International Research Journal Of Supply Chain and Logistics Management

Vol 7, Issue 2, pp 35-44, Nov 18, 2025, © International Research Journal Publishers, ISSN 2710-2742 (online) www.irjp.org

Influence of Supplier Coordination on Operational Performance and Practices in Healthcare Projects in Kisumu County, Kenya

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Accepted, Nov 17th, 2025

Abstract

This study investigated the influence of supplier coordination on operational performance and practices among healthcare projects in Kisumu County, Kenya. The study was grounded on Just-in-Time theory. A descriptive research design was employed, targeting 252 staff from 71 healthcare projects, including public and private facilities. Stratified random and purposive sampling selected 155 staff from 60 projects, achieving a 94.8% response rate. Data were collected via questionnaires, analyzed using descriptive statistics and simple linear regression in SPSS. The study found that supplier coordination was a key driver of operational performance in healthcare projects in Kisumu County. The advantages of supplier coordination included regular deliveries and communications, but disturbances caused by the delays demonstrated the weaknesses. Supplier co-ordination needs to be more robust in terms of contracts that focus on on time deliveries and communication channel and penalties in cases of late deliveries. The suppliers should also be varied so that there is no interruption, and to track the orders should be done online.

Keywords: *Supplier Coordination, Operational Performance and Practices, Healthcare Projects*

INTRODUCTION

Inventory management is a critical component of operational efficiency, especially in healthcare settings where the timely availability of supplies and equipment is essential for effective patient care. Proper inventory control ensures that necessary medical supplies, pharmaceuticals, and equipment are available when needed, without overstocking or wastage. Efficient inventory management in healthcare facilities can significantly reduce costs, improve patient outcomes, and streamline operational processes. Ineffective inventory management, on the other hand, can lead to stockouts, delays in treatment, increased operational costs, and suboptimal patient care (Akinci & Hsieh, 2019). Healthcare organizations worldwide, particularly in low-resource settings, face significant challenges in managing their inventories efficiently, which directly affects their operational performance.

On a global scale, healthcare inventory management has become increasingly sophisticated, with many developed countries adopting advanced technologies such as barcode scanning, RFID

systems, and automated tracking systems to ensure accuracy and efficiency. These technologies help streamline inventory processes, reduce human error, and ensure that supplies are available when needed. However, in many developing countries, including those in Africa, healthcare facilities often struggle with outdated inventory management practices due to limited resources, lack of access to technology, and insufficient training for staff (Nwachukwu *et al.,* 2021). As a result, many healthcare projects in these regions experience issues such as stockouts, wastage, and increased operational costs, which ultimately impact the quality of care provided to patients.

In Africa, the challenges of inventory management are particularly pronounced in public healthcare systems, where resources are often limited, and demand for healthcare services is high. Kisumu County, located in western Kenya, is no exception. The county's healthcare facilities, including hospitals, clinics, and health centers, face significant challenges in managing their inventories effectively. The growing population, coupled with limited financial resources and outdated inventory systems, has led to inefficiencies in inventory control across various healthcare projects in Kisumu County. These inefficiencies manifest in stockouts of essential medicines, wastage of medical supplies, and increased costs, which ultimately affect the quality of healthcare services provided to the population (Kihara & Ngugi, 2021).

At the local level, Kisumu County's healthcare system has made efforts to improve inventory management through various initiatives, but challenges persist. The county's public healthcare facilities, such as Kisumu County Referral Hospital and various sub-county hospitals, often struggle with the proper management of medical supplies, which hampers their ability to deliver timely and effective care. The Walter Reed Project, which is one of the significant healthcare projects in Kisumu County, serves as a key example of the challenges faced by healthcare projects in the region. Despite efforts to improve inventory control, inefficiencies remain, leading to delays in treatment, stockouts of essential medicines, and increased operational costs. The broader issue of inventory control in Kisumu County's healthcare projects requires further investigation to identify the root causes of inefficiencies and propose practical solutions for improving operational performance (Kirui & Kimani, 2020).

This study aims to explore the influence of supplier coordination inventory control practice on operational efficiency across healthcare projects in Kisumu County, focusing on identifying the factors that contribute to inventory management challenges and evaluating the impact of these challenges on the operational efficiency of healthcare facilities. By examining the current inventory management practices in the county's healthcare projects, the study seeks to provide insights into how inventory control can be optimized to enhance operational efficiency, reduce costs, and improve patient care.

