

Inventory Management Practices and Performance of Siaya County Government Referral Hospital, Kenya

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ABSTRACT

This study examined the effect of inventory management practices on the performance of Siaya County Government Referral Hospital, Kenya. Specifically, it assessed the effects of inventory planning, stock control, inventory disposal and inventory auditing. The study was anchored on Resource-Based View, Systems Theory, Institutional Theory and Control Theory and adopted a correlational cross-sectional research design. The target population comprised 173 staff involved in inventory-related activities, from which a sample of 121 respondents was selected using Yamane's formula. Data were collected using a semi-structured questionnaire and analysed using descriptive statistics, Pearson correlation and multiple regression analysis. A total of 108 responses were analysed. All inventory management practices had positive and significant relationships with hospital performance: inventory planning ($r = .432, p < .001$), stock control ($r = .586, p < .001$), inventory disposal ($r = .358, p < .001$) and inventory auditing ($r = .401, p < .001$). The regression model was statistically significant, $F(4,103) = 88.512, p < .001$, explaining 77.5% of the variation in hospital performance ($R^2 = .775$). Stock control had the strongest effect ($B = .458, \beta = .270, p < .001$), followed by inventory planning ($B = .294, \beta = .247, p = .001$), inventory auditing ($B = .152, \beta = .182, p = .004$) and inventory disposal ($B = .157, \beta = .130, p = .003$). The study concludes that strengthening inventory management practices significantly enhances hospital performance. It recommends improved digital stock controls, structured inventory planning, formal disposal procedures and regular inventory audits.

Keywords: Inventory Management, Inventory Planning, Stock Control, Inventory Auditing, Hospital Performance.

INTRODUCTION

Background of the Study

In devolved healthcare systems, the performance of county government hospitals is critical to service delivery, efficient resource utilization, and patient outcomes. Hospital performance is multidimensional and may be assessed through timeliness of service, availability of essential services, cost-effectiveness, and patient satisfaction (World Bank, 2020). Although devolution was expected to improve healthcare responsiveness and access, public healthcare institutions continue to experience operational inefficiencies that undermine service delivery and public confidence (Mugenda, 2018). These challenges are particularly important in county referral hospitals, which provide higher-level care and manage complex medical cases. Consequently, effective management of operational resources is essential to achieving the objectives of devolved healthcare.

Inventory management is an important operational capability because the availability and efficient utilization of medicines, equipment, and other medical supplies directly support continuity of healthcare services.

Ineffective practices can result in stockouts, overstocking, expiry, and wastage, increasing operational costs and disrupting services (Smith & Lee, 2020; Wilson et al., 2021). Conversely, effective inventory management can improve supply availability, cost management, and operational efficiency (Johnson et al., 2022). Globally, healthcare institutions have therefore emphasized stronger internal processes, technological adoption, and efficient resource utilization to improve hospital responsiveness and service quality (Chopra et al., 2022). However, implementation remains challenging in developing healthcare systems because financial constraints, inadequate infrastructure, and governance weaknesses can undermine inventory effectiveness (Adeyemi & Ojo, 2021). Although digital systems can strengthen stock tracking and reduce stockouts, adoption is constrained by technical and financial limitations (Van der Merwe et al., 2022), while unreliable electricity and limited technological capacity can further hinder implementation (Teklu & Assefa, 2022). These challenges may contribute to shortages and accumulation of obsolete inventory.

In Kenya, healthcare devolution transferred substantial responsibility for service delivery to county governments, making the performance of county health institutions an important indicator of devolved healthcare effectiveness. County referral hospitals play a pivotal role in specialized care, but their performance depends partly on effective resource management. Poor inventory management has been associated with service interruptions, higher operational costs, and compromised quality of care (Kipruto & Shale, 2019; Nsikan et al., 2020), whereas improved inventory systems have been linked to greater efficiency, transparency, and service delivery in county institutions (Omondi, 2021). The increasing emphasis on digitalization and accountability in Kenya's public health sector further reinforces the importance of effective inventory management (Mwangi & Kariuki, 2022).

Inventory management encompasses interconnected practices. Inventory planning aligns anticipated demand with available resources through forecasting and budgeting (Gupta & Mishra, 2021); stock control promotes inventory accuracy, availability, and timely replenishment (Johnson et al., 2022); inventory disposal facilitates the appropriate removal of obsolete and expired items, reducing waste and operational risks (Wilson et al., 2021); while inventory auditing strengthens accountability through verification, reconciliation, and internal controls (Smith & Lee, 2020). These practices can be understood through the Resource-Based View, Systems Theory, Institutional Theory, and Control Theory, emphasizing organizational resources, system interdependence, institutional requirements, and monitoring mechanisms, respectively (Barney, 1991; von Bertalanffy, 1968; DiMaggio & Powell, 1983; Ouchi, 1979). Nevertheless, limited empirical attention has examined these four practices collectively within county referral hospitals. This study therefore examined their influence on the performance of Siaya County Government Referral Hospital, Kenya.

