African Journal of Emerging Issues
Peer reviewed | Double blind | Interdisciplinary

African Journal of Emerging Issues (AJOEI)
Online ISSN: 2663 - 9335
Available at: https://ajoeijournals.org

PROCUREMENT AND SUPPLY CHAIN

THE INFLUENCE OF INVENTORY MANAGEMENT ON THE PERFORMANCE OF LEVEL FIVE COUNTY REFERRAL HOSPITALS IN KENYA

[1]David Mukuna Khasakhala, [2]Dr. Anthony Osoro & [3]Dr Jackson Ndolo

[1]Ph.D. Candidate, Jomo Kenyatta University of Agriculture and Technology
Emails: davymukuna@yahoo.com

[2] Lecturer, Jomo Kenyatta University of Agriculture and Technology
Email: aosoro@jkuat.ac.ke/ansoroh@gmail.com

[3] Lecturer, KCA University
Email: ndolologistics@gmail.com

Publication Date: May 2024

ABSTRACT

Purpose of the Study: The purpose of the study was to evaluate inventory management on the performance of level five county referral hospitals in Kenya.

Problem Statement: Insufficient medicines in public health facilities is common in the current devolved system in most counties in Kenya and in particular in Bungoma County (Kaitany, 2022). Most health facilities experience medicines stock outs from time to time, making it incredibly difficult for them to continue providing the health care services (Atkins *et al*., 2022). Patients are often required to purchase drugs from private pharmacies, which are costly due to high markups in supply chain (Wandera *et al*., 2022a). In 2017, Bungoma county referral hospital, was hit by an acute shortage of medicines after KEMSA cut off supply over a Ksh 21 million debts (Barasa *et al*., 2018). This shortage included basic medicines such as painkillers, anti-malaria medicines and other medical suppliers (Omai, Ngugi & Kiarie, 2019).

Methodology: The resource-based view theory guided the study using cross-sectional census strategy of mixed methods research using random sampling on 47 county referral hospitals in Kenya with a target population of 150 respondents. Procurement, finance, and medical staffs were units of remark. The study piloted twenty (15) questionnaires (10 % of sample) to test validity and reliability of research instruments.

Results: Data on 82 questionnaires was transformed to interval scale, analyzed using exploratory factor analysis in developing multiple linear regression equation model. The final overall model was interpreted using *F*-test statistics and R^2 value the overall final model results were; {*F* statistic (5, 76) = (4.613}, against critical *F*-value {(2.49), and general rule of thumb (F>2.5), R^2 (.443)}.

Conclusion: This upshot suggests a substantial relationship amid all moderated independent variables on the dependent variable.

Recommendation: Future research be on suppliers' characteristics and behaviours on supplier visibility in pharmaceutical supply chains in Kenya, route planning and scheduling on sourcing optimization in county referral hospitals in Kenya, communication structures on performance of county referral hospitals in Kenya, order systems on performance of county referral hospitals in Kenya, and closed loop ended operations on performance of reverse logistics sourcing in referral hospitals in Kenya.

Keywords: *Inventory management, Performance, Policies, Supply chain management*

INTRODUCTION

The concept of inventory in hospital supply chain management (SCM) has become critical in availing medical services to humanity (Wisner, Tan & Leong, 2016; Makori & Muturi, 2018). Prudent inventory practices are becoming more and more central to improved performance and value creation within organizations (Gorane & Kant, 2014). Focus is now more on networked business operations that require heavy investment in supply chain management practices (Wisner *et al*., 2016). It is argued that through improvements targeting the supply chain, firms as well as customers and partners stand to reap more benefits (Kepher, Shalle & Oduma, 2018). Global pandemics have been present and plagued humanity since early days, where each pandemic caused economical and societal effect that threatened humanity (LePan, 2020).

Supply chain is of great importance in the healthcare industry's is the backbone of the healthcare industry (Mathur, Gupta, Meena, & Dangayach, 2018). Quality of healthcare delivered is largely dependent on availability of medical suppliers, at the right time and at the right quantities (Mathur et al., 2018). For performance improvement as well as to stay competitive in the market, the most important and valuable way is to have efficient SCM (Gorane & Kant, 2014). Through this way, firms remain competitive in the market since there is a great competition of SCM among organizations (Wandera, Namusonge & Sakwa, 2022b). In the era of early 1990's, the global market came under great competition in order to provide right product or services at a right time and right place (Mathur *et al*., 2018). In the healthcare sector, SC comprises movement of various goods involving different stakeholders to supply goods in an apt manner and provide good quality and right quantity to accomplish suppliers' needs (Mathur *et al.*, 2018).