Statement of the Problem

Healthcare projects in Kisumu County face persistent challenges in managing their inventories, a problem that directly undermines their operational performance and the practices they employ to deliver care. Stockouts of essential medicines, wastage of perishable supplies, and escalating costs are recurrent issues, largely driven by the county’s reliance on manual and outdated inventory systems. Kihara and Ngugi (2021) note that these inefficiencies lead to significant disruptions, such as delays in patient treatment and increased financial burdens on healthcare facilities, which in turn compromise the quality of service delivery. Despite the critical role that inventory control plays in ensuring operational success, there remains a lack of comprehensive understanding of how these practices specifically affect healthcare projects in Kisumu, necessitating a detailed investigation to identify root causes and potential solutions.

Although some attempts have been made to improve inventory management in Kisumu County, the outcomes have been inconsistent and insufficient to address the scale of the problem. For instance, basic systems introduced in facilities like Kisumu County Referral Hospital have not fully eliminated stockouts or reduced wastage, as highlighted by Odeny (2015). This suggests that while awareness of the issue exists, the current approaches lack the depth or adaptability needed to tackle the county's unique challenges, such as unreliable supply chains and limited staff capacity. Without a clear picture of how inventory control influences operational performance, healthcare projects in Kisumu will continue to struggle with inefficiencies that drain resources and hinder their ability to meet patient needs effectively. This study aims to bridge this gap by providing a thorough analysis of the situation and its implications.

The scarcity of localized research further compounds the problem, as most existing studies focus on broader national or international healthcare systems rather than the specific context of Kisumu County. While Nwachukwu et al. (2021) address inventory challenges across sub-Saharan Africa and Akinci and Hsieh (2019) explore global best practices, few investigations zero in on Kisumu's public healthcare projects, as noted by Kirui and Kimani (2020). This lack of targeted knowledge leaves policymakers and healthcare managers without the evidence needed to design interventions that fit the county's circumstances, such as its mix of urban and rural facilities or its economic constraints. By focusing on Kisumu, this research seeks to fill this critical gap, offering insights that are both relevant to the local setting and grounded in the realities of its healthcare system.

The urgency of addressing this problem lies in its potential to transform healthcare delivery in Kisumu County. Effective inventory control could lead to substantial cost savings, better resource allocation, and improved patient outcomes, all of which are vital for a region where healthcare projects serve as a primary lifeline for a vulnerable population. Kihara and Ngugi (2021) argue that optimizing inventory practices could alleviate operational pressures, allowing facilities to function more efficiently and reliably. If this study can pinpoint the factors driving inventory-related inefficiencies and propose practical strategies for improvement, it could pave the way for a stronger, more responsive healthcare system in Kisumu, with benefits that might extend to other Kenyan counties facing similar struggles.

Objective of the Study

To determine the influence of supplier coordination on operational performance and practices in healthcare projects in Kisumu County.

LITERATURE REVIEW

Theoretical Framework

The study was anchored on Just-in-Time Theory. The Just-in-Time model centers on delivering resources exactly when needed, minimizing waste and storage costs. Originated by Taiichi Ohno in the 1950s within Toyota's production system in Japan, JIT focuses on streamlining processes to ensure materials arrive at the point of use without delay or excess. The model aims to reduce inventory holding, improve flow, and align supply with demand. In manufacturing, JIT transformed efficiency by cutting unnecessary stock, and its principles later spread to other sectors, including healthcare. For this study, JIT offers a view of inventory control as a process that supports operational performance by keeping supplies lean yet sufficient, a concept applicable to managing medical stock in healthcare settings. In Kisumu County, JIT relates to healthcare projects by highlighting the need to balance supply availability with resource limits. Facilities often face stockouts or overstocking due to poor planning, disrupting operations and patient care. The model suggests that ordering supplies only as required could prevent these

issues, ensuring medicines and equipment reach clinics when patients need them. Ohno's approach emphasizes timing and coordination, which in Kisumu means syncing procurement with treatment schedules to avoid gaps or surplus. This study uses JIT to explore how healthcare projects can adjust inventory practices to match demand, reducing costs and delays in a region where funds and storage space remain scarce.

Conceptual framework

This section outlines the conceptual framework guiding the study on inventory control and operational performance in healthcare projects in Kisumu County.

