. Inventory reordering is therefore an important component of health commodity management. It involves determining when available stock has reached a level that requires replenishment and determining the appropriate quantity to order. Reorder levels provide a trigger for replenishment before stock-outs occur. Appropriate reordering requires reliable information on consumption, stock balances, lead time, demand patterns and commodity criticality. Where such information is available and effectively used, health facilities can make more timely and appropriate replenishment decisions.

The present manuscript focuses specifically on the first objective of a broader study that examined inventory management practices and health commodity security in public health facilities in Nyamira County. The first objective was to establish the influence of inventory reordering practices on health commodity security. The study examined inventory control systems, quantification practices and ABC-VEN analysis as important components of reordering. The findings provide empirical evidence on the extent to which these practices contribute to reducing stock-outs and maintaining continuous availability of essential medicines.

Background of the Study

Health commodity security is an essential requirement for effective healthcare delivery because healthcare providers cannot provide appropriate services when essential medicines and supplies are unavailable. The Ministry of Health has developed guidelines for the management of health products and technologies to improve commodity availability, reduce stock-outs and minimize wastage at health facilities. The World Health Organization similarly recognizes health commodities as essential inputs in the prevention and management of different health conditions. Shortages of these commodities can therefore compromise the quality and continuity of healthcare services. At the global level, many healthcare systems continue to experience difficulties in ensuring consistent availability of essential medicines. Although governments have increased investments in healthcare and pharmaceutical systems, limited access to essential medicines remains a concern, particularly in sub-Saharan Africa. The literature reviewed in the study indicates substantial variations in medicine availability across countries. For example, Asmamaw et al. (2024) reported availability of medicines used for the treatment of non-communicable diseases at 18.7% in Ethiopia, while Ayako et al. (2023) reported essential medicine availability of 68.73% in Kenya. These variations demonstrate that the availability of medicines remains an important health-system challenge.

The security of health commodities depends on several supply chain processes. One of the important processes is inventory reordering because it determines when replenishment should occur. Reorder levels are established stock thresholds that trigger the replenishment process. According to USAID (2011), appropriate reorder levels help facilities maintain sufficient stock while minimizing the risk of both stock-outs and unnecessary overstocking. Reordering decisions should therefore be based on reliable information concerning stock consumption, expected demand and replenishment lead time. Lead time is closely associated with reordering effectiveness. It refers to the period between placing an order and receiving the commodity for use. Lead time may be affected by order-processing procedures, supplier preparation, transportation and receiving processes. Where lead time is long and not properly incorporated into reorder decisions, health facilities may exhaust available stock before replenishment arrives. The study reviewed evidence showing that longer lead times can increase the risk of essential medicine stock-outs. Chuene et al. (2024), for example, found that long lead times increased medicine stock-outs in South Africa, while Ezezew et al. (2023) reported a significant relationship between lead time and availability of health products in Ethiopia.

Order fill rate is another factor associated with commodity security. It compares the quantity ordered with the quantity actually delivered. A low order fill rate means that a health facility may receive only part of the quantity requested, thereby increasing the risk of stock-outs even where the facility has submitted its order on time. The study reviewed evidence showing that public health facilities in Kenya have experienced relatively low order fill rates. Ministry of Health data indicated an order fill rate of between 54% and 67% for KEMSA during the

2020/2021 financial year, while Musuva et al. (2024) reported order fill rates of between 50% and 60% in public health facilities across four Kenyan counties. These challenges demonstrate that ordering commodities is not simply an administrative activity. The timing and accuracy of ordering decisions can determine whether commodities remain available during the period between one replenishment and the next. Facilities therefore need inventory control systems that provide clear triggers for ordering and enable healthcare workers to respond to changing stock levels.