Public hospitals for instance in Kenya, often experience commodity security related challenges that range from erratic supply of health products and technologies (Atkins *et al*., 2022). There is frequent stock-outs of essential drugs and medical products therefore patients are sent to buy them

in other outlets (Kaitany, 2022). In so doing, it exposes patients to financial constraints related to out-of-pocket expenditure which may exacerbate their poverty level (Oliech & Mwangangi, 2019). Shortage in supply of medical products such as drugs continues to be challenges globally; According to world health organization (WHO), health product shortage is a multifaceted and global problem, affecting both developing and developed countries (Barasa, Oluchina & Cholo, 2018). Kepher *et al*., 2018). Health care products are a crucial part of human life, and their availability is important in ensuring patients' access quality and affordable services (LePan, 2020). Health product shortages and misuse have a far-reaching effect on patients' well-being and hospital's operations (Kaitany, 2022). All facilities have experienced drug shortages and drug expiries with 75% of them having a drug fill rate of between 50% and 70% (Atkins *et al*., 2022). This still remain a common challenge in most health facilities in Kenya and Africa at large, despite numerous efforts being put in place to eradicate this menace from citizens (Kaitany, 2022).

Numerous counties have been allocating significant proportions of their budgets towards health docket (Atkins *et al*., 2022). However, a huge percentage of health department's allocation, of more than 90% in some cases, goes to recurrent expenditure (Olaniran *et al*., 2022). Bungoma County for instance, in 2018/2019 financial year, allocated about 40% of its budget to department of health and sanitation (Barasa *et al*., 2018). This is way above the recommended 15% as per the Abuja declaration, 2001 (Sadr-Azodi & Rodríguez, 2019). About 97% of this was however, allocated towards recurrent expenditure, leaving a paltry 3% for development including purchase of essential medicines (Sadr-Azodi & Rodríguez, 2019; Wandera, Namusonge & Sakwa, 2022a).

STATEMENT OF PROBLEM

Insufficient medicines in public health facilities is common in the current devolved system in most counties in Kenya and in particular in Bungoma County (Kaitany, 2022). Most health facilities experience medicines stock outs from time to time, making it incredibly difficult for them to continue providing the health care services (Atkins *et al*., 2022). Patients are often required to purchase drugs from private pharmacies, which are costly due to high markups in supply chain (Wandera *et al*., 2022a). In 2017, Bungoma county referral hospital, was hit by an acute shortage of medicines after KEMSA cut off supply over a Ksh 21 million debts (Barasa *et al*., 2018). This shortage included basic medicines such as painkillers, anti-malaria medicines and other medical suppliers (Omai, Ngugi & Kiarie, 2019). Despite counties getting a regular budgetary allocation, they have continued to owe KEMSA huge amounts of money (Atkins *et al*., 2022).

In January 2020, as, counties owed KEMSA about Ksh 2.8 billion. Bungoma County is still featured on this list with a KSh 84.9 million debts (Omai *et al*., 2019). According to data from global burden of diseases, most pneumonia deaths occurred in Kakamega 818, Meru 674, Nakuru 593, Mandera 566, and Homabay 534 (Oliech & Mwangangi, 2019). These deaths were attributed to weak commodity management system leading to frequent shortage of drugs that treat pneumonia in children, therefore causing death (Atkins *et al*., 2022). Therefore, non-strategic vaccine supply and distribution are delaying and limiting the impact of vaccine (Sadr-Azodi & Rodríguez, 2019).

PURPOSES OF THE STUDY

Examine the influence of inventory management on organizational performance of level five county referral hospitals in Kenya.

RESEARCH HYPOTHESIS

H_{01}: *Inventory management has no significant effect on organizational performance of level five county referral hospitals in Kenya.*

THEORETICAL FRAMEWORK

This study is based on resource based view theory which postulates that a firm has resources unique in nature that explains variation in firm performances (Xiao Arikan & Barney, 2018). In this case a firm has resources in the form capital that it can use to procure inventory.

CONCEPTUAL FRAMEWORK

Conceptual framework refers to a visual or written relationship amid various variables often derived from one or more theories and traces the input-process-out put paradigm of study (Saunders, Lewis & Thornhill, 2019).