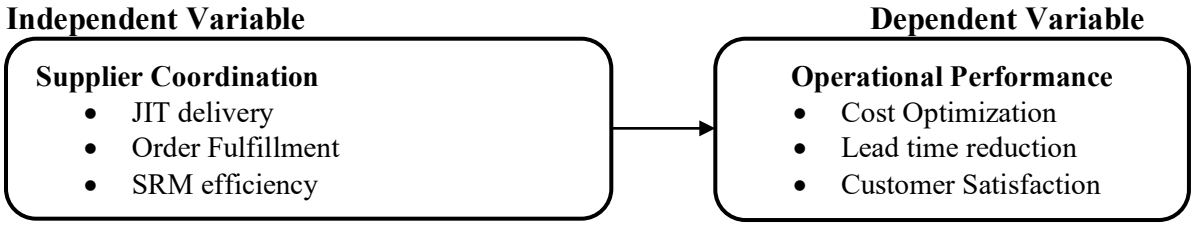

Figure 1 Conceptual Framework

Empirical Review

Empirical studies on challenges in inventory management identify stockouts, wastage, resource limits, and system delays as critical issues, with relevance to Kisumu County's healthcare projects. Nwachukwu *et al.* (2021), in "The challenges of inventory management in public healthcare facilities in sub-Saharan Africa," surveyed 40 facilities across South Africa and found that stockouts occurred in 75% due to unreliable suppliers and poor forecasting. Using descriptive statistics, they showed that shortages delayed treatments by an average of four days, a challenge Kisumu could face given its dependence on external supply chains. The researchers noted that manual systems exacerbated these issues, a reality likely in Kisumu where technology remains scarce.

Kirui and Kimani (2020), in "Effect of system review practices on operational performance of construction industry in Uasin Gishu County, Kenya," studied construction firms but offered insights applicable to healthcare. Through questionnaires, they found that wastage from excess stock affected 60% of firms, driven by overordering and lack of storage. In Kisumu, where healthcare projects manage perishable drugs, similar wastage could strain budgets, reducing funds for essential supplies. The researchers linked wastage to weak system reviews, suggesting that Kisumu's manual processes might face parallel challenges, impacting operational performance.

Kesumo et al. (2024), in "The Effect of Inventory Control on the Work Productivity of Inventory Division Employees at PT Duta Sentosa Yasa (MR DIY) KBN Marunda," surveyed 50 employees in Indonesia and identified resource limits as a major barrier. They found that budget constraints restricted stock purchases in 70% of cases, while staff shortages slowed inventory tasks by 25%. In Kisumu, where healthcare projects operate with limited funding and personnel, these limits could hinder stock management, leading to inefficiencies. The study used correlation analysis to show that resource scarcity reduced productivity, a concern for Kisumu's understaffed facilities.

Ilori and Majiyagbe (2024), in "Impact of Inventory Control Management Practices on Organizational Performance in Nigerian Manufacturing Companies," interviewed managers and found that system delays affected 65% of firms due to manual processes and bureaucratic approvals. They noted that delays in stock replenishment took up to 10 days, increasing costs and disrupting operations. In Kisumu, where healthcare projects rely on timely supplies, such delays

could delay patient care, a gap this study seeks to address. These studies indicate that challenges like stockouts, wastage, resource limits, and delays are widespread, suggesting Kisumu faces similar issues needing localized investigation.

Empirical research shows that inventory control practices influence operational efficiency in healthcare and related sectors, offering insights for Kisumu County. Lievchalermwong and Aunyawong (2022), in "The mediation effect of inventory management practices on operational performance in public university," surveyed 200 staff at a Thai university and found that effective stock tracking reduced costs by 15% and improved task completion by 20%. Using structural equation modeling, they showed that automated systems enhanced efficiency, a finding relevant to Kisumu where manual systems prevail. The researchers noted that better practices freed staff time, a potential benefit for Kisumu's healthcare workers.

Panigrahi et al. (2024), in "Impact of inventory management practices on the operational performances of SMEs: review and future research directions," reviewed 60 studies and found that firms with structured procurement planning saw efficiency gains of 22%. Through meta-analysis, they linked timely stock replenishment to reduced waste and improved service delivery, applicable to Kisumu where planning gaps could affect care. The study focused on SMEs, but its emphasis on resource alignment suggests that Kisumu's healthcare projects could improve performance with similar practices, a gap this study explores.

Odumusor (2024), in "Effect of inventory management on the production efficiency of manufacturing Firms in Nigeria," surveyed 40 firms and found that inventory control practices like regular audits cut stockouts by 30% and costs by 18%. Using regression analysis, they showed that efficient practices improved process flow, a benefit Kisumu could gain if audits replace manual checks. The researchers noted that supplier coordination was key, a challenge in Kisumu's context where supply chains falter, suggesting a need for localized research.

