EFFECTS OF ACTIVITY BASED COSTING AS ASPECT OF INVENTORY MANAGEMENT PRACTICE ON SUPPLY CHAIN PERFORMANCE OF HOMA BAY COUNTY TEACHING AND REFERRAL HOSPITAL

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Abstract

Despite the policy and institutional reforms undertaken by the Kenya Government on health facilities, Homa Bay Teaching and Referral Hospital still not able to effectively and efficiently manage its inventory (Wamai, 2008). Studies by Oballa et.al (2015) and Wagura (2015) observed that some researches have been conducted in this area, however they have failed to address the effect of activity based costing (ABC) on supply chain performance of public health facilities in Homa-Bay County. The purpose of this study therefore, was to specifically investigate effects of activity based costing as an aspect of inventory management practice on supply chain performance of the Homa Bay County Teaching and Referral hospital. For the purpose of this study, correlation and descriptive research designs were adopted and the target population for the study was thirty (30) procurement officers of Homa Bay County Teaching and Referral Hospital. Data was collected using questionnaires whereas the statistical analyses were carried out using SPSS. Regression analysis results revealed that activity based costing inventory practice had a positive and significant (β = 0.321, p = 0.001) effect on supply chain performance of Homa Bay Teaching and Referral hospital. In conclusion, the study revealed that the majority of the respondent at 48.1% either agreed or strongly agreed that activity based costing reduces space in supply chain in the health facility at the county teaching and referral hospital. The study established that averagely there was decrease in space utilization in Homa

Bay County teaching and referral hospital, based on this finding, the study recommended that county assemblies should legislate against sudden decreases in capacity by providing progressive policies that will provide a road map on medical and non-medical supplies storage criteria to enhance supply chain performance in government health facilities specifically Homa-Bay County teaching and referral hospital. The study also recommended that the management of Homa-Bay teaching and referral hospital should frequently conduct count of a number of medical and non-medical supplies and attach value based on customer urgency in different parts of facility to reduce storage space capacity. The study further recommended that the department of supply chain should create policies and procedures that will enable ordering of a number of medical and non-medical supplies in different parts of the facility only when they are needed without having to store redundant inventory that might not be needed for the next six months thus improving supply chain performance not only through improved customer satisfaction but also enhanced inventory management accuracy.

Keywords: Activity Based Costing, Inventory Management Practices, Supply Chain Management

INTRODUCTION

Inventory management is the supervision of non-capitalized assets or inventory and stock items as a component of supply chain management, which oversees the flow of goods from manufacturers to warehouses and from these facilities to point of sale (Wieland and Wallenburg, 2012). Fearon et.al (1985), described inventory management practices as a process that requires operational processes to be followed and maintained on the floor in inventory management systems; continuous study, analysis and decision making to control and manage inventory levels. According to Cecil and Robert (2006), efficient and effective inventory management practices attempts to control costs that comes along with the dimension of the total value of goods included and the tax burden generated by the aggregate value of the inventory. In addition, inventory management practices in the organization helps by adding value in terms of having control over and maintaining lean inventory. Inventory should not be too much or too less. Both the situations are bad for the company, maintaining accurate records of finished goods that are ready for shipment. In normal occasions, this implies posting the production of newly completed goods to the inventory totals as well as removing the most recent shipments of finished goods to buyers

The essence of inventory management practices is to enhance an organized fulfilment center. An organized warehouse results in more efficient present and future fulfilment plans.

This also includes cost-savings and improved product fulfilment for businesses utilizing the warehouse for managing inventory (Dryden et.al, 2012).According to Rajeev et.al (2008), organizations should design and implement an inventory management system that efficiently manages inventory, where you can have the right products in the right quantity on hand and avoid products being out of stock and funds being tied up in excess stock which intends to ensure your products are sold in time to avoid spoilage or obsolescence, or spending too much money on stock that's taking up space in a warehouse or stockroom. Companies should design and build up an inventory management system that balances the demand and supply.

Consequently, the organization can effectively manage its inventory and synchronize its supply chain system leading to improved supply chain performance. Health facilities in the current world are designing and implementing effective inventory management practices to ensure supply chain performance is encouraged (Connor, 1998).