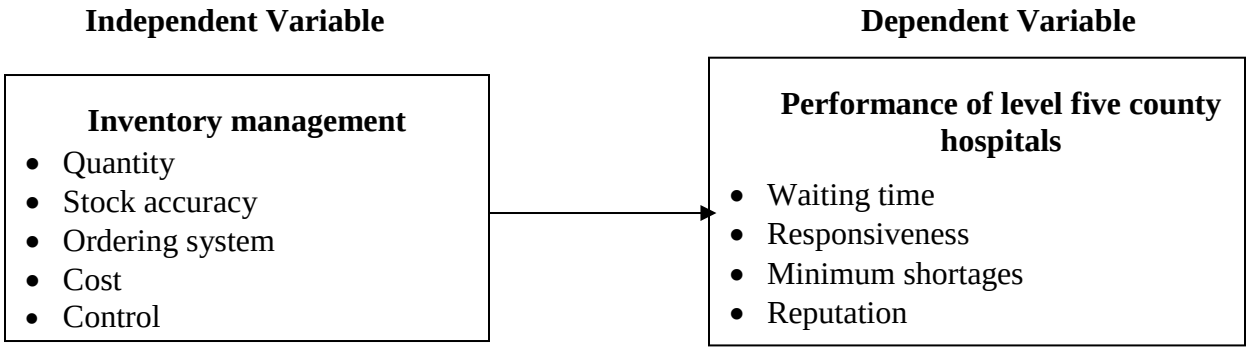

Figure 1: Conceptual Framework

Inventory management is conceptually defined as tracking of inventory from manufacturers to warehouses and to the point of sale (Eicker & Cilliers, 2018). Similarly it is operationally defined as monitoring inventory from point of manufacture to sale and measured via likert scale (DeVellis, 2017).

LITERATURE REVIEW

Kaewchur, Sritong, Sriard and Nimad (2021) examined inventory management factors affecting competitive advantage and confirm inventory management factors affecting competitive gain from in Thailand ascertained that inventory control systems had greatest influence on competitive advantage, followed by inventory control practices, and information technology. Hazrati, Paknejad, Azerashik and Tahera (2018) examined ABC and VED (i.e. vital, essential, desirable) analysis of pharmacy of Imam Reza educational hospital was carried out to determine categories of medicines, which necessitate strict control in Iran. The ABC analysis showed that 5.7%, 11.2%, and 83.1% of items belonged to category A, B, and C, respectively, conforming 74.873%, 20.089%, and 5.038% of ADE of pharmacy. Befekadu, Cheneke, Kebebe and Gudeta (2020) assessed performance of inventory management for laboratory commodities in public hospitals in Jimma zone in Ethiopia. The study ascertained wastage rate of commodities in the hospitals was 27.2% and resulted in a loss of about 10,248.5 US dollars. Budget constraints, absence of prompt administrative support, lack of staff commitment, and frequent shortages of commodities on part of suppliers were major bottlenecks of inventory management.Mabizela, Nakambale and Bangalee (2023) examined interrelationships amid overstocking, stockouts, and wastage in eight healthcare facilities in Northern KwaZulu-Natal, South Africa. The study ascertained a moderate, statistically significant correlation amid overstocking and expiry-related wastage. Stock-outs had a weak correlation with redistribution, accounting for only 4.5%. A weak correlation was found between stock-outs and overstocking, as well as between stockouts and expired medicines.

Okello, Arani and Sitienei (2020) examined the effect of inventory categorization practices on operational performance of public hospitals in Siaya County and the study ascertained that inventory categorization had a statistically significant effect on performance of public hospitals in Siaya County. The study recommends that inventory managers should categorize inventory with accurate forecasts. Anyona, Karimi and Maru (2021) investigated inventory management practices used, evaluate the supply chain performance, and determine challenges affecting inventory management of ARV medicines in 8 public hospitals across Nyamira County. The study

ascertained that with exception of order lead time (17.98 days), other supply chain performance metrics namely stock out rate (52.12%), stock wastage rate (43.2%), and reporting rates (70.84%) were found to be deficient. Korir, Kaitany and Sang (2021) establish relationship between economic order quantity stock control technique and performance of selected level five hospitals in south rift region, Kenya using economic quality theory and established that economic order quantity had a positive statistical relationship with performance of level five hospitals. Makori and Muturi (2018) examined influence of inventory management practices on procurement performance of Kisii Teaching and Referral hospital, Bungoma Level 5 hospital, Russia Kisumu hospital, Migori Level 5 hospital, Homabay Level 5 Hospital in a period of one month from 15th October to 15th November using Just in time, vendor management and activity cost analysis theories and established that automated systems coordinates inventory management practices, automated systems enables better demand management and reduces the storage space ((Awle, 2016).