Statement of the Problem

The performance of public healthcare institutions remains a major concern within Kenya's devolved healthcare system, particularly among county referral hospitals that are expected to provide timely, efficient and reliable health services. Although devolution was intended to improve access and responsiveness, challenges related to service delays, inefficiencies and the availability of essential medicines persist within public healthcare facilities (World Bank, 2020; Ministry of Health, 2020). These challenges may undermine service delivery and the ability of county referral hospitals to effectively meet growing healthcare demands. Concerns about hospital performance are further reinforced by reports of inefficiencies in resource utilization and accountability within county health facilities (Auditor-General, 2022), while procurement-related inefficiencies continue to contribute to resource losses in the public sector (EACC, 2022). Persistent stockouts and weaknesses in the management of medical supplies may therefore have direct implications for operational efficiency, continuity of care and overall hospital performance.

Inventory management is a critical internal operational function because it determines how medical supplies are planned, controlled, accounted for and disposed of throughout their lifecycle. Inefficiencies in inventory planning, stock control, inventory disposal and inventory auditing may result in stock imbalances, wastage, weak accountability and disruptions in healthcare service delivery (Mugenda, 2018; Wanjiru, 2021). However, despite the recognition of these operational challenges, limited empirical evidence exists at the individual facility level on the extent to which specific inventory management practices influence hospital performance. Existing studies have largely approached inventory management from logistics and procurement perspectives

or focused on private-sector and broader public-sector contexts, with relatively limited attention to county referral hospitals operating within Kenya's devolved healthcare system (Chopra & Meindl, 2016; Otieno, 2019; Wanjiru, 2021).

Further, although the Resource-Based View, Systems Theory, Institutional Theory and Control Theory provide useful explanations of how organizational capabilities, system coordination, compliance and control mechanisms may influence performance, their application to inventory management and performance within county referral hospitals remains limited. Consequently, there is insufficient facility-level evidence explaining how inventory planning, stock control, inventory disposal and inventory auditing affect hospital performance in the devolved healthcare context. This knowledge gap limits the development of evidence-based interventions for strengthening internal inventory systems and improving hospital performance. Therefore, this study sought to establish the effect of inventory management practices on the performance of Siaya County Government Referral Hospital, Kenya, by examining the effects of inventory planning, stock control, inventory disposal and inventory auditing.

Objectives of the study

- To analyze the effect of inventory planning on performance of Siaya County Government referral hospital in Kenya.
- To evaluate the effect of stock control on performance of Siaya County Government referral hospital in Kenya.
- To assess how the disposal of inventory affects the performance of Siaya County Government in Kenya.
- To assess how inventory audits impact the performance of Siaya County Government in Kenya.

LITERATURE REVIEW

Theoretical review

This study was anchored on the Resource-Based View, Systems Theory, Institutional Theory and Control Theory. Collectively, these theories explain how organizational resources, coordination among operational systems, compliance with institutional requirements and internal control mechanisms influence organizational performance. They provide a complementary basis for examining the relationship between inventory planning, stock control, inventory disposal and inventory auditing and the performance of Siaya County Government Referral Hospital.

The Resource-Based View (RBV), originating from Penrose (1959) and subsequently developed by Wernerfelt (1984) and Barney (1991), explains performance differences in terms of the resources and capabilities available to an organization and how effectively they are deployed. According to RBV, resources contribute to superior performance when they are valuable, rare, difficult to imitate and non-substitutable. In healthcare organizations, such resources include skilled personnel, information systems, planning capabilities, financial resources and managerial knowledge. Although public hospitals may operate under similar policy and regulatory frameworks, differences in internal capabilities can produce variations in operational performance. In this study, RBV provides the theoretical basis for inventory planning. Effective inventory planning depends on the availability and strategic use of demand information, skilled procurement personnel, budgeting systems and planning processes to align inventory with anticipated service requirements. When these capabilities are effectively coordinated, the hospital is better positioned to minimize stock imbalances, reduce emergency procurement and support reliable service delivery.

Systems Theory, developed by von Bertalanffy (1968), views organizations as complex systems composed of interrelated and interdependent subsystems working towards common objectives. The theory emphasizes that organizational effectiveness depends on coordination, integration, information flow and feedback among different components rather than the performance of individual units in isolation. Within a hospital, procurement, stores, pharmacy, finance and clinical departments are interconnected, and weaknesses in one subsystem can affect the entire service delivery system. Systems Theory is therefore applied to explain stock

control. Effective stock control links demand, procurement, storage and service delivery through accurate stock records, monitoring, reorder levels and timely information sharing. Weak stock control may result in stockouts, overstocking, delays and operational disruptions that extend beyond the stores function and affect clinical services. Conversely, coordinated stock control supports the continuous availability of essential supplies and improves overall operational efficiency.

Institutional Theory, associated with Meyer and Rowan (1977) and DiMaggio and Powell (1983), explains how organizational practices are shaped by formal rules, regulations, professional norms and pressures for legitimacy. Public institutions are required to comply with statutory and accountability requirements, although the effectiveness of such compliance depends on enforcement and institutional capacity. This theory is relevant to inventory disposal because the disposal of obsolete, expired or surplus items is governed by formal procedures intended to safeguard public resources, ensure accountability and minimize wastage. Within Kenya's devolved healthcare system, county institutions are expected to comply with applicable procurement and asset disposal requirements. Effective disposal practices can reduce storage congestion, prevent the accumulation of obsolete stock, improve resource utilization and enhance compliance. Institutional Theory therefore explains how the strength and enforcement of disposal procedures may influence hospital performance.