Activity based costing (ABC) is an accounting methodology that assigns costs to activities rather than products or services. This enables resources and overhead costs to be more accurately assigned to the products and the services that consume them. ABC is a systematic, cause-and-effect method of assigning the cost of activities of products, services, customers, or any cost object (Christensen and Sharp, 1993). ABC assigns costs more accurately to products and customers by: a) identifying the activities being performed by organizational resources; b) assigning resource costs to the activities; 3) identifying all the products, services, and customers of the organization; and iv) assigning activity costs to these outputs via activity cost drivers. Also covers activity attributes, such as the cost hierarchy, value and non-value added, and business processes, as well as different types of activity cost drivers: transaction, duration, and intensity. Closes with the admonition to balance the benefits from more accurate cost estimates with the cost of developing an appropriate activity-based cost system (Kaplan, 2001).

One of the advantage of using activity based costing (ABC) in the business operation is the accuracy in the process of costing with regards to the product line, the end-users of the product, the stock-keeping units employed by the management and the channel and category which streamline the flow of the product from the producer to the end user. This system also assists in the process of understanding the concept of overhead costs i.e. the allocation of common business resources as they are used by specific product lines and their relation to specific cost driver. ABC system can assist in management decision making that management should do. In addition to costing more accurate than the decision will be taken by the management pack gets better and right. This is based on the accuracy of the calculation of the cost of products that become very important in today's competitive climate (Dadan, 2016).

Excess inventory can be the result of a number of disruptions in the product cycle. These factors can be broken down into three categories: Sixty percent Shipment delays Delays due to factors like processing times, order frequency and international regulations, twenty five percent technical challenges Issues caused by system integration, purchase orders, EDI (Electronic data interchange) processing and lack of visibility into business, fifteen percent Other factors For example returns or quality requirements. Consumer behavior and market trends can also play a significant role in creating excess inventory. In the retail and home goods industries, excess inventory can occur as soon as the seasonal trends change (Burton et.al, 2002).

In organizations that deal with fast moving consumer goods where demand is hard to predict, excess inventory is often caused by a miscalculation in customer demand, leading to companies over-stocking in slower-moving items leading to poor customer satisfaction Brigham et.al (2013).Conversely, too little inventory often disrupts firm's operations, and increases the likelihood of failure (Dimitrios, 2008). Agus and Noor (2010) argues that there is increased need for business enterprises to embrace effective and efficient inventory management practices as an edge to improve their competitiveness.

Inventory management practices is a framework employed in firms in controlling its interests in inventory and functions used by organizations to manage stocks of finished products, semi-finished products and raw materials. Effective implementation of these framework enables the organizations to minimize costs and increase profits or revenue (Stevenson, 2007).

Some of the inventory management practices used in this study are as follows: Activity based costing inventory analysis, Vendor managed inventory, Just In Time and Batch tracking. Information technology has also enabled health facilities to control and manage their inventories more efficiently through storage, processing, distribution and exchange information within and outside the organization in the supply chain. Innovations such as Vendor Managed Inventory (VMI) and Inventory forecasting are based on an increased level of automation in both the flow of physical materials and goods and the flow of information be-tween companies to improve the efficiency in the entire supply chain (Laudon and Scott 2012). Emergence of internet devices are helping to improve inventory management by helping organizations easily keep track of an item's precise location. This helps reduce the time it takes to find inventory. All of the available real-time data helps provide valuable insights to support strategic and tactical business decisions. The use of internet-based system to carry out individual or all stages of procurement process has significantly redefined the inventory management in government health sector such as searching, sourcing, negotiation, ordering, receipt, and post purchase review (Nyabwanga and Ojera, 2012). The accuracy of inventory can be achieved through the following strategies

proposed by Lee and de Mesquita (2006); Make sure your warehouse is organized at all times, have good inventory naming and labeling practices, Create and follow documented policies and procedures, Utilize cycle counting as a more efficient way to count inventory and assigning unique identifying numbers.

According to Nyabwanga and Ojera (2012) the problem in Homa-Bay health facilities is supply chain; it's inventory management. With the majority of hospitals failing to outsource supply chain functions to distributors (HIDA, the Health Industry Distributors Association,2016) estimates that ninety percent of Homa-Bay health facilities use distributors in lowest capacity Hospitals typically receive the supplies they need within 2 days or more. With the inability to quickly receive new supplies to virtually any location, health facilities are suffering from supply chain problems, since they have inventory management issues. As a result of poor inventory management processes, hospitals struggle with overstocking, stock-outs, high supply costs, high labor costs and dissatisfied clinical staff (Odhiambo and Nganga ,2013).