The maximum-minimum inventory control system provides one approach to managing commodity levels. According to USAID (2011), three common approaches within this system are forced ordering, continuous review and standard ordering. In a forced order system, stock is assessed at the end of a predetermined review period and the quantities required to restore inventory to an appropriate level are calculated. In a continuous review system, orders are placed whenever stock reaches the established minimum level. In a standard ordering system, orders are placed at the end of the review period only for commodities that have reached their minimum stock levels. Quantification is another important component of inventory reordering. It involves determining the quantity of health commodities required and the resources necessary to procure them. The Ministry of Health (2020) identifies different approaches to health commodity quantification, including consumption-based, morbidity-based, proxy consumption and service-level projection methods. Consumption-based forecasting uses historical commodity consumption to estimate future requirements, while morbidity-based forecasting uses information on disease patterns, expected patient numbers and standard treatment guidelines.

Consumption-based forecasting is particularly useful where reliable historical consumption information is available. It allows health facilities to use previous utilization patterns when estimating future needs. However, its effectiveness depends on the quality of consumption data and the stability of demand. Morbidity-based forecasting can be useful where disease patterns and treatment protocols provide a reliable basis for estimating future needs. The choice of forecasting method should therefore reflect the characteristics and information environment of the health facility. ABC-VEN analysis provides another mechanism for prioritizing health commodities. ABC analysis classifies commodities according to their monetary value, while VEN analysis classifies them according to their clinical importance. ABC analysis divides commodities into A, B and C categories based on expenditure, while VEN analysis classifies them as vital, essential or non-essential. The combination of the two approaches can assist health facilities in identifying commodities that require greater managerial attention because of their financial value or clinical importance.

In Kenya, the management of health commodities is particularly important because public health facilities serve large populations and depend substantially on coordinated procurement and distribution systems. Health commodities and technologies are mainly supplied through the national supply chain, including KEMSA. Delays in ordering, approval, financing and delivery can therefore have direct implications for commodity availability at facility level. Nyamira County provides an important setting for examining these issues because public health facilities continue to experience challenges relating to the availability of health commodities. The original study identified frequent stock-outs as a challenge affecting the provision of quality health services in the county. The study therefore sought to examine inventory management practices that could contribute to improved commodity security. Although previous studies have examined health commodity management, gaps remain regarding the specific contribution of inventory reordering practices in lower-level public health facilities. The literature reviewed in the study identified studies conducted in different countries and settings but noted that some studies concentrated on higher-level facilities. The present study therefore addressed a contextual gap by examining inventory reordering practices among public health facilities in Nyamira County.

Statement of the Problem

The availability of essential medicines is fundamental to effective healthcare delivery. However, public health facilities in many developing countries continue to experience stock-outs and interruptions in the availability of essential health commodities. Stock-outs can affect treatment continuity, increase the cost of accessing medicines and undermine confidence in public healthcare services. The problem is particularly important where public facilities serve populations that depend heavily on government-provided medicines and medical supplies.

In Kenya, health commodity availability remains affected by weaknesses in different parts of the supply chain. Challenges may occur during forecasting, quantification, procurement, order processing, delivery and distribution. The study background identified continued shortages of health commodities in public health facilities in Nyamira County and noted that frequent stock-outs hamper the provision of quality health services.

Inventory reordering represents one of the critical facility-level processes through which stock-outs can be prevented. When health facilities fail to identify declining stock levels and initiate orders early enough, commodities can run out before replacement supplies are received. Similarly, inaccurate forecasting can result in quantities that are insufficient to meet demand, while inappropriate inventory classification may cause critical commodities to receive inadequate attention. Despite the importance of inventory reordering, there has been insufficient empirical evidence specifically demonstrating its influence on health commodity security in public health facilities in Nyamira County. Existing studies have examined inventory management, forecasting, lead time and commodity availability in different settings, but their findings cannot necessarily be generalized to the operational environment of public health facilities in Nyamira County.

The study therefore addressed this gap by examining inventory reordering practices through inventory control systems, quantification practices and ABC-VEN analysis. Establishing whether these practices significantly influence health commodity security was important for identifying practical measures that facility managers and county health authorities can implement to reduce stock-outs and improve medicine availability.

Objective of the Study

The objective of this study was:

To establish the influence of inventory reordering practices on health commodity security in public health facilities in Nyamira County, Kenya.

Research Question

How do inventory reordering practices influence health commodity security in public health facilities in Nyamira County, Kenya?