Control Theory, advanced in organizational control literature by Ouchi (1979) and further developed by Otley (1999), emphasizes the role of standards, monitoring, feedback and corrective action in ensuring that organizational activities achieve intended outcomes. The theory is particularly relevant to public institutions, where formal controls are necessary to promote accountability and reduce resource misuse. In this study, Control Theory provides the basis for inventory auditing. Inventory audits involve verifying physical stock against records, identifying discrepancies, assessing compliance and implementing corrective measures. Regular auditing can improve inventory accuracy, reduce losses and strengthen accountability. Where audit findings are effectively acted upon, the hospital can continuously improve its inventory systems and operational performance. Together, the four theories provide an integrated framework for explaining how inventory planning, stock control, inventory disposal and inventory auditing influence the performance of Siaya County Government Referral Hospital.

Empirical Review

Inventory Planning and Organizational Performance

The relationship between inventory planning and organizational performance has received considerable empirical attention, although the evidence remains mixed across contexts. Thogori and Gathenya (2014), studying Delmonte Kenya, found that planning-related factors, particularly inventory levels, lead times, and order management, were associated with customer satisfaction, with longer order delays reducing satisfaction and loyalty. While the findings demonstrate the operational importance of aligning inventory decisions with demand, the single-firm manufacturing setting limits their transferability to public hospitals, where demand is less predictable and stockouts may directly disrupt patient care. Similarly, Ngumi (2015) reported that inventory planning among large manufacturing firms in Nairobi was associated with cost savings, improved efficiency, productivity, and customer satisfaction. However, reliance on descriptive analysis means that the reported associations were not subjected to rigorous inferential testing. In contrast, Adu-Fosu (2016) found no meaningful relationship between inventory planning and productivity, suggesting that planning alone may not improve performance where organizational capacity and other operational conditions are weak. Onwuchekwa (2022) subsequently reported a strong positive relationship between planning and performance, but the study's industrial and cross-sectional design again limits direct comparison with public healthcare.

Stock Control and Organizational Performance

Empirical evidence generally supports a positive association between stock control and organizational performance, although the strength and nature of this relationship vary by sector and institutional environment. Oloo (2021), in a context directly relevant to the present study, found substantial stock variances within Siaya County and linked inaccurate records and delayed stock updates to delays in medicine dispensing and lower

patient satisfaction. However, because the study was descriptive and focused primarily on patient satisfaction, it did not establish the statistical effect of stock control on broader organizational outcomes. Evidence from other settings reinforces the importance of accurate stock visibility. Munoz-Najar et al. (2021) found that real-time stock monitoring reduced shortages in Nairobi public schools, while Van der Olayanju (2022) reported reduced stockouts following technology-based tracking in South African public hospitals. The latter is more healthcare-specific, although differences in technological infrastructure and institutional capacity constrain direct generalization to Kenyan counties. Mawonde and Demberere (2022) also found positive direct and indirect effects of inventory control systems on mining-firm performance using a more rigorous quantitative approach, but mining operations differ fundamentally from hospitals in demand uncertainty and service objectives. Thus, although evidence converges around the importance of stock accuracy, monitoring, and replenishment, the literature remains fragmented across education, mining, manufacturing, and healthcare.

Inventory Disposal and Organizational Performance

Compared with inventory planning and stock control, the relationship between inventory disposal and organizational performance is less directly examined, with much of the available evidence emerging from waste management rather than inventory management. Gachuru (2022) found a strong positive relationship between waste management practices and employee performance at a Kenyan water and sanitation utility, indicating that structured disposal can reduce inefficiencies in the working environment. However, employee performance is narrower than organizational performance, and the utility context does not capture the regulatory and safety requirements associated with expired medical commodities. Gitau (2018) similarly found that waste reduction, reuse, recycling, and related practices positively influenced construction project performance. Although this study connected disposal practices with broader efficiency and cost outcomes, project-based construction differs from hospitals, which manage inventory continuously and must dispose of pharmaceuticals and medical supplies according to specialized procedures. Liu (2017) also demonstrated the importance of disposal infrastructure and institutional arrangements, but the household and community-level setting makes the findings only indirectly applicable to organizational inventory disposal.

Inventory Auditing and Organizational Performance

Studies on inventory auditing generally indicate that stronger verification and control mechanisms improve accountability and reduce inventory-related losses, although evidence linking auditing directly to broader organizational performance remains limited. Manani and Mose (2024) found that enhanced audit traceability through blockchain-based systems reduced stock theft in a Kenyan county context, demonstrating how improved audit trails can strengthen control over public resources. However, the study primarily measured theft reduction rather than service delivery, operational efficiency, or overall organizational performance. Similarly, Ndigwa et al. (2024) found that inventory audits strengthened the relationship between procurement practices and financial performance among listed manufacturing firms. While this provides stronger evidence of auditing's performance role, the emphasis on financial outcomes and private-sector organizations limits applicability to public hospitals. Liu (2025) reported reduced stock variance and improved data accuracy through real-time inventory auditing in public hospitals, but the findings emerged from a substantially different technological and resource environment. Conversely, Rangsiyunyaporn (2021) identified weaknesses in inventory audit systems but did not adequately quantify their consequences for organizational performance. The literature consequently establishes that inventory auditing can improve control, transparency, and inventory accuracy, but leaves uncertainty regarding whether these benefits translate into improved performance within devolved county hospitals.