According to Ondiek (2013),despite the average distance of five kilometers covered by patients to arrive at health facilities in Homa-Bay County, only forty six percent of women deliver their babies in health facility against a national average of forty four percent which could be attributed to slow response to emergency and lack of equipment due to inappropriate inventory management practice hence patients preference for traditional midwives, who at times risks the lives of expectant mothers and their babies due to non-scientific medical procedure. This study therefore aimed to investigate the effect of activity based costing as an inventory management practice on supply chain performance in Homa-Bay County teaching and referral hospital.

Statement of the problem

Despite the policy and institutional reforms undertaken in the Kenya government health institutions and the support from non-governmental organizations, government health facilities in Homa Bay County, are still not able to effectively manage their inventory (Wamai, 2008). This is shown by the data obtained from Homa Bay County Health Management Information System report for example stock outs for essential drugs, lack of response to emergency, lack of equipment for operation services and delays in food supplies for patients all pointing to an ineffective supply chain management. Onkundi and Bichanga (2016) investigated the factors influencing inventory management in public hospital in Kisii County, their findings revealed that overstocking and under stocking of inventory in the public Health Sector in Kisii County was due to inadequate forecasting of requirements, Scheduled time for deliveries, insufficient staff, scheduled time for receiving, issuing and unorganized storage facilities which affected

information sharing between the customer and supplier thus affecting the supply chain performance.

Similarly Oballa et.al (2015) study revealed that inventory management and inventory records accuracy have a positive influence on supply chain performance while inventory shrinkage have a negative effect on supply chain performance. Moreover, a study by Wagura (2015) assessed the impact of inventory management systems on supply chain performance in public hospitals in Homa-Bay, his finding indicated lack of proper inventory management systems to control cost. Studies by Oballa et.al (2015) and Wagura (2015) observed that some researches have been conducted in this area, however they have failed to address the effect of Activity Based Costing (ABC) on supply chain performance of public health facilities in Homa-Bay County. This study therefore intended to investigate the effect of Activity Based Costing (ABC) supply chain performance of health facilities in Homa-Bay County Teaching and Referral hospital.

Objectives of the study

General objective

The main objective of the study was to investigate the effect of inventory management practices on supply chain performance of public health facilities in Homa-Bay County.

Specific objective

To investigate effect of activity based costing as aspect of inventory management practice on supply chain performance of Homa Bay County and referral hospital.

Research hypotheses

$H0_1$: Activity based costing as aspect of inventory management practice has no effect on supply chain performance of Homa Bay County and referral hospital.

Scope of study

The study was conducted using one case study of Homa-Bay County referral hospital. Homa-Bay county teaching and referral hospital is a government health center which provides comprehensive medical and surgical services. It is located in Homa-Bay township sub-location, Homa-Bay location, Asego division, and Range constituency in Homa-Bay County (0°3'38.32" N, 34°27'25.70" E). Homa-Bay county teaching and referral hospital has been in operation for many years now and consistently offering quality goods and services to the public and whose importance is unmatched. The study focused on the nature of inventory management practices

at the supply chain department, the nature and type of challenges faced in inventory management and how to overcome those challenges.

The study specifically focused on Procurement Officers, Procurement Assistants, Store men, sales men as well as the Clerical Officers working in supply chain department. It aimed at gaining an overview of the nature and practice concerning inventory management practices and their effectiveness in ensuring sustainable supply chain and customer satisfaction.

Conceptual framework

Independent variable   **Dependent variable**

Activity Based Costing
• Inventory accuracy
• Inventory optimization

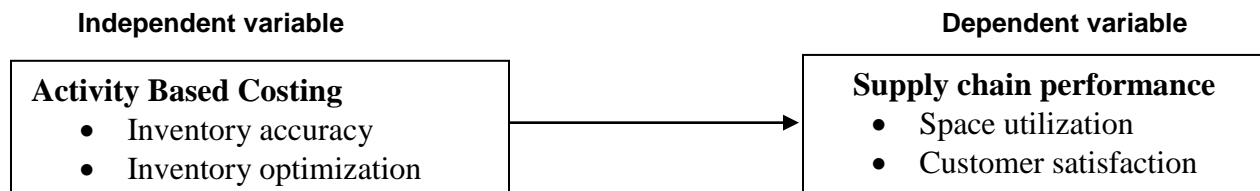| **Supply chain performance** |
| --- |
| • Space utilization |
| • Customer satisfaction |

Figure 1. Conceptual framework

Theoretical Perspective

A theoretical framework consists of theories, concepts and their definitions in reference to relevant scholarly literature and existing theory that is used in a particular study (William, 2017).