Tawfiq (2020), in "The effect of disruptive factors on inventory control as a mediator and organizational performance in health department of Punjab, Pakistan," studied 25 health facilities and found that effective practices increased care consistency by 25%. Through path analysis, they linked stock availability to patient outcomes, a priority for Kisumu where shortages disrupt treatment. The study highlighted that disruptions like delays reduced efficiency, a concern this study addresses in Kisumu's setting. These studies collectively suggest that effective inventory practices enhance efficiency, but their limited focus on Kenyan healthcare leaves a gap this research fills.

METHODOLOGY

The study adopted a descriptive research design to examine inventory control and its impact on operational performance in Kisumu County's healthcare projects. A cross-sectional approach complemented the descriptive design, collecting data at one point in time during 2025. This method ensured efficiency in gathering information from multiple facilities simultaneously, reflecting Kisumu's healthcare system as it stood.

The target population for this study comprised healthcare facilities and their staff involved in inventory management across Kisumu County, Kenya, as of 2025. Kisumu County hosted approximately 71 healthcare projects, which formed the basis of the target population, reflecting both urban and rural settings to capture the diversity in resource availability and operational demands. The total number of staff targeted within these 71 healthcare projects was estimated at 252 individuals, derived from average staffing levels tailored to facility size and complexity—ranging from 10 staff at the referral hospital to 3 per primary health center. To determine an

appropriate sample size that ensured representativeness while remaining feasible, the Yamane formula was applied:

$n = \frac{N}{1+N*e^2}$,

where n is the sample size, N is the population size (71 projects), and e is the margin of error (set at 0.05 for a 95% confidence level).

Calculating: $n = \frac{71}{1+71*0.05^2}$

$= \frac{71}{1+71*0.0025}$

$= \frac{71}{1+0.1775}$

$= \frac{71}{1.1775} \approx 60.$

Thus, a sample of 60 healthcare projects was selected, representing approximately 85% of the sampling frame, balancing precision with resource constraints.

From these 60 projects, staff were sampled based on the total target population of 252 individuals. Using the same Yamane formula for staff:

$n = \frac{252}{1 + 252 * 0.05^2}$

$= \frac{252}{1 + 252 * 0.0025}$

$= \frac{252}{1 + 0.63}$

$= \frac{252}{1.63}$

$\approx 155.$

Therefore, 155 staff members were selected, averaging 2-3 staff per facility, including administrators, inventory managers, and healthcare workers (e.g., nurses, pharmacists), to provide insights into inventory control and operational performance.

A stratified random sampling technique ensured representation across project types and locations.

The study employed questionnaires as the primary research instruments to collect data from Kisumu County's healthcare projects. Questionnaire data from 252 respondents, reflecting the target population across 71 healthcare projects, were coded and entered into SPSS software. Descriptive statistics, means, frequencies, and percentages, were generated. Regression analysis tested the relationships between the independent variable and the dependent variable, Operational Performance.

FINDINGS AND DISCUSSIONS

The study distributed 155 questionnaires to staff across 60 healthcare projects in Kisumu County, targeting administrators, inventory managers, and healthcare workers involved in inventory management. Out of these, 147 questionnaires were completed and returned, yielding a response rate of 94.8%.

Descriptive Findings on Supplier Coordination and Operational Performance and Practices

This section assesses the influence of supplier coordination on operational performance in Kisumu County's healthcare projects. Data from 147 respondents were collected using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) to evaluate supplier delivery

timeliness, order accuracy, communication effectiveness, delivery disruptions, and supplier reliability.

Table 1: Descriptive Statistics for Supplier Coordination

Statement	N	Mean	Std. Deviation
Suppliers deliver stock on time consistently.	147	4.39	1.088
Ordered quantities match what suppliers deliver here.	147	4.29	1.130
Communication with suppliers is effective in this facility.	147	4.30	1.113
Late deliveries disrupt stock availability.	147	4.05	1.145
Reliable suppliers improve stock planning here.	147	4.07	1.045

Source: Research Data (2025)

The statement "Suppliers deliver stock on time consistently" had a mean of 4.39 and a standard deviation of 1.088. The mean, above 4 (Agree), indicates that respondents agreed that suppliers consistently delivered stock on time. The standard deviation of 1.088 suggests moderate variability, implying that while most facilities experienced timely deliveries, some faced inconsistencies, possibly due to logistical challenges in rural areas. Timely deliveries support stock availability, enhancing operational performance.