LITERATURE REVIEW

Inventory Reordering Practices

Inventory reordering practices refer to the processes used by health facilities to determine when commodities should be replenished and the quantities required. Effective reordering aims to maintain adequate stock levels while avoiding unnecessary accumulation of commodities. In health facilities, reordering decisions are particularly important because demand for medicines can vary and some commodities are critical for patient survival. Reorder levels provide an important mechanism for determining when replenishment should occur. A reorder level represents the stock threshold that triggers a new order. According to USAID (2011), health facilities need to understand both when to order and what quantities to order to maintain adequate commodity levels. Effective reordering therefore requires continuous attention to stock balances, consumption patterns and replenishment lead times. Inventory reordering practices in the present study were operationalized through three broad dimensions: inventory control systems, quantification practices and ABC-VEN analysis. These dimensions were selected because they represent important processes through which health facilities determine when commodities should be replenished, how much should be ordered and which commodities should receive priority.

Inventory Control Systems

Inventory control systems provide a structured approach for determining when health commodities should be reordered. The maximum-minimum system is commonly applied in health commodity management because it

provides a framework for maintaining stock between defined levels. USAID (2011) identifies forced ordering, continuous review and standard ordering as common approaches. The forced order system involves assessing commodities at the end of a predetermined reporting period and calculating the quantity required to restore stock to the desired level. Although the approach provides a structured ordering schedule, it may be less responsive to unexpected changes in consumption. If demand increases rapidly during a reporting period, the facility may experience shortages before the next ordering cycle. The continuous review system is more responsive because it triggers ordering when commodities reach the minimum stock level. It requires regular monitoring of stock balances. The approach can help facilities identify impending shortages early and initiate replenishment before available stock is exhausted.

The standard ordering system combines elements of periodic review and minimum stock monitoring. Orders are placed at the end of the review period for commodities that have reached their minimum stock level. This approach can help reduce unnecessary ordering of commodities whose stock remains adequate. The choice and implementation of an inventory control system can therefore influence commodity security. A responsive system can reduce the time between identification of a shortage and initiation of replenishment. However, the effectiveness of any system depends on the accuracy of stock information, the appropriateness of minimum stock levels and the efficiency of the procurement and delivery processes.

Quantification Practices

Quantification refers to the process of estimating the quantities and financial resources required to procure health commodities. The Ministry of Health (2020) identifies consumption-based, morbidity-based, proxy consumption and service-level projection approaches. Consumption-based forecasting uses historical consumption information to estimate future requirements. The approach is appropriate where consumption data are reliable and demand is relatively stable. It allows health facilities to use actual commodity utilization as a basis for determining future orders. Morbidity-based forecasting estimates commodity requirements using information on disease patterns, expected patient numbers and treatment protocols. The method can be particularly useful for new programmes or situations where historical consumption information may not adequately reflect future requirements. Accurate quantification is important because both underestimation and overestimation can create problems. Underestimation may result in inadequate supplies and stock-outs, while overestimation may result in excessive stock levels, wastage and inefficient use of limited financial resources. Kiptoo and Wanyoike (2021) found that systematic inventory monitoring and demand-based forecasting were associated with improved commodity availability and reduced stock interruptions. Munyua et al. (2022) similarly reported better stock management outcomes among healthcare facilities using consumption-based forecasting and inventory classification techniques. These findings support the importance of evidence-based quantification in inventory reordering.

ABC-VEN Analysis

ABC-VEN analysis is used to prioritize health commodities according to financial value and clinical importance. ABC analysis categorizes commodities based on expenditure, while VEN analysis categorizes commodities based on their clinical importance. Under ABC analysis, Category A commodities represent a relatively small number of items that account for a large proportion of expenditure, Category B commodities account for a moderate proportion, while Category C commodities comprise a larger number of lower-value items. VEN analysis categorizes commodities as vital, essential or non-essential according to their importance to healthcare delivery. The combination of ABC and VEN analysis enables health facilities to identify commodities requiring close monitoring. Vital commodities should receive particular attention because their absence can have serious consequences for patient care. High-value commodities also require careful management to avoid unnecessary expenditure and wastage. Mfizi et al. (2023) and Deressa et al. (2022) emphasized the usefulness of ABC-based classification in pharmaceutical inventory management. The application of ABC-VEN analysis can therefore support better allocation of scarce resources and improve the prioritization of commodities during the reordering process.