Muchaendepi et al. (2019) studied the relationship between inventory management and firm performance in Zimbabwean SMEs using qualitative research. They found that most SMEs used the Just-In-Time inventory technique to manage the inventory. In this regard, SMEs face many challenges related to the supply chain. Further, they also faced problems of customer delays due to a lack of technology. Mbah et al. (2019) investigated the significant association between firms' operational performance and inventory management in Nigerian manufacturing firms. In this regard, they examined different techniques of inventory used by firms through structured questionnaires. The results reported a significant positive association between the firms' operational performance and different inventory management methods.

RESEARCH METHODOLOGY

Design of Study

The study adopted a cross-sectional correlation census design using qualitative and quantitative techniques (Creswell & Clark, 2017).

Population of the Study

Table 1: Personal bio-data and supply chain management best practices for Respondents

Bio-data	Frequency	Valid Percent
Gender		
Male	45	54.9
Female	37	45.1
Total	**82**	**100.0**
Education level		
Secondary level	08	9.8
College level	25	30.5
University level	32	39.0
Post graduate level	17	20.7
Total	**82**	**100.0**
Department/Section of Work		
Procurement	29	35.4
Finance	14	17.1
Medical	36	47.6
Total	**82**	**100.0**
Work Experience		
1-3 years	02	2.4
6 -10 years	20	24.4
11 to 15 years	39	47.6
Over 15 years	21	25.6
Total	**82**	**100.0**

Sample size and Sampling Techniques

Kenya has 47 counties, where Nairobi County has 2 referral hospitals, while Kiambu County has 3 referral hospitals. The study used 1 professional from finance, procurement and medical sections, thereby targeting 150 respondents. The study based non-parametric sampling census technique. The sample size was attained using Slovin's formulae of 1960 for sample size determination on non-probability sampling design for finite population (Ayiro, 2021; Wandera et al., 2022a).

$$n = \frac{N}{\left(1 + Ne^2\right)}$$

Where,
n = Sample size
N= Target population
e = Error term at 95% confidence interval

$$n = \frac{150}{\left(1 + 150 \times 0.05^2\right)} = 109$$

Instrument for Data Collection

The study collected primary data using structured questionnaires and secondary data was derived from journal, periodicals and books.

Method of Data Collection

Data was collected using interview method

Method of Data Analysis

This relationship derived a link between inventory management on dependent variable by outlining a multiple linear regression equation as listed in the model (Yin, 2017).

$Y=\beta_0 +\beta_1 X_1+\varepsilon$……(1)

Where;

Y	Performance of level five hospitals in Kenya
β_0	Constant.
B_1	Coefficients of independent variables
X_1	Inventory management
ε	Error term

FINDINGS/RESULTS

Descriptive Statistics for Inventory Management

Respondents were presented with twenty-five (25) opinion statements on indicators in measuring the variable as indicated in Table 2 on a five-point likert scale.

Table 2: Descriptive Statistics for Inventory management Items

Opinion statement	SD (%)	DA (%)	N (%)	A (%)	SA (%)	Mean	Std Dev
Our hospital inventory management system manages stock quantity held	17.1	24.4	29.3	19.5	9.8	2.80	1.222
Our hospital uses technology to manage inventory held in stores	40.2	32.9	14.6	8.5	3.7	2.02	1.111
Our hospital inventory management system applies current stock management practices on stock quantity held	35.4	40.2	11.0	11.0	2.4	2.05	1.065
Our hospital inventory management system conducts frequent audit on stock quantity held	30.5	32.9	23.2	11.0	2.4	2.22	1.078
Our hospital redistributes various quantities of stock quantity held to various hospitals	22.0	24.4	23.2	23.2	7.3	2.70	1.254
Our hospital stock is accurate due to use of technology	28.0	37.8	19.5	12.2	2.4	2.23	1.069
Our hospital employs competent staff to work in stores	30.5	26.8	22.0	15.9	4.9	2.38	1.214
Our inventory system is tamper proof	36.6	26.8	18.3	8.5	9.8	2.28	1.308
Our hospital inventory system has passwords management by authorized personnel	22.0	40.2	24.4	6.1	7.3	2.37	1.117
Our hospital applies technology in managing inventory ordered	41.5	26.8	8.5	14.6	8.5	2.22	1.352
Our hospital uses bar coding and other stock management techniques in controlling stock n=82	56.1	24.4	6.1	4.9	8.5	1.85	1.258

Twenty-nine point three percent (29.3%) of the respondents were neutral that “our hospital inventory management system manages stock quantity held”. Forty point two percent (40.2%) of the respondents strongly disagreed that “our hospital uses technology to manage inventory held in stores”. Forty-point two percent (40.2%) of respondents disagreed that “our hospital inventory management system applies current stock management practices on stock quantity held”. Thirty-two point nine percent (32.9%) of the respondents disagreed that “our hospital inventory management system conducts frequent audit on stock quantity held”. Twenty-four point four percent (24.4%) of the respondents disagreed that “our hospital redistributes various quantities of stock quantity held to various hospitals”. Thirty-seven point eight percent (37.8%) of respondents disagreed that “our hospital stock is accurate due to use of technology”. Thirty point five percent (30.5%) of the respondents strongly disagreed that “our hospital employs competent staff to work

in stores". Thirty-six point six percent (36.6%) of the respondents strongly disagreed that "our inventory system is tamper proof".