Lean Inventory Theory

Lean Theory was first propounded by John Krafcik in his 1988 article. Lean is the set of "tools" that assist in the identification of value and steady utilization of inventory space through elimination of waste in supply chain. As waste is eliminated, production time, cost and space is reduced while quality and value improves which in the long run boosts supply chain performance (Krafcik, 1988). Kros et.al (2006), further defined lean as an extension of ideas of Activity Based Costing (ABC) and JIT as well as elaborating just in time inventory management practice as a pull-based system designed to align value, inventory management and business operations throughout the supply chain. Green and Inman (2005) assessed the impact of lean theory on supply chain performance. They suggested that lean theory may eliminate buffer stock and minimize waste in inventory management process. The Lean methodology aimed at maximizing value for customers or patients in the case of health care while minimizing waste leading to satisfaction of customers (Radnor et.al, 2012).

According to Agus and Noor et.al (2006) eliminating the processes and steps that do not give value to the customer, inventory management will be more efficient, save money and

provide an improved customer experience and the same concept may be applied to inventory management of a health care facility. Krafcik (1988) philosophy is underpinned by the following key principles: The underlying assumption of the Lean concept is that the delivery of an inventory or service should give value to customers Thus, Lean tools and methods are used to critically examine processes to reduce wasteful activities in inventory management practices that add no value for the customer.

Understanding customer value in health care facilities raises the question: who is the customer? In general, the customer is the patient, although there are several different perspectives on this issue, Radnor et.al (2012) argued that Lean in health care facilities breaches the view that the patient is the sole customer and that the customer and commissioner (the one who pays) are the same. Equally, in public funded services like health facilities, the patient does pay, albeit indirectly through taxation.

The value stream is defined as the processes or activities required to design, order and provide a specific inventory or service. This requires identification of the individual inventory components. Womack and Jones, (2003) described actions that clearly create value and actions that create no value but are required because of inventory management systems of current processes (necessary non value adding) and activities that create no value (waste). However, Lean thinking is not only about waste reduction but also about increasing activities that improved supply chain performance without any additional costs.

According to Rahman et.al, this approach in an organization was to maximize the efficiency of individual parts of the inventory where work is undertaken in batches and then passed on to the next part of the process. Lean Theory sought to achieve continuous and seamless flow in inventory management essentially through reduction in variation of demand through ABC analysis and JIT technique thus reducing cost, improving quality and minimizing space. When patients wait in queues as a result of inappropriate inventory management systems at different points in health facilities pathway, it is wasteful (Rahman et.al, 2016).

As Radnor et al (2012) observed, health facilities are usually capacity based, whereby demand is pushed into the system rather than pulled as advocated by Lean thinking. Therefore, because of both random and non-random patterns of demand, large variations are the norm for many health-care pathways and it is hard to achieve a balance between inventory demand and capacity at certain times.

Eroglu and Hofer (2011) found that positive leanness affects profitability of a business firm; they argued that inventory accuracy, value and space utilization are the best inventory management performance tools. The lean theory elaborated on how an organization gains flexibility in their ordering decisions, reduce the stocks of inventory held on site and eliminate

inventory carrying costs. At the aggregate level, the empirical strength of the lean explanation lies both in inventory value, space utilization, inventory costs and the magnitude of the adoption. Therefore, this theory is important in providing an understanding on the effect of ABC inventory practice on the supply chain performance.

Deterministic Inventory Theory

According to Croom and Jones (2010), deterministic inventory model is one of the fundamental techniques used by firms to develop inventory reserve estimates. Deterministic model of inventory control are used to determine the optimal inventory of a single item when demand is largely obscure. Under this model, inventory is built up at a constant rate to meet a determined or accepted demand.