Inventory Reordering and Health Commodity Security

Health commodity security depends partly on the ability of health facilities to maintain sufficient quantities of essential medicines. Effective reordering contributes to commodity security by ensuring that replenishment occurs before existing stock is exhausted. The relationship between reordering and commodity security can be explained through the interaction between stock levels and lead time. If a facility knows its consumption rate and the time required for an order to be delivered, it can establish a reorder point that allows sufficient stock to cover expected consumption during the replenishment period. Where reorder levels are too low or monitoring is irregular, stock-outs become more likely.

The evidence reviewed in the study demonstrates that lead time is an important component of commodity availability. Chuene et al. (2024) found that longer lead times increased essential medicine stock-outs in South Africa, while Ezezew et al. (2023) established a significant association between lead time and health product availability in Ethiopia. The literature therefore suggests that inventory reordering should not be considered independently from procurement and delivery processes. A facility may identify the need for replenishment correctly but still experience stock-outs if orders are delayed, suppliers fail to deliver or the order is only partially fulfilled.

Empirical Literature and Research Gap

Previous studies have established the importance of inventory management practices in improving health commodity availability. However, there are differences in study settings, health systems and inventory management arrangements. Evidence from Ethiopia, South Africa, Tanzania and other settings provides useful insights but does not necessarily explain the situation in public health facilities in Nyamira County. The study reviewed evidence that effective inventory management practices improve health commodity security, but identified a gap regarding the specific influence of inventory reordering practices, inventory records updating practices, inventory storage practices and staff competence in public health facilities in Nyamira County. A contextual gap was also identified because some previous studies focused on higher-level health facilities. The present study therefore contributed evidence from public health facilities in Nyamira County and specifically examined how inventory reordering practices influence health commodity security.

METHODOLOGY

Research Philosophy

The study adopted a pragmatic research philosophy. Pragmatism was considered appropriate because the study used both quantitative and qualitative approaches to obtain evidence on inventory management and health commodity security. The quantitative approach provided measurable evidence on the relationship between inventory reordering practices and health commodity security, while qualitative interviews provided contextual explanations of the processes and challenges experienced by healthcare workers.

Research Design

The study adopted an analytical cross-sectional research design with a mixed-methods approach. Data were collected from respondents at a particular period, allowing the researcher to examine the relationship between inventory reordering practices and health commodity security. The design was appropriate because it enabled the study to combine quantitative measurement with qualitative explanations.

Study Population

The target population consisted of healthcare workers involved in managing health products and technologies in public health facilities in Nyamira County. The study population included the county pharmacist, sub-county pharmacists and healthcare workers involved in health commodity management. The documented target population comprised 115 healthcare workers across 115 public health facilities.

Sample Size and Sampling

The study targeted 89 respondents for the quantitative component. Out of the 89 questionnaires distributed, 86 were fully completed and returned, resulting in a response rate of 96.6%. Three questionnaires were either not returned or were incomplete.

Data Collection Instruments

A structured questionnaire was used to collect quantitative data from healthcare workers. The questionnaire contained statements measuring inventory reordering practices and health commodity security using a five-point Likert scale. For inventory reordering practices, the instrument measured forced ordering, continuous review, standard ordering, consumption-based forecasting, morbidity-based forecasting, ABC-VEN analysis and the perceived contribution of reordering practices to prevention of stock-outs.

Key informant interviews were also used to obtain qualitative information from healthcare personnel involved in health commodity management. The interviews provided additional explanations concerning stock monitoring, reorder levels, quantification, order processing and challenges affecting replenishment.

Data Analysis

Quantitative data were analyzed using SPSS version 29. Descriptive statistics, including frequencies, means and standard deviations, were used to summarize the inventory reordering indicators. Pearson Product Moment Correlation was used to determine the relationship between inventory reordering practices and health commodity security. Multiple linear regression analysis was used to determine the influence of inventory reordering practices while controlling for the other inventory management variables included in the broader study.