CONCEPTUAL FRAMEWORK

The conceptual framework illustrates the proposed relationship between inventory management practices and the performance of Siaya County Government Referral Hospital. The framework identifies inventory planning, stock control, inventory disposal, and inventory auditing as the independent variables. Each practice is represented by specific indicators reflecting how inventory is planned, monitored, disposed of, and audited within the hospital. Hospital performance constitutes the dependent variable and is assessed through timeliness

of service delivery, cost efficiency, and availability of medical supplies. The framework assumes that effective implementation of the four inventory management practices enhances the hospital's ability to deliver timely, efficient, and reliable healthcare services.

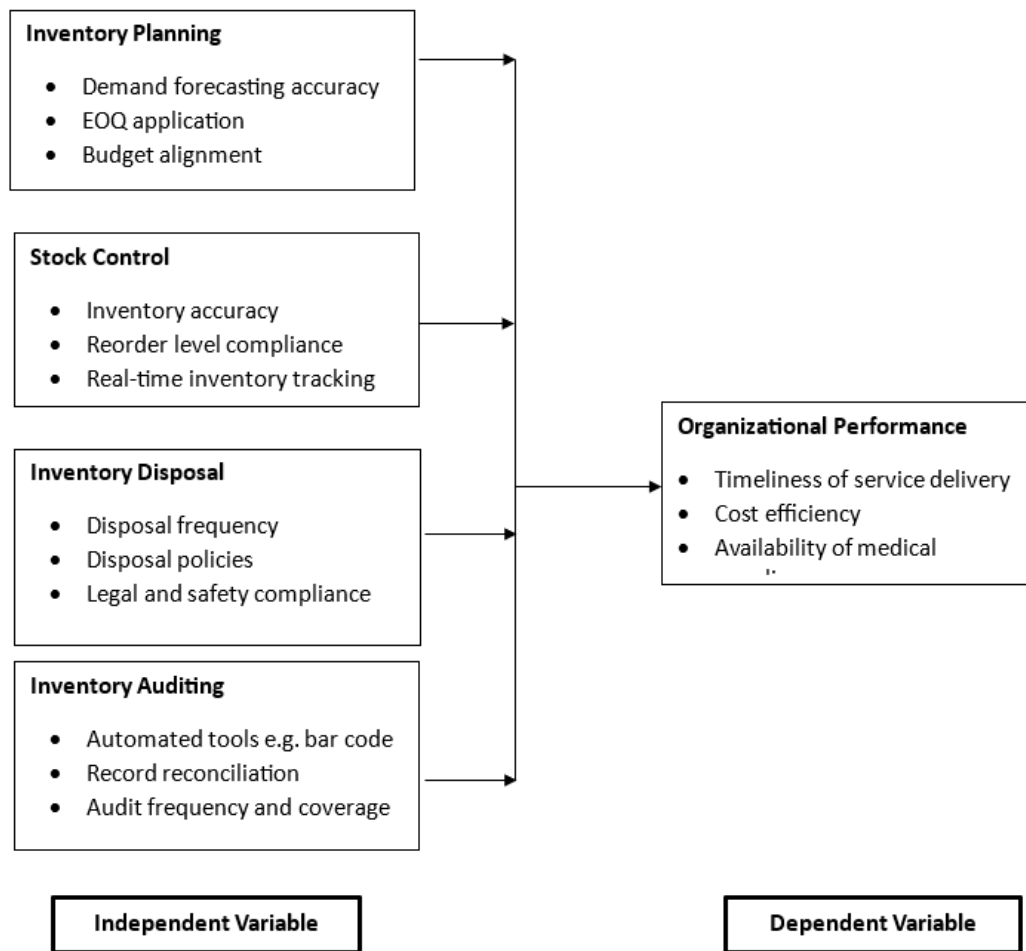


Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

This study adopted a correlational research design to examine the influence of inventory management practices on the performance of Siaya County Government Referral Hospital. The design was appropriate because it enabled the study to examine existing inventory management practices and their relationship with hospital performance without manipulating the study environment. The study focused on four inventory management practices: inventory planning, stock control, inventory disposal, and inventory auditing. Hospital performance, the dependent variable, was assessed in terms of service delivery efficiency, cost-effectiveness, and patient satisfaction.

The target population comprised 173 employees of Siaya County Government Referral Hospital whose responsibilities and professional roles provided relevant knowledge of the hospital's inventory management practices. These included procurement officers, pharmacists, storekeepers, inventory officers, finance officers, and administrators. The sample size was determined using Yamane's (1967) formula at a 5% margin of error, resulting in a sample of 121 respondents. Respondents were selected through simple random sampling, giving each eligible member of the target population an equal and independent chance of selection and supporting the representativeness of the sample.

Primary data were collected using self-administered semi-structured questionnaires containing closed-ended and a limited number of open-ended questions. Closed-ended items measured the study variables using a five-point Likert scale ranging from Strongly Disagree to Strongly Agree, while open-ended questions enabled

respondents to provide additional explanations regarding inventory management issues and practices. Before the main data collection, a pilot study involving 12 respondents, representing approximately 10% of the main sample, was conducted at a public healthcare facility outside Siaya County Government Referral Hospital. The pilot assessed question clarity, respondent understanding, questionnaire sequencing, completion time, and the reliability and validity of the instrument. Content validity was assessed by three experts comprising two academic supervisors and a healthcare practitioner, while construct validity was enhanced through alignment of questionnaire items with the theoretical constructs, research objectives, and conceptual framework. Face validity was assessed through feedback from hospital employees. Internal consistency reliability was tested using Cronbach's Alpha, with a coefficient of 0.70 or above considered acceptable, and items that reduced reliability were revised or removed. Following the necessary university, ethical, and hospital approvals, questionnaires were administered primarily through physical distribution at the hospital, with electronic administration through email and secure online platforms used where necessary. Departmental heads assisted in identifying appropriate times for data collection to minimize disruption of hospital operations. Follow-up reminders and in-person visits were used to improve response rates, while completed questionnaires were checked for completeness and consistency before coding and data entry.