The statement "Ordered quantities match what suppliers deliver here" recorded a mean of 4.29 and a standard deviation of 1.130. The mean, above 4 (Agree), shows that respondents agreed that delivered quantities matched orders. The standard deviation of 1.130 indicates moderate variability, suggesting that most facilities received accurate orders, though discrepancies occurred in some, likely due to supplier errors or communication issues. Accurate deliveries ensure reliable inventory planning, supporting operational efficiency.

The statement "Communication with suppliers is effective in this facility" had a mean of 4.30 and a standard deviation of 1.113. The mean, above 4 (Agree), indicates that respondents agreed that supplier communication was effective. The standard deviation of 1.113 suggests moderate variability, reflecting consistent communication in most facilities but potential challenges in others, possibly due to rural connectivity issues. Effective communication supports coordination, improving operational outcomes.

The statement "Late deliveries disrupt stock availability" recorded a mean of 4.05 and a standard deviation of 1.145. The mean, just above 4 (Agree), shows that respondents agreed that late deliveries disrupted stock availability. The standard deviation of 1.145 indicates moderate variability, suggesting that disruptions were more significant in some facilities, likely those reliant on distant suppliers. This issue highlights a coordination challenge that negatively impacts operational performance.

The statement "Reliable suppliers improve stock planning here" had a mean of 4.07 and a standard deviation of 1.045. The mean, above 4 (Agree), indicates that respondents agreed that reliable suppliers enhanced stock planning. The standard deviation of 1.045 suggests moderate variability, implying that most facilities benefited from reliable suppliers, though some experienced inconsistencies. Reliable suppliers support effective inventory management, improving operational efficiency.

Regression Analysis

This section presents the regression analysis to evaluate the effects supplier coordination on operational performance in Kisumu County's healthcare projects.

Model Summary

The model summary provides an overview of the regression model's fit and explanatory power.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.853	.728	.721	.39473

Predictors: (Constant), Supplier Coordination

Source: Research data (2025)

The R value of 0.853 indicates a strong positive correlation between the independent variable (supplier coordination) and the dependent variable (operational performance). The R Square value of 0.728 shows that 72.8% of the variance in operational performance was explained by supplier coordination, suggesting a robust model fit.

ANOVA Test Results

The ANOVA test assesses the overall significance of the regression model.

Table 3: ANOVA Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
1					
Regression	59.298	1	59.298	388.619	.000
Residual	22.125	145	.153		
Total	**81.423**	**146**			

Dependent Variable: Operational Performance

Predictors: (Constant), Supplier Coordination

Source: Research data (2025)

The ANOVA results show a regression sum of squares of 59.298 with 1 degree of freedom, yielding a mean square of 59.298. The residual sum of squares was 22.125 with 145 degrees of freedom, resulting in a mean square of 0.153. The F-statistic of 388.619, with a significance level of 0.000 ($p < 0.01$), indicates that the regression model was statistically significant, rejecting the null hypothesis that the independent variable had no effect on operational performance.

Coefficients

Table 4: Coefficients

Model	Unstandardized Coefficients	Standardized Coefficients		t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.313	.258		1.214	0.001
Supplier Coordination	.453	.045	.534	10.181	0.000

Source: Research data (2025)

The coefficient for supplier coordination was 0.453 (standard error = 0.045), with a Beta of 0.534, a t-value of 10.181, and a significance level of 0.000 ($p < 0.01$). The positive coefficient indicates that a one-unit increase in supplier coordination increased operational performance by 0.453 units, a significant effect. The high Beta value suggests that supplier coordination was a strong predictor of operational performance.

Conclusion

Supplier coordination was a strong predictor of operational performance. The advantages of supplier coordination included regular deliveries and communications, but disturbances caused by the delays demonstrated the weaknesses. This serves the purpose of establishing the role of supplier coordination and concludes that the competent partnerships are the key to the timely availability of supplies and planning of stocks.

Recommendations

Supplier co-ordination needs to be more robust in terms of contracts that focus on on time deliveries and communication channel and penalties in cases of late deliveries. The suppliers should also be varied so that there is no interruption, and to track the orders should be done online. There is need to set a central coordination center of the county government to bargain better conditions, to select similar quantities and certainty of the results, as observed in the positive but weak correlations.

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