Kotleba (2006) suggested that the deterministic inventory model considers the trade-off between ordering costs and storage costs in choosing the quantity to use in replenishing inventory items for optimum supply chain performance. The relevance of this theory is that a smaller order quantity reduces average inventory but requires more frequent and higher ordering costs. Agus and Noor (2010) suggested that deterministic inventory model is the most applicable in health care systems seeking to mitigate inventory costs, minimize space and satisfy patients for efficient and effective inventory management for sustainable supply chain. Beamon (1998) argued that one of the advantages often explored to cushion the burden of net inventory costs and to enjoy substantial savings is the benefit from procuring large enough quantity that reduces the unit price of the item. This results to reduction of aggregate costs which enhances supply chain performance.

Empirical Literature

An Empirical review surveys books, scholarly articles, and any other sources relevant to a particular issue, area of research, or theory, and by so doing, provides a description, summary, and critical evaluation of these works in relation to the research problem being investigated (Arlene et.al, 2005).

Effects of ABC as Aspect of Inventory Management Practice on Supply Chain Performance

Nawanir et.al (2013) investigated the effect of ABC inventory practices on operation performance and business performance from the Indonesian manufacturing companies and established that ABC inventory control practice had a positive and significant impact on both Operations performance namely; quality of product, inventory minimization, on time delivery,

cost reduction and supply chain performance namely; profitability, sales and customer satisfaction. Chituri et.al (2016) investigated the linkage between the determinants of inventory management and customer satisfaction within supermarkets in Nigeria and established that ABC inventory management practices had the most significant positive impact on customer satisfaction. Further, the results indicated that maintaining an efficient inventory management system is important in enhancing supermarkets operation efficiency due to capacity utilization. It would be of value to test the same hypothesis in the government health facilities in Kenya specifically the health facilities in Homa Bay County.Mukopi and Iravo (2016) investigated the effects of inventory management practices on supply chain performance function of the sugar manufacturing companies in the western sugar belt namely; Mumias Sugar Company, West Kenya Sugar Company. Nzoia Sugar Company and Butali Sugar Mills and revealed a strong positive relationship between ABC inventory systems and supply chain performance.

RESEARCH METHODOLOGY

Research design

This study employed correlation and descriptive research designs. A descriptive research describes a situation or condition at hand. It examines aspects such as opinion, abilities, behavior, knowledge and beliefs of individuals, groups or situation (Kothari, 2004). The purpose of this research was to analyze the effect of Inventory management practices on the supply chain performance of Homa-Bay county health facilities specifically Homa-Bay county referral hospital given this circumstance of getting a clear picture on inventory management and supply chain performance, descriptive research study design is the most appropriate.

Study area

The study area will be Homa-Bay County teaching and referral hospital. It was formally known as Homa Bay District hospital and was started in 1969 as a dispensary. The facility currently serves as teaching and referral hospital for residents from 18 sub counties of Homa Bay County as well as the surrounding counties. Our research was be based on this area because Health facilities in Homa-Bay County has been experiencing supply chain challenges.

Target population

The target population for this study consisted of officers from various departments who are directly involved in inventory management. The unit of investigation was the procurement officers, procurement assistants store men and clerical officers who were 100 in total. The study

considered thirty percent (30%) of the population was representative enough to give the desirous results.

The main factor considered in determining the sample size was to keep it manageable enough and also to enable the researcher to derive from it detailed data at an affordable costs in terms of time, finances and human resources (Mugenda, 1999). The researcher selected thirty percent of the target population to act as the sample size, since it has been argued that such a sample size is adequate for a descriptive survey study (Patton, 2002).

Sample size

To ensure representation of various strata in the population, a stratified sampling method was employed. A stratified sampling is a method of sampling from a population which can be partitioned into subpopulations (Mugenda, 1999). The population was divided into four categories based on the principle contribution to inventory management practices. These are procurement officers, procurement assistants, store men and clerical officers.

Table 1. Sampling

Category	Population size	Sample size
Procurement officers	30	9
Procurement assistants	17	5
Store men	23	7
Clerical officers	30	9
Total	100	30

Data collection procedure

The researchers introduced themselves and explained the purpose of the study. After permission has been granted, they proceeded to the respondents to whom they will also explain the purpose of the visit. The researcher then administered the questionnaires to the employees of the department of procurement of Homa-Bay Teaching and referral hospital.