Quantitative data were analysed using descriptive and inferential statistics. Frequencies, percentages, means, and standard deviations described respondents' perceptions and the study variables. Pearson product-moment correlation established the direction and strength of relationships between inventory management practices and hospital performance, while multiple regression determined their individual and joint influence on performance. Model fitness and significance were assessed using R^2 and ANOVA, regression coefficients and p-values determined individual effects, and Variance Inflation Factors assessed multicollinearity. Qualitative responses were analysed thematically through coding, theme identification, and interpretation to complement the quantitative findings. Ethical principles of informed consent, voluntary participation, confidentiality, anonymity, secure data storage, and protection from harm were observed throughout the study.

RESULTS AND DISCUSSION

Response Rate

121 questionnaires were distributed at the Siaya County Referral Hospital and 108 were filled out and returned, indicating a response rate of 89.26 percent. Sekaran (2020) contends that a response rate of 70 percent or greater is acceptable for an analysis in social science research. The response rate from this study is positive and adequate for a statistical analysis, thereby substantiating the findings of this research. A summary of the response rate is shown in Table 1.

Table 1: Response Rate

Category	Frequency	Percent
Returned	108	89.26
Not Returned	13	10.74
Total	121	100

Correlation Analysis

Correlation analysis was conducted using Pearson's correlation coefficient to determine the strength and direction of the relationships between inventory management practices and hospital performance. The analysis involved 108 respondents, with statistical significance assessed at the 0.05 level. The findings show that all four inventory management practices had positive and statistically significant relationships with hospital performance. This implies that improvements in inventory planning, stock control, inventory disposal, and inventory auditing were associated with improved hospital performance.

Table 2: Correlation Analysis of Study Variables

Variable	Inventory Planning	Stock Control	Inventory Disposal	Inventory Auditing	Hospital Performance
Inventory Planning	1				
Stock Control	.309**	1			
Inventory Disposal	.364**	.484**	1		
Inventory Auditing	.240*	.338**	.481**	1	
Hospital Performance	.432**	.586**	.358**	.401**	1

Note: N = 108. ** Correlation is significant at the 0.01 level (2-tailed); * Correlation is significant at the 0.05 level (2-tailed).

Inventory planning had a positive and statistically significant relationship with hospital performance ($r = .432$, $p = .000$). The moderate relationship indicates that improved demand forecasting, establishment of appropriate reorder levels, advance procurement planning, and regular review of inventory requirements are associated with better hospital performance. Effective planning may support the availability of essential supplies, reduce unnecessary delays and contribute to service delivery efficiency, cost-effectiveness, and patient satisfaction. The finding is consistent with studies by Thogori and Gathenya (2014), Ngumi (2015), and Onwuchekwa (2022), which associated systematic inventory planning with improved organizational outcomes. However, its moderate rather than strong correlation supports Adu-Fosu's (2016) observation that planning alone may not sufficiently explain performance without complementary inventory management practices.

Stock control recorded the strongest positive relationship with hospital performance ($r = .586$, $p = .000$). This indicates that effective day-to-day control of inventory was more strongly associated with hospital performance than the other practices examined. Regular updating of stock records, physical stock counts, documentation of stock movements, control of stock access, and timely identification of expired items may reduce stockouts, wastage, and operational disruptions. This finding agrees with Mwachiru and Owuor (2015), Van der Olayanju (2022), and Mawonde and Demberere (2022), who found that effective inventory control improves operational efficiency and accountability. In a hospital environment, where uninterrupted service depends heavily on the availability of medical supplies, the strong association demonstrates the importance of maintaining accurate and effective stock control systems.

Inventory disposal was also positively and significantly related to hospital performance ($r = .358$, $p = .000$). Although this was the weakest relationship among the four independent variables, the findings show that appropriate identification, segregation, documentation, and disposal of expired, obsolete, or unusable inventory are associated with improved performance. Effective disposal may reduce storage congestion, wastage, operational risks, and unnecessary costs while promoting compliance with disposal procedures. The finding supports Gitau (2018) and Gachuru (2022), who associated structured waste and disposal practices with improved efficiency and performance. The comparatively lower correlation may reflect the fact that disposal is less directly connected to daily service provision than planning and stock control, although it remains an important component of efficient inventory management. Inventory auditing had a positive and statistically significant relationship with hospital performance ($r = .401$, $p = .000$). This suggests that regular physical verification, reconciliation of stock records, documentation of audit findings, and implementation of corrective actions are associated with improved hospital performance. Auditing enhances accountability, identifies discrepancies, reduces inventory losses, and strengthens internal controls. The result is consistent with Manani and Mose (2024) and Ndigwa et al. (2024), who found that stronger audit systems improve accountability and organizational outcomes. Overall, the correlation findings provide preliminary evidence that all four inventory management practices are positively associated with hospital performance, with stock

control showing the strongest relationship, followed by inventory planning, inventory auditing, and inventory disposal.