The regression model was specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where:

- Y = Health commodity security
- X_1 = Inventory reordering practices
- X_2 = Inventory records updating practices
- X_3 = Inventory storage practices
- X_4 = Staff competence in inventory management
- β_0 = Constant
- β_1 – β_4 = Regression coefficients
- ϵ = Error term

Qualitative interview data were analyzed using thematic analysis.

RESULTS AND DISCUSSION

Response Rate

The study distributed questionnaires to 89 targeted respondents. A total of 86 questionnaires were fully

completed and returned, representing a response rate of 96.6%. Three questionnaires, representing 3.4%, were either not returned or were incomplete. The high response rate provided an adequate basis for statistical analysis.

Descriptive Results on Inventory Reordering Practices

The findings on inventory reordering practices are presented in Table 1.

Table 1: Inventory Reordering Practices

Inventory reordering practice	N	Mean	Std. Deviation
Forced order system	86	2.19	0.819
Continuous review system	86	3.37	1.218
Standard ordering system	86	3.38	1.076
Consumption-based forecasting	86	3.71	1.027
Morbidity-based forecasting	86	3.10	1.148
ABC-VEN analysis	86	3.44	1.080
Current reordering practices help prevent stock-outs	86	4.06	1.033

Source: Research Data (2026).

The results show that respondents generally agreed that inventory reordering practices were used in public health facilities in Nyamira County. The highest mean score was recorded for the statement that current inventory reordering practices help prevent stock-outs of essential medicines, with a mean of 4.06 and standard deviation of 1.033. This indicates strong agreement among respondents regarding the contribution of reordering practices to the prevention of stock-outs.

The high mean score is important because prevention of stock-outs represents a direct outcome of effective inventory replenishment. When facilities identify declining stock levels early and place orders before commodities are exhausted, they are more likely to maintain continuous availability. The finding therefore suggests that healthcare workers recognize inventory reordering as a critical mechanism for maintaining health commodity security. Consumption-based forecasting recorded the second-highest mean among the specific reordering practices, with a mean of 3.71 and standard deviation of 1.027. This indicates that many facilities rely on historical consumption patterns when estimating future medicine requirements. The relatively high score suggests that actual commodity utilization provides an important basis for determining future orders.

The finding is consistent with Kiptoo and Wanyoike (2021), who established that systematic inventory monitoring and demand-based forecasting were associated with improved commodity availability and reduced stock interruptions. It also supports Munyua et al. (2022), who found that consumption-based forecasting and inventory classification practices were associated with better stock management outcomes. ABC-VEN analysis recorded a mean of 3.44 and standard deviation of 1.080. This represents moderate agreement that the technique is used in the sampled facilities. The result indicates that health facilities employ some form of commodity prioritization based on value and clinical importance. Such classification can assist facilities in allocating limited resources to commodities requiring greater managerial attention.

The standard ordering system recorded a mean of 3.38 and standard deviation of 1.076, while the continuous review system recorded a mean of 3.37 and standard deviation of 1.218. The similar scores indicate moderate application of both systems. These findings suggest that some facilities monitor commodity levels and initiate replenishment when minimum levels are reached, although implementation varies between facilities.

Morbidity-based forecasting recorded a mean of 3.10 and standard deviation of 1.148. This indicates moderate application but comparatively less use than consumption-based forecasting. The difference may suggest that facilities rely more heavily on actual historical consumption than disease-based projections when determining medicine requirements. The forced order system recorded the lowest mean score of 2.19 and standard deviation

of 0.819. The result indicates that respondents generally disagreed that essential medicines are mainly reordered at the end of the reporting period. This finding suggests limited dependence on rigid periodic ordering and indicates movement towards more responsive reordering mechanisms based on stock levels and consumption information. Overall, the descriptive findings suggest that public health facilities in Nyamira County have adopted several approaches to inventory reordering. The relatively high score for consumption-based forecasting, moderate scores for continuous review and standard ordering, and low score for forced ordering indicate a preference for approaches that can respond to actual stock requirements.