The procurement department respondents who filled the copies of the questionnaire in the presence of the researchers so that the researcher could give clarification on questions or items in the question that will not be clear. However, when not filled immediately, then the researcher gave the respondent time to fill them and collect them after two days

Instrument for data collection

This study used primary data which was collected with the help of structured questionnaires. The use of primary data was to establish the effectiveness of inventory management practices on supply chain performance in the health facility. The study respondents were procurement officers, procurement assistance, store men, clerical officers and other staffs or person(s) carrying the same responsibility. There was an introduction to the question which explained the study topic and the purpose of the study. Drop and pick method was used as a method of administering the questionnaires so that the respondent can fill the questions at their convenient time.

Reliability and validity

Collar (2012) suggested that for a survey to deliver helpful outcomes, it must have legitimacy and unwavering quality. On the off chance that the survey can really test what is expected for it and alludes to legitimacy, though, unwavering quality measures the importance. To test the unwavering quality and legitimacy of the survey, a pretest was done. The poll was managed to 10 respondents not in the investigation test in order to determine whether the survey measures what it indicates to quantify. According to Kothari, (2008), validity is the degree to which a test measures what it is supposed to measure. The reliability of the measures was assessed using the Cronbach's alpha coefficient in which the alpha value was greater than 0.70 and was therefore considered as sufficient.

Data analysis and presentation

Essential information gathered was coded and examined with the assistance of the statistical package for social sciences (SPSS).The analysis utilized graphic measurements like connection and relapse examination was done to build up the effects of inventory management on supply chain performance. The outcomes were introduced utilizing tables, diagrams and an outline for simplicity and comprehension.

On the other hand, the study analyzed qualitative data through content analysis. A multivariate regression model was used in the determining of coefficients of the independent in relation to the dependent variable. The multivariate model was as follows:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$, where Y = Supply Chain Performance, X1= Activity Based Costing, X2 = Just in Time, X3= Batch tracking.

where, β_0 = the constant term while the coefficient β_i = 1…3 were used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables X1, X2, X3 and ε is the error term, which captures the unexplained variations in the model.

RESULTS AND DISCUSSIONS

Demographic Characteristics

Table 2. Respondent Demographic Information

Demographic Characteristics	Category	Percentage
Respondent level of Education.	PhD.	3.8%
	Masters degree	23%
	Bachelors degree	23%
	Diploma	38%
	Certificate.	12%
Work experience.	Between 1-3 years.	50%
	Between 4-7 years.	46%
	8 years and above.	3.8%

Descriptive Results

The study's independent variables included Activity Based Costing, Just in Time and Batch tracking. The study also presented the descriptive results on the dependent variables.

Activity Based Costing

Table 3. Descriptive results on Activity Based Costing

Statements	SD	D	N	A	SA	M	Std dev
Homa-Bay County applies	3.8%.	46%.	7.7%.	42%.	0%.	4	1.15

The first objective of this study was to determine the effect of Activity Based Costing inventory management practice on supply chain performance of Homa-Bay Teaching and Referral hospital.

In this section the study basically sought to determine if Activity Based Costing inventory practices were carried out in Homa-Bay Teaching and Referral hospital. Table 1 presents the descriptive results. The study sought to establish whether the health facility applies Activity Based Costing to manage their inventory and the findings indicated that 42% and 0% of the respondents agreed and strongly agreed respectively. The results further revealed that the statement had a mean of 4 confirming majority of the respondents agreed and a standard deviation of 1.15 implying variation in the responses.

On whether, Activity Based Costing reduces space in supply chain in the health facility, the findings revealed that 46.1% and 2% of the respondents agreed and strongly agreed respectively. Similarly, the findings revealed a mean of 4 and standard deviation of 1.16 which confirmed majority respondents agreed and the response slightly varied from the mean. The study further sought to establish whether due to activity Based Costing there is improvement in customer satisfaction, the findings also showed that 46% and 12% of the respondents agreed and strongly agreed. Those who disagreed and very strongly disagreed were 38.5% and 0% respectively.

Supply Chain performance

Table 4 presents the findings on the supply chain performance of Homa-Bay Teaching and Referral hospital. The measurements of the supply chain performance adopted included space utilization and the extent of customer satisfaction. The research findings presented in the table revealed that 46.1% and 15.3% of the respondents agreed and strongly agreed that Inventory optimization leads to customer satisfaction in the health facility, 19.2% remained neutral while 11.5% and 7.7% disagreed and strongly disagreed respectively with the statement. The statements had a mean of 3 confirming that the respondents had varying opinions. On whether, maintaining inventory only when needed in the health facility reduces space and cost, the findings showed that 46.1% and 19.2% indicated agreed and strongly agreed respectively. The statement had a mean response of 4 confirming that majority of the respondents agreed and very much agreed that maintaining inventory only when needed in the health facility reduces space and cost.

The study further sought to establish whether inventory accuracy improves customer satisfaction in the health facility, 26.9% and 19.2% of the respondents indicated agreed and strongly agreed, while 15.3% and 15.3% disagreed and strongly disagreed respectively. The statement had a mean of 3 which further confirmed that majority of the respondents had varying opinion.

The findings also showed that 50% and 19.2% of the respondents agreed and strongly agreed on whether timely obtaining of medical and non-medical supplies have improved supply chain performance in the health facility. The statement had a mean of 4 and standard deviation of 0.84 which implied that majority of the respondents agreed and the response varied slightly from the mean. The findings in this section implied that supply chain performance varied in Homa-Bay Teaching and Referral hospital. Some of the inventory management practices in the health facility had better supply chain performance as shown by those who agreed while others had poor supply chain performance as shown by those who disagreed. However, the findings

revealed that on average the supply chain performance was below average. According to Ng'ang'a (2013) delays, inaccuracy and frequent stock outs of inventory affects the supply chain performance of government health facilities.

Table 4. Descriptive results on supply chain performance

Statements	SD	D	N	A	SA	M	Std. Dev
Inventory optimization leads to customer satisfaction	7.7%	11.5%	19.2%	46.1%	15.3%	3	1.35
Maintaining inventory only when needed in the health facility reduces space and cost.	0%	11.5%	23%	46.1%	19.2%	4	1.10
Inventory accuracy improves customer satisfaction	15.3%	15.3%	23%	26.9%	19.2%	3	1.06
Timely obtaining of medical supplies have improved supply chain performance	3.8%	7.6%	19.2%	50%	19.2%	4	0.84

Inferential Statistics

Correlation Results

The Pearson Correlation of Activity Based Costing versus supply chain performance was computed and established as 0.418 (p-value=0.000) which is a significant and positive relationship between the two variables.

These findings implied that effective Activity Based Costing inventory practice results to positive supply chain performance. Study findings concur with Mukopi and Iravo (2015) who revealed a strong positive relationship between Activity Based inventory systems and supply chain performance. Similarly, Chituri et al (2016) the results indicated that maintaining an efficient inventory management system is important in enhancing supermarkets patronage.

Regression is the determination of a statistical relationship between two or more variables (Kothari, 2014). This section presents the regression analysis of Activity Based Costing and supply chain performance. The results are presented in 5. The regression analysis shows a relationship R=0.753 and R2=0.580. These findings meant that 58.0% of variation in the supply chain performance can be explained by a unit change in lean inventory practices, inventory record accuracy, information technology and demand forecasting. The remaining percentage of 41.3% is explained by other variables that were not included in this model.

Table 5. Model Summary results

R	R square	Adjusted R square	Standard error of estimate
0.753	0.580	0.563	0.41276

The results of ANOVA in table 6 indicated that Activity Based Costing was significant predictor variable of supply chain performance of Homa-Bay County and referral hospital. This was indicated by the F-statistics results (F = 27.753, p = 0.000) meaning that the model used to link the independent variables and dependent variable was statistically significant. The study further confirmed the findings by comparison of the F calculated and F critical results. F critical (F 4, 53, (0.05)) was obtained from the f-distribution table using a numerator degrees of freedom of 4 and denominator degrees of freedom of 53 at 5% level of significance. The value of F critical was 2.546 which is less than F calculated value of 27.753 implying that the model linking inventory management practice to supply chain performance was significant.

Table 6. ANOVA Regression results

	Sum of squares	Df	Mean square	F	Sig
Regression.	20.782	4.	5.198	27.753.	0.000
Residual	14.895	53	0.187		
	35.586	57			

The regression results revealed that ABC inventory practice had a positive and significant (β = 0.321, p = 0.001) effect on supply chain performance of Homa-Bay County Teaching and Referral hospital. These findings implied that increase in Activity Based Costing inventory management practices increased the supply chain performance of Homa-Bay County Teaching and Referral hospital. Study findings concur with