Regression Analysis

Regression Diagnostic Tests

Prior to multiple regression analysis, diagnostic tests were conducted to establish whether the data met the assumptions underlying regression analysis. The tests examined normality, multicollinearity, homoscedasticity, and independence of errors.

Normality Test

Normality testing was conducted to determine whether the study data were approximately normally distributed. The Shapiro-Wilk test was used because it is appropriate for assessing normality in moderate sample sizes. The null hypothesis states that the data are normally distributed. A p-value greater than 0.05 indicates that the null hypothesis cannot be rejected. The analysis was based on the 108 valid responses obtained from the study.

Table 3: Normality Test

Variable	Shapiro-Wilk Statistic	df	Sig.
Inventory planning	0.917	107	0.522
Stock control	0.926	107	0.314
Inventory disposal	0.921	107	0.537
Inventory auditing	0.929	107	0.143
Hospital performance	0.981	107	0.451

All significance values exceeded 0.05. Therefore, the null hypothesis was not rejected, indicating that the variables did not significantly deviate from normality.

Multicollinearity Test

Multicollinearity was assessed using tolerance and Variance Inflation Factor (VIF). Tolerance values above 0.10 and VIF values below 10 indicate an absence of problematic multicollinearity.

Table 4: Test for Multicollinearity

Predictor	Tolerance	VIF
Inventory planning	0.842	1.188
Stock control	0.734	1.363
Inventory disposal	0.621	1.611
Inventory auditing	0.752	1.330

All tolerance values exceeded 0.10 and all VIF values were below 10, confirming that multicollinearity was not a concern and that the four predictors could be retained in the regression model.

Homoscedasticity Test

Homoscedasticity was assessed to determine whether the variance of the regression errors remained constant across the predicted values. The Levene test was used, with a p-value greater than 0.05 indicating homogeneous variance. The test produced a Levene statistic of 8.916 ($p = .108$). Since the p-value exceeded 0.05, the null hypothesis was not rejected, indicating that the error variance was homogeneous and that there was no significant evidence of heteroscedasticity.

Test for Independence of Errors

The Durbin-Watson test was used to assess the independence of regression errors. A value close to 2 indicates independence of errors. The obtained Durbin-Watson statistic was 2.213, which falls within the acceptable range of 1.5–2.5. This indicates that the residuals were independent and that autocorrelation was not a concern.

Multiple-linear regression model

A multiple regression analysis was performed to determine whether planning inventory, controlling stock, disposing of inventory, and conducting inventory audits together, or separately, impact the performance of Siaya County Referral Hospital. The results of the regression are the model summary, the results of the ANOVA test, and the coefficients of the regression.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.880 ^a	.775	.766	2.95468
a. Predictors: (Constant), planning of inventory, control of stock, disposal of inventory, auditing of inventory				

Source: Research Data (2025).

The model summary shows a positive relationship between the merged inventory management practices and hospital performance. The R Square value of 0.775 shows that the four inventory management practices of this model account for 77.5% of the variance in hospital performance. This is a high value, and implies that within a devolved context of health care, hospital performance is highly explainable by inventory management practices.

Table 6: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3090.898	4	772.725	88.512	.000 ^b
	Residual	899.204	103	8.730		
	Total	3990.102	107			
a. Dependent Variable: Hospital performance						
b. Predictors: (Constant), planning for inventory, control inventory, disposal of inventory, inventory auditing						

Source: Research Data (2025).

The results from the ANOVA confirmed the significance of the model. The F-Statistic was 88.512 and the significance level was less than 0.05 hence showing significance. Hence, the regression model was significant and the effect of the four inventory management practices on the performance of the hospitals was real and not due to random chance. Therefore, inventory planning, control, disposal, and auditing practices, in a combination, are significant predictors of the performance of hospitals. A high F value indicates a significant gap between the variance explained by the model and the variance not explained by the model. This too shows the strength of the model.

Table 7: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.983	1.766		3.388	.001
	Inventory planning	.294	.134	.247	2.200	.001
	Stock control	.458	.077	.270	5.913	.000
	Inventory disposal	.157	.056	.130	2.792	.003
	Inventory auditing	.152	.069	.182	2.200	.004
a. Dependent Variable: Performance of Siaya County referral hospital						

Source: Research Data (2025).

Regression analysis examined the individual effect of each inventory management practice on hospital performance while controlling for the influence of the other variables. The constant term was 5.983 and statistically significant at the 0.001 level, representing the baseline hospital performance predicted by the model when the independent variables are held constant.

Inventory planning had a positive and statistically significant effect on hospital performance, with a coefficient of 0.294. This implies that a one-unit improvement in inventory planning was associated with a 0.294 unit increase in hospital performance, holding the other variables constant. Effective demand forecasting, procurement planning, scheduling, and regular review of inventory requirements therefore contribute to improved preparedness, supply availability, and operational performance. This finding is consistent with Thogori and Gathenya (2014), Ngumi (2015), and Onwuchekwa (2022), although it also supports Adu-Fosu's (2016) argument that planning requires complementary operational practices to achieve stronger performance outcomes.