Correlation between Inventory Reordering Practices and Health Commodity Security

Pearson Product Moment Correlation analysis was conducted to determine whether inventory reordering practices were associated with health commodity security.

Table 2: Correlation between Inventory Reordering Practices and Health Commodity Security

Variables	Health Commodity Security
Inventory reordering practices	r = 0.352
Significance	p = 0.001
N	86

Source: Research Data (2026).

The findings established a positive and statistically significant relationship between inventory reordering practices and health commodity security, with **r = 0.352** and **p = 0.001**. The positive correlation indicates that better inventory reordering practices are associated with higher levels of health commodity security. The statistical significance of $p = 0.001$, which is below the 0.05 significance level, indicates that the observed relationship is statistically significant. Therefore, the null hypothesis that there is no significant relationship between inventory reordering practices and health commodity security is rejected.

The result implies that facilities with better mechanisms for determining when to reorder, estimating commodity requirements and prioritizing essential commodities are more likely to maintain adequate supplies. The finding is consistent with the descriptive result in which respondents strongly agreed that current reordering practices help prevent stock-outs. The correlation coefficient of 0.352 indicates that the relationship is positive but not perfect. This means that inventory reordering practices are important but do not account for all differences in health commodity security. Other factors, including procurement efficiency, financing, supplier reliability, lead time and order fill rates, can also influence commodity availability. This interpretation is supported by the qualitative findings. Key informants reported that delays in order approval, inadequate funding, supplier delays and changes in commodity demand can affect the effectiveness of reordering and sometimes lead to temporary shortages.

Regression Results

Multiple regression analysis was used to determine whether inventory reordering practices significantly predicted health commodity security after controlling for other inventory management practices.

Table 3: Regression Coefficient for Inventory Reordering Practices

Predictor	B	Beta (β)	t	p-value
Inventory reordering practices	0.290	0.302	2.875	0.005

Source: Research Data (2026).

The regression results indicate that inventory reordering practices had a positive and statistically significant influence on health commodity security. The unstandardized coefficient was $B = 0.290$, while the standardized coefficient was $\beta = 0.302$. The t-statistic was 2.875 and the p-value was 0.005. The positive beta coefficient indicates that improvement in inventory reordering practices is associated with an improvement in health commodity security. Specifically, the results suggest that facilities with stronger reordering systems are more likely to maintain adequate health commodity supplies.

The p-value of 0.005 is less than 0.05, demonstrating that the influence of inventory reordering practices was statistically significant. Consequently, the null hypothesis that inventory reordering practices have no significant influence on health commodity security is rejected.

The regression finding provides stronger evidence than the correlation analysis because it establishes the independent contribution of inventory reordering practices after accounting for the other inventory management practices included in the model. The result confirms that reordering is a particularly important aspect of inventory management in relation to commodity security. The overall regression analysis in the broader study showed that inventory management practices collectively explained 16.4% of the variation in health commodity security, with inventory reordering practices being the only individual predictor that demonstrated a statistically significant influence.

Qualitative Findings on Inventory Reordering Practices

The qualitative findings complemented the quantitative results by demonstrating how reordering practices operate in public health facilities. Key informants reported that facilities commonly monitor commodity balances using consumption patterns, minimum stock levels and routine stock assessments. Regular stock monitoring was identified as an important activity because it enables healthcare workers to identify potential shortages before commodities are completely depleted. When stock levels approach the established reorder point, orders can be initiated to replenish supplies. One key informant explained that commodities are monitored regularly and orders are placed when they reach the reorder level, thereby reducing the likelihood of stock-outs.

The qualitative findings also emphasized the importance of timely ordering and accurate quantification. These findings support the quantitative result showing that consumption-based forecasting recorded a relatively high mean of 3.71. Accurate quantification allows facilities to estimate the quantity required and submit orders that are more likely to meet expected consumption. However, the interviews identified several challenges affecting the effectiveness of reordering. These included delays in approval of orders, inadequate allocation of funds, supplier delays and changes in commodity demand. These challenges can create a situation in which healthcare workers correctly identify the need for replenishment but the commodity does not arrive on time.