Forty point two of the respondents disagreed that "our hospital inventory system has passwords management by authorized personnel". Forty-one point five percent of the respondents strongly disagreed that"our hospital applies technology in managing inventory ordered". Fifty-six-point one percent (56.1%) of respondents strongly disagreed that "our hospital uses bar coding and other stock management techniques in controlling stock". These findings are in agreement with various scholars; Barasa *et al*. (2018) reported on a study in Bungoma, Kenya, which investigated influence of inventory management practices on availability of medicines in public health facilities. From the results, inventory management practices were shown to impact directly on medicines availability.

Factor Analysis for Inventory management

Twenty five (25) items in Table 3 describes inventory management subjected to factor analysis (Warne & Larsen, 2014; Beauducel & Hilger, 2019).

Total variance explained.

Table 3: Total variance explained for Inventory management Items

Component	Initial Eigen values			Extraction of squared loadings			Rotation sums of squared loadings[a]		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	9.008	36.033	36.033	9.008	36.033	36.033	4.637	18.548	18.548
2.	2.516	10.064	46.097	2.516	10.064	46.097	3.177	12.707	31.255
3.	1.835	7.342	53.439	1.835	7.342	53.439	2.967	11.869	43.123
4.	1.575	6.299	59.738	1.575	6.299	59.738	2.767	11.067	54.191
5.	1.279	5.115	64.852	1.279	5.115	64.852	2.665	10.662	64.852
25.	.083	.332	100.000						

Extraction Method: Principal component analysis

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Twenty-five (25) measures on inventory management were further subjected to factor analysis that attracted only five (5) latent factor loadings for further analysis. This had an a cumulative variance of 64.852% as presented in Table 3. This accumulation can be elucidated as follows; factor one (1) 36.033%, factor two (2) had 10.064%, factor three (3) had loading of 7.342%, factor four (4)

had loading of 6.299% and factor five (5) had loading of 5.115% of total variance explained respectively. These components were further rotated as illustrated in Table 4.

(i) Rotated Component Matrix[a]

Table 4 presents results of analysis for rotated component matrix for inventory management items.

Table 4: Rotated Component Matrix for Inventory Management Items

Description	1	2	3	4	5
Our hospital inventory system cannot be manipulated	**.862**	.032	.070	-.050	.237
Our hospital inventory system is cheap in comparison with others	**.844**	.161	.093	.105	-.012
Our hospital procures inventory from prequalified suppliers	**.647**	.168	.425	.188	.044
Our hospital bargains for discounts on orders made for supplies	**.647**	.198	.129	.270	.334
Our hospital inventory is quality	**.618**	.288	.288	.210	-.143
Our hospital inventory management system applies current stock management practices on stock quantity held	.049	**.870**	-.028	.050	.051
Our hospital inventory management system conducts frequent audit on stock quantity held	.129	**.691**	.292	.004	.087
Our hospital redistributes various quantities of stock quantity held to various hospitals	.213	**.690**	.312	.063	.168
Our hospital uses technology to manage inventory held in stores	.099	**.678**	.022	-.011	.414
Our hospital has an organized ordering system for supplies	.127	.179	**.824**	.071	.224
Our hospital works with all departments in placing orders for supplies	.225	.110	**.808**	.201	.176
Our hospital manages the ordering systems for supplies	.342	.209	**.783**	.011	.100
Our hospital labels our stock as part of control	.101	.165	.057	**.788**	-.219
Our hospital inventory is kept in secure rooms for control	.061	.024	.229	**.767**	.014
Our hospital uses bar coding and other stock management techniques in controlling stock	.186	-.030	-.079	**.741**	.051
Our hospital applies technology in managing inventory ordered	.071	.007	.097	**.696**	.264
Our inventory system is tamper proof	.224	.181	.105	.062	**.765**
Our hospital stock is accurate due to use of technology	.180	.202	.269	.041	**.737**
Our hospital employs competent staff to work in stores	.185	.393	.385	.037	**.559**

Extraction method: Principal component analysis.