Stock control had the strongest positive and statistically significant effect on hospital performance ($B = 0.458$, $p = 0.000$). A one-unit improvement in stock control was associated with a 0.458-unit increase in hospital performance, making it the most influential predictor in the model. Regular stock record updates, physical stock counts, controlled access, documentation of stock movements, and timely identification of expired items are therefore particularly important for ensuring supply availability, reducing wastage, and maintaining continuity of clinical services. This finding supports Mwachiru and Owuor (2015) and Van der Olayanju (2022).

Inventory disposal also had a positive and significant effect on hospital performance ($B = 0.157$, $p = 0.003$). Although weaker than planning and stock control, effective disposal of obsolete, expired, and unusable

inventory contributes to reduced congestion, lower disposal-related costs, improved safety, and regulatory compliance. The finding is consistent with Gitau (2018), Gachuru (2022), Pearce (2015), and Mulder (2018).

Finally, inventory auditing had a positive and statistically significant effect on hospital performance ($B = 0.152$, $p = 0.004$). Regular stock verification, reconciliation, documentation of audit findings, and corrective action enhance accountability, transparency, and inventory accuracy. Overall, all four practices significantly improved hospital performance, with stock control exerting the greatest influence, followed by inventory planning, inventory disposal, and inventory auditing.

CONCLUSIONS

The study concluded that inventory management practices significantly influence the performance of Siaya County Referral Hospital, demonstrating that effective management of medical supplies is essential to service delivery, cost-effectiveness, and patient satisfaction. Inventory planning had a positive and significant influence on performance, indicating that demand forecasting, procurement scheduling, appropriate reorder levels, and regular review of inventory requirements improve preparedness and reduce emergency purchasing. Stock control emerged as the strongest predictor of hospital performance, confirming the importance of accurate stock records, regular physical counts, controlled access, and proper documentation in preventing stockouts, reducing wastage, and ensuring continuity of clinical services. Inventory disposal also had a significant positive influence, demonstrating that the timely and properly documented disposal of obsolete, damaged, and expired items reduces storage congestion, minimizes holding costs, promotes safety, and supports regulatory compliance. Inventory auditing similarly had a significant positive effect by strengthening accountability, transparency, inventory accuracy, and corrective action. Overall, the findings establish that hospital performance is enhanced when inventory practices are effectively implemented throughout the inventory lifecycle. The study therefore concludes that strengthening inventory planning, stock control, disposal, and auditing is a strategic requirement for improving operational efficiency, accountability, and reliable healthcare service delivery within the devolved public healthcare system.

RECOMMENDATIONS

Based on the findings, Siaya County Government Referral Hospital management, in collaboration with the County Department of Health, should strengthen inventory planning by requiring the Procurement and Stores Departments to establish a structured demand-forecasting and procurement-planning schedule within three months, using historical consumption and service-utilization data. The hospital should allocate resources for staff training, forecasting tools, inventory records, and planning activities, with inventory requirements reviewed monthly and procurement plans aligned with approved budgets. Given that stock control was the strongest predictor of hospital performance, Hospital Management, the Stores and Pharmacy Departments, and the ICT Unit should implement or upgrade an integrated digital inventory management system within six months. The system should provide real-time stock visibility, automated reorder alerts, and identification of expired items, supported by computers or scanners, connectivity, software, maintenance funds, and staff training. Physical stock counts should be conducted monthly and discrepancies promptly reconciled.

The Inventory Disposal Committee and Stores Department should, within three months, establish and implement documented procedures for identifying, segregating, approving, and disposing of obsolete, damaged, and expired inventory. Identification and segregation should occur monthly, while authorized disposal should be undertaken quarterly, supported by trained personnel, secure temporary storage, documentation materials, transport, and an allocated disposal budget. The Internal Audit Unit, working with the Stores and Pharmacy Departments, should conduct quarterly inventory audits beginning within three months, with audit reports submitted to Hospital Management within 14 days and corrective actions implemented within 30 days. Resources should include adequate audit personnel, reconciliation records, verification tools, and funds for follow-up activities. These measures assign clear responsibilities to relevant actors, establish measurable activities and timelines, and provide the resources necessary to strengthen accountability, minimize inventory losses and wastage, improve resource utilization, and enhance hospital performance.

LIMITATIONS OF THE STUDY

The study was limited to Siaya County Government Referral Hospital, which may constrain the generalizability of the findings to other public hospitals or healthcare facilities in Kenya. The cross-sectional research design captured inventory management practices and hospital performance at a single point in time and therefore limits the ability to establish causal relationships. In addition, the study relied primarily on self-reported questionnaire data, which may have been subject to respondent bias or socially desirable responses. The study also examined only four inventory management practices—inventory planning, stock control, inventory disposal, and inventory auditing—and therefore did not account for other organizational, financial, operational, or contextual factors that may influence hospital performance. These limitations should be considered when interpreting and applying the findings.