The qualitative findings therefore provide an important explanation for the moderate correlation coefficient. Inventory reordering practices can significantly improve commodity security, but their effectiveness depends on other parts of the supply chain. A facility may have a good internal ordering system but still experience stock-outs when procurement approval is delayed or suppliers fail to deliver.

DISCUSSION OF FINDINGS

The study established that inventory reordering practices significantly influence health commodity security in public health facilities in Nyamira County. The descriptive findings showed that facilities use several inventory reordering approaches, while the inferential results demonstrated a statistically significant positive relationship and influence. The strong agreement that current inventory reordering practices help prevent stock-outs, with a mean score of 4.06, demonstrates the practical importance of replenishment systems. This finding is consistent with the principle that effective inventory management should ensure the continuous availability of commodities while minimizing excess stock. The relatively high use of consumption-based forecasting is also significant. Consumption-based forecasting allows facilities to use previous utilization patterns when estimating future needs. Its mean score of 3.71 suggests that it is an important component of reordering in the sampled facilities.

This is consistent with Kiptoo and Wanyoike (2021), who linked systematic monitoring and demand-based forecasting with improved commodity availability.

The moderate use of continuous review and standard ordering systems suggests that facilities have adopted mechanisms for responding to declining stock levels. Continuous review is particularly useful because it enables facilities to reorder when commodities reach a minimum threshold rather than waiting until the end of a fixed reporting period. The low mean score of 2.19 for forced ordering suggests that facilities were less dependent on rigid periodic ordering. This may be viewed positively because a purely periodic system may not respond quickly enough to unexpected changes in consumption. The finding suggests that facilities increasingly rely on stock-level and consumption information when making replenishment decisions. The moderate application of ABC-VEN analysis indicates that facilities use commodity prioritization mechanisms but that implementation can still be strengthened. Given resource limitations in public healthcare, classification of commodities according to financial value and clinical importance can help managers focus attention on medicines whose absence would have the greatest consequences.

The positive correlation between inventory reordering practices and health commodity security further confirms the descriptive findings. The correlation coefficient of 0.352 demonstrates that better reordering practices are associated with better commodity security. The statistically significant p-value of 0.001 confirms that this relationship is unlikely to be due to chance. The regression coefficient provides further evidence of the importance of reordering. With $\beta = 0.302$ and $p = 0.005$, inventory reordering practices significantly predicted health commodity security. This means that reordering practices remained important even after other inventory management practices were considered. The findings are also consistent with the literature concerning lead time. Where replenishment takes longer, facilities need to maintain adequate stock to cover the period before new commodities arrive. Evidence reviewed in the study showed that long lead times increase the risk of stock-outs.

The findings also highlight the importance of supply chain coordination. The qualitative interviews demonstrated that facility-level reordering cannot guarantee commodity security if external processes are inefficient. Order approval, financing, supplier performance and changes in demand can affect the final availability of commodities. This means that strengthening inventory reordering should be accompanied by improvements in procurement and distribution systems. The results therefore support an integrated interpretation of health commodity security. Inventory reordering is a critical facility-level process, but it operates within a wider supply chain. Effective forecasting and stock monitoring must be connected to timely procurement, adequate financing, reliable suppliers and efficient delivery systems.

CONCLUSION

The study concludes that inventory reordering practices significantly influence health commodity security in public health facilities in Nyamira County, Kenya. The findings demonstrated that facilities use a combination of inventory control systems, forecasting approaches and commodity classification techniques to support replenishment decisions. The descriptive results showed that consumption-based forecasting was relatively well applied, with a mean score of 3.71, while ABC-VEN analysis recorded a mean of 3.44. Continuous review and standard ordering systems recorded mean scores of 3.37 and 3.38, respectively. The forced order system recorded a relatively low mean of 2.19, indicating limited reliance on reordering only at the end of reporting periods. Respondents strongly agreed that current inventory reordering practices help prevent stock-outs, with a mean score of 4.06.