Rotation method: Varimax with the Kaiser Normalization

a. Rotation converged in 8 iterations

Table 4 elucidates three (3) latent factors having strong loadings greater than 0.4. These loadings exhibit existence of positive correlation amid quantity, accuracy, ordering system, cost policy and control parameters. The loadings on component one (1) were items from sub-concepts on cost policy. Component one (1) was named cost policy. The main loadings on component two (2) were items from sub-concepts on quantity. Component two (2) was named quantity. The main loadings

on component three (3) were items from sub-concepts on ordering system. Component three (3) was named ordering system. The main loadings on component four (4) were items from sub-concepts on control. Component four (4) was named control. The main loadings on component five (5) were items from sub-concepts on accuracy. Component five (5) was named accuracy.

(ii) Model summary, Anova and Regression Test results for inventory management on organizational performance of level five county referral hospitals in Kenya items

The study sought to establish inventory management and the performance of level five county referral hospitals in Kenya. To attain this objective, coefficient of determination, level of significance and strength of relationship were assessed using model summary, anova and regression analysis tests in Table 5.

Table 5: Model Summary, Anova, and Regression Analysis Test Results for inventory management and the performance of level five county referral hospitals in Kenya Items

Model	R	R- Square	Adjusted R-square	Std. Error of the Estimate	Durbin Watson
1	.483[a]	.233	.1153	17.704	2.012

a. Predictors: (Constant), control, quantity, ordering system, cost policy, accuracy
b. Dependent variable: Performance

Model		Sum of square	df	Mean square	F	Sig
1	Regression	7229.474	5	1445.895	4.613	.001[b]
	Residual	3819.648	76	313.416		
	Total	**31049.122**	**82**			

a. Dependent variable: Component 2, Performance
b. Predictors: (Constant), control, quantity, ordering system, cost policy, accuracy

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std.Error	Beta		
1	(Constant)	46.077	7.280		6.329	.000
	Quantity	-.391	.625	-.084	-.626	.533
	Accuracy	.424	.631	.101	.673	.503
	Ordering system	1.271	.580	.317	2.193	.031
	Cost policy	.654	.539	.177	1.213	.229
	Control	.025	.465	.006	.054	.957

a. **Dependent variable: Component 1, Performance**

DISCUSSIONS AND ANALYSIS

The coefficient of determination and coefficient correlation results in table 5 for model 1 are {(R^2=0.483, R=0.233)}. These results implies that 48.3% of variation in the response variable is

explicated by inventory management, whilst 23.3% is the relationship amid explanatory and criterion variables. The anova results in table 5 are {F (5, 76) =4.613, p<.05)}. From these outputs, *F* statistic (4.613) is higher than critical *F* value (2.72), and general rule of thumb (F>2.5) (Kissell & Poserina, 2017). These outcomes designate that inventory management consequentially influenced the criterion variable ((Simchi-Levi et al., 2015. The un-standardized values in Table 7 exhibit quantity, accuracy, ordering system, cost policy and control as insignificant to the response variable. This model was significant given its R^2 (0.483) value.

The analysis derived ensuing econometric regression equation; $Y=46.077-.391X_1+.424X_2+1.271X_3+.654X_4+.025X_5$ for the model, where Y: performance, X_1: quantity, X_2: accuracy, X_3: ordering system, X_4: cost policy and X_5: control. In order to examine inventory management and the performance of level five county referral hospitals in Kenya. To comprehend this objective, descriptive analysis, factor analysis, model summary, anova and regression test were performed on five (5) variable parameters (quantity, accuracy, ordering system, cost policy and control) on the response variable.

The *F*-statistic (4.613) against critical *F* value and general rule of thumb {(2.34, 2.5)}. These results exhibit a noteworthy relationship amid the variable and criterion variables (Wandera *et al*., 2022b). The R^2 0.233 depicts a significant relationship with the criterion variable (Yolsal, 2021). The coefficient estimate values in Table 5 for the variable for models 1 and 2 are as follows {(F statistic (4.613), critical F value (2.34), and R-values (0.483)} respectively. The F statistic (4.613) is higher than F>2.5 and the critical F value (2.34) combined, thus making the model noteworthy. This finding demonstrates that the Z score did not arose from sampling error (Kissell & Poserina, 2017). These results indicate a genuine but moderate relationship (Kline, 2016). Hence the null hypothesis is rejected and the alternate hypothesis accepted.

CONCLUSIONS

Inventory management significantly explicates variation in the response variable. This result confirms that quantity, accuracy, and ordering system reflective indicator construct factors significantly influence the dependent variable.

RECOMMENDATIONS

This sub-section was linked to managerial and policy frameworks for county level five hospitals in Kenya. The study recommends that organizations should develop structures that create

sustainable systems for managing supplier relationship management by on arm's length transactions, partnership, and JIT. Equally counties should develop robust transport systems to allow the flow of essential services. Studies indicate that information sharing influences flow of services, but real time information is lacking. Lastly, inventory management plays a significant role in enhancing service delivery. Events of inadequate drugs and essential services in county hospitals should be controlled. Supply chains are solutions to a seamless service offers by organizations. The government should allow county governments procure certain non-essential drugs directly from suppliers to beat bureaucracy. All county governments should employ qualified personnel in procurement and frequent checks and audits be conducted in all hospitals on sully chain management best practices.

ACKNOWLEDGMENTS

I would like to thank God almighty for bringing me this far and everyone that did more than their jobs to make this thesis a success. Special thanks to my supervisors Dr Anthony Osoro and Dr. Jackson Ndolo for their endless commitment in providing guidance and support throughout the entire period of the development to this thesis. My sincere gratitude and appreciation goes to my family members for their moral support, encouragement and understanding when I was not there for them during this demanding period. Especially my dear wife Elizabeth for the support and encouragement she has given me throughout my studies and my children. Finally, without forgetting my late mother Nipher Owendi, late father Johnstone Khasakahala and my lovely aunty Catherine Kitwa who began my academic journey. I owe them entirety. I also wish to thank Robert Wandera for his tremendous support. I also acknowledge JKUAT for giving me the opportunity to pursue this degree. I may not mention all of you, but I just wish to say a thank you for your assistance.

REFERENCES

Anyona Johnson, Karimi Peter.,&Maru Shital. (2021). Inventory management practices and supply chain performance of antiretroviral medicines in public hospitals in Nyamira County, Kenya, *Rwanda journal of medicine and health sciences, vol.4*, no.2, https://dx.doi.org/10.4314/rjmhs.v4i2.5

Atkins K, Musau A, Mugambi M, Odhyambo G, Tengah SA, Kamau M, et al. (2022). Health system opportunities and challenges for PrEP implementation in Kenya: A qualitative framework analysis. *PLoS ONE, vol. 17, no.*10, e0259738. https://doi.org/10.1371/journal.pone.0259738

Awle I. (2016). Relationship between effective drug inventory control management and stock-outs in Kenya's public hospitals: a case study of Kenyatta national hospital and defence forces memorial hospital, Strathmore university; 2016.Availablefrom: plus.strathmore.edu/handle/11071/2474.

Ayiro Laban P. (2021). *A functional approach to educational research methods and staThistics: Qualitative, quantitative, and mixed methods approaches,* Edwin Mellen Pr, ISBN-13: 978-0773429017, ISBN-10: 0773429018

Barasa N, Oluchina S.,& Cholo W. (2018). Influence of inventory management practices on availability of medicines in public health facilities in Bungoma County, Kenya, *Int J acad res dev*, 3(6):53–60, https://www.researchgate.net/publication/329443491

Befekadu Abdi, Cheneke Waqtola, Kebebe Dereje., & Gudeta Tadesse. (2020). Inventory management performance for laboratory commodities in public hospitals of Jimma zone, Southwest Ethiopia, *Journal of pharmaceutical policy and practice, vol.13:49 https://doi.org/10.1186/s40545-020-00251-1*

Creswell., & Clark. (2017). *Research design: Qualitative, quantitative and mixed methods approach*, (4th ed.), Sage Publications, Inc

DeVellis, R. F. (2017). *Scale development: Theory and applications* (4th ed.), Thousand Oaks, CA: Sage

Eicker Themari., & Cilliers Orpha J. (2018). Inventory decision-making by small Sowetan retailers, *Journal of transport and supply chain management, vol.12*, a387, https://doi.org/10.4102/jtscm.v12i0.387

Gorane, S. J., & Kant, R. (2014). Supply chain practices: study and framework for future development. *International journal of logistics systems and management, 17*(1), 83-103.

Hazrati E, Paknejad B, Azerashik A., & Tahera M. (2018). ABC and VED analysis of Imam Reza educational hospital pharmacy, *Ann mil health Sci Res, vol.16*, no.3, e86183, *https://doi.org/10.5812/amh.86183*

Kaewchur Pornthep, Sritong Charcrit, Sriard Banterng.,& Nimad Thawatchai. (2021). Role of inventory management on competitive advantage of small and medium companies in Thailand, *Turkish journal of computer and mathematics education,vol.12*,no. 8 (2021), 2753-2759

Kaitany Fridah Chebet. (2022). Influence of supply chain management practices on Health commodity security among level four public hospitals in Nairobi County, Kenya, unpublished Master's Thesis Methodist university, Kenya

Kepher, A, B., Shalle, I. N., & Oduma, E. (2018). Role of supplier management on procurement performance in manufacturing sector in Kenya: A case of East African Breweries, Kenya. *International journal of social science and humanities research*, *3*(4), 540-555.

Kissell Robert.,& Poserina Jim. (2017). *Optimal sports math, statistics, and fantasy*, London, Academic Press, ISBN**:** 9780128052938 0128052937

Korir Kiprotich Geoffrey, Kaitany Pauline., & Sang Hellen. (2021). Economic order quantity stock control technique and performance of selected level five hospitals: An evidence of Kenya, *International journal of business marketing and management, vol.6*, Issue 6 June 2021, Pp. 08-13, ISSN: 2456-4559 www.ijbmm.com

Mabizela S, Nakambale HN., & Bangalee V. (2023). Predictors of medicine redistribution at public healthcare facilities in King Cetshwayo District, KwaZulu-Natal, South Africa. *Bmc health serv res, vol. 23, no.*1:1108, https://dx.doi.org/10.1186/s12913-023-10096-4

Makori Jacinter Kwamboka.,& Muturi Willy. (2018). Influence of inventory management practices on performance of procurement function in health institutions in Kenya. A survey of selected public health institutions in Western Kenya, *International journal of social sciences and information technology, vol .iv*, issue X, ISSN 2412-0294

Mathur, B., Gupta, S., Meena, M., & Dangayach, G. (2018). Healthcare supply chain management: literature review and some issues. *Journal of advances in management research*, *15*(3), Pp. 265–287.

Okello, S. O., Arani, W., & Sitienei, C. K. (2020). Inventory categorization and operational performance: A supply chain analysis of public hospitals in Kenya, *Journal of business management and economic research, vol: 4*, Issue: 5

Olaniran Abimbola, Briggs Jane, Pradhan Ami, Bogue Erin, Schreiber Benjamin, Dini Hannah Sarah, Hurkchand Hitesh.,& Ballard Madeleine. (2022). Stock-outs of essential medicines among community health workers (CHWs) in low-and middle-income countries (LMICs): a systematic literature review of the extent, reasons, and consequences, *Human resources for health*, 20:58 https://doi.org/10.1186/s12960-022-00755-8

Oliech Charles Omondi., &Mwangangi Patrick. (2019). Effect of strategic procurement management on performance of level five in Kenya, *International journal of supply chain management, vol.4,no.1*

Omai Kevin Moindi, Ngugi Patrick Karanja.,& Kiarie David. (2019). Influence of supply chain practices on performance of textile and apparel firms in Kenya, http://hdl.handle.net/123456789/5042

Sadr-Azodi Nahad.,& Rodríguez Marisol. (2019). Following the 2001 Abuja Declaration of committing 15 percent government expenditure on health, is Africa making progress towards universal health coverage? Barcelona school of management, published Master's thesis.

Saunders Mark, Lewis Philip., & Thornhill Adrian. (2016). *Research methods for business students*, (7th ed.), L.E.G.O. S.p.A

Wandera, R. W. , Namusonge, G. S., & Sakwa, M. M. (2022b). The effect of inter-supplier rivalry practices on the performance of motor vehicle assembly companies in Kenya. *American journal of supply chain management, 7, no.*1, Pp. 42-60, https://doi.org/10.47672/ajscm.1255, https://ajpojournals.org/journals/index.php/AJSCM/article/view/1255

Wandera, R. W., Namusonge, G. S., & Sakwa, M. M. (2022a). The effect of supplier-buyer relationship practices on the performance of motor vehicle assembly companies in Kenya. *A merican journal of supply chain management, vol. 7, no.*1, Pp.19-41,https://doi.org/10.47672/ajscm.1254, https://ajpojournals.org/journals/index.php/AJSCM/article/view/1254

Wisner, J.L., Tan, K-C., & Leong, G.K. (2016). *Principles of supply chain management: A balanced approach*, Cengage Learning

Xiao Ting, Arikan Asli M., & Barney Jay B. (2018). Resource-based view**,** _____https://doi.org/10.1057/978-1-137-00772-8_512

Yin, Robert. K. (2017). *Case study research and applications: Design and methods*, (6th ed.), Sage Publications Inc

Yolsal, Murat. (2021). Re: Acceptable ranges of R^2 (Square) in Social Sciences?