REFERENCES

1. Oloo, D. O. (2021). Procurement and management of pharmaceutical supplies at the Siaya County Referral Hospital. *African Journal of Health Sciences*, 34(2), 261–276.
2. Ogendi, S. O., & Juma, D. (2025). Effect of Inventory Management Practices on Procurement Performance of Public Level Four Hospitals in Kisii County, Kenya. *Journal of Economics, Management Sciences & Procurement*, 4, 219–231.
3. Ndung'u, M. H. N., Njeru, D. M., Muathe, S. M., & Ocharo, K. N. (2025). Healthcare financing: The nexus between entrepreneurial supply chain practices and performance of public hospitals in Kenya.
4. Almalky, S. A., Miny, A. S. S., Hakami, F. A. O., Alqarni, A. A. A., Allahyani, K. M. A., Alabsi, S. H. N., et al. (2024). The role of nursing in improving medical inventory management and quality of work in health facilities: A systematic review. *Journal of International Crisis and Risk Communication Research*, 7(S5), 443.
5. Bilal, A. I., Bititci, U. S., & Fenta, T. G. (2024). Effective Supply Chain Strategies in Addressing Demand and Supply Uncertainty: A Case Study of Ethiopian Pharmaceutical Supply Services. *Pharmacy*, 12(5), 132.
6. Oguta, Z. O., Mogere, D., Wanderi, P., & Njeru, P. (2024). Stocking Cholera Prevention Measures among Health Providers and Communities at Kakuma Refugee Camp, Turkana County, Kenya: A Desk Review. *Open Journal of Preventive Medicine*, 14(12), 226–245.
7. Ogu, U. U., Ebenso, B., Mirzoev, T., Uguru, N., Etiaba, E., Uzochukwu, B., et al. (2023). Demand and supply analysis for maternal and child health services at the primary healthcare level in Nigeria. *BMC Health Services Research*, 23(1), 1280.
8. Chebet, K., & Mbandu, V. (2024). Cloud-Enabled Machine Learning: A Framework for Revolutionizing Pharmacy Inventory Management in Nairobi County. *International Journal of Professional Practice*, 12(6), 15–27.
9. Madamidola, O. A., Daramola, O. A., Akintola, K. G., & Adeboje, O. T. (2024). A Review of Existing Inventory Management Systems. *International Journal of Research in Engineering and Science*, 12(9), 40–50.
10. Vaka, D. K. (2024). Integrating inventory management and distribution: A holistic supply chain strategy. *The International Journal of Managing Value and Supply Chains*, 15(2), 13–23.
11. Halilović, E., Bajrić, H., Melin, K., & Neimarlija, E. (2023). Strategies for Reducing Excess and Obsolete Inventory. In *International Conference "New Technologies, Development and Applications"* (pp. 396–410).
12. Affordofe, M., Udofia, E. A., Akyeampong, E., Koranteng, F. O., Tettey, P., Botwe, P. K., et al. (2025). Knowledge and practice of solid healthcare waste management among waste handlers in hospitals in Southern Ghana: A qualitative study. *BMC Public Health*, 25(1), 702.
13. Rangsipunyaporn, P. (2021). An improvement of data analytics detection rules in the internal audit of the procurement and inventory processes.
14. Manani, A. C., & Mose, T. (2024). Blockchain technology and revenue administration in Nairobi city county government, Kenya. *International Journal of Social Sciences Management and Entrepreneurship*, 8(2).

15. Bostan, I., Tudose, M. B., Clipa, R. I., Chersan, I. C., & Clipa, F. (2021). Supreme audit institutions and sustainability of public finance. *Sustainability*, 13(17), 9757.
16. Ugbebor, F., Adeteye, M., & Ugbebor, J. (2024). Automated Inventory Management Systems with IoT Integration to Optimize Stock Levels and Reduce Carrying Costs for SMEs. *Journal of Artificial Intelligence General Science*, 6(1), 306–340.
17. Uddin, M. Z. (2025). The Cost of Coordination Failures: Impacts on Urban Development Projects and Citizen Services in Bangladesh. *Open Access Indonesia Journal of Social Sciences*, 8(1), 1922–1936.
18. Charles, M., Ndolo, J., & Odari, S. (2023). Inventory management practices and performance of electoral systems in Kenya. *International Journal of Social Science and Humanities Research*, 1(1), 811–826.
19. Kumar, R., & Kumari, K. (2024). Enhancing Economic Development through Inventory Management Optimization. *International Journal for Multidisciplinary Research*, 6(2).
20. Galkin, A., Levada, V., Kyselov, V., Hulchak, O., Prunencko, D., & Voronko, I. (2022). Methods of Comparison of the Economic Order Quantity and Just-in-Time Restocking Technologies. *Communications-Scientific Letters of the University of Zilina*, 24(2), A35–A43.
21. Ivanov, D., Tsipoulanidis, A., & Schönberger, J. (2021). Production and material requirements planning. In *Global Supply Chain and Operations Management* (pp. 359–383).
22. Mukula, D. M. (2023). Just-in-time Purchasing Strategies and Operational Performance of Manufacturing Firms in Nairobi County, Kenya (Doctoral dissertation, University of Nairobi).
23. Namagembe, S., Ntayi Mpeera, J., & Kalid, A. (2021). An examination of SME involvement in public procurement under bid lot sizing. *Journal of Public Procurement*, 21(4), 370–398.
24. Chen, Y., Bretschneider, S., Stritch, J. M., Darnall, N., & Hsueh, L. (2022). E-procurement system adoption in local governments. *Public Management Review*, 24(6), 903–925.
25. Willis, R., Mbuthia, D., Gichagua, M., Nzinga, J., May, C., Mugo, P., & Murphy, A. (2025). ‘You can sleep hungry just to buy the medicine’: Applying a patient-centred model of cumulative complexity. *SSM-Qualitative Research in Health*, 100563