The correlation analysis established a positive and statistically significant relationship between inventory reordering practices and health commodity security, with $r = 0.352$ and $p = 0.001$. The regression analysis further demonstrated that inventory reordering practices significantly and positively predicted health commodity security, with $\beta = 0.302$ and $p = 0.005$. The qualitative findings supported the quantitative results by showing that regular stock monitoring, appropriate reorder levels, timely ordering and accurate quantification contribute to maintaining adequate supplies. However, the interviews also revealed that delays in order approval, inadequate funding, supplier delays and changing commodity demand can interfere with effective replenishment.

The study therefore concludes that inventory reordering is a critical determinant of health commodity security, but its effectiveness depends on the wider health commodity supply chain. Strengthening facility-level reordering procedures should therefore be accompanied by improvements in procurement responsiveness, financing, supplier reliability and commodity distribution.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made:

First, public health facilities should strengthen inventory monitoring and reorder-level systems. Facilities should establish appropriate minimum and reorder levels for essential medicines and ensure that stock balances are reviewed regularly. Healthcare workers responsible for commodity management should initiate replenishment before stock reaches critically low levels.

Second, facilities should strengthen consumption-based forecasting. Since consumption-based forecasting recorded a relatively high mean score of 3.71, facilities should continue using historical consumption information while improving the quality and timeliness of consumption data. Accurate consumption information should be used when determining order quantities and anticipating future demand.

Third, continuous review systems should be strengthened. Facilities should monitor stock levels regularly and initiate orders when commodities reach established minimum levels. This can reduce dependence on rigid ordering schedules and enable facilities to respond more quickly to changes in consumption.

Fourth, public health facilities should strengthen the application of ABC-VEN analysis. Commodities should be classified according to their financial value and clinical importance so that vital and high-value commodities receive appropriate monitoring and replenishment priority. This can support efficient allocation of limited resources.

Fifth, county health authorities should reduce delays in order approval and processing. The qualitative findings demonstrated that delays in approving orders can undermine effective reordering. County-level administrative procedures should therefore be streamlined to ensure that facility orders are processed within appropriate timelines.

Sixth, adequate financing should be provided for health commodity procurement. Facility-level reordering practices may not produce the desired outcome when funds are unavailable. County health authorities should therefore ensure that adequate resources are allocated for the timely procurement of essential medicines and other health commodities.

Seventh, supplier performance should be strengthened. Suppliers should be monitored based on timely delivery, order completeness and reliability. Improved supplier performance can reduce the gap between placing an order and receiving commodities and consequently reduce the risk of stock-outs.

Finally, inventory reordering should be managed as part of an integrated health commodity supply chain. Facility-level monitoring and ordering should be linked with forecasting, procurement, financing, transportation and distribution. Such coordination is necessary because effective reordering alone cannot guarantee commodity security where external supply chain constraints remain unresolved.

REFERENCES

1. Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
2. Chuene, M., Nzimande, M., & Mabuza, L. H. (2024). The impact of lead time on the availability of essential medicines in public healthcare facilities in South Africa. *BMC Health Services Research*, 24, Article 1234.

3. Ezezew, A., Tadesse, B., & Gebre, M. (2023). Lead time and availability of health commodities in public health facilities in Ethiopia. *Journal of Pharmaceutical Policy and Practice*, 16, Article 89.
4. Kiptoo, J. K., & Wanyoike, D. M. (2021). Inventory management practices and availability of health commodities in public health facilities. *International Journal of Supply Chain Management*, 10(4), 45–56.
5. Ministry of Health. (2020). Kenya health products and technologies quantification and forecasting guidelines. Government of Kenya.
6. Munyua, J. M., Otieno, A. O., & Wanjala, P. M. (2022). Inventory management practices and availability of essential medicines in public health facilities in Kenya. *Journal of Health, Medicine and Nursing*, 7(2), 25–38.
7. Musuva, E., Were, S., & Odock, S. (2024). Order fill rate and availability of health commodities in public health facilities in Kenya. *International Journal of Healthcare Management*, 17(3), 1–12.
8. Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
9. United States Agency for International Development. (2011). The logistics handbook: A practical guide for the supply chain management of health commodities. USAID | DELIVER PROJECT, Task Order 1.
10. World Health Organization. (2021). WHO guideline on country pharmaceutical pricing policies (2nd ed.). World Health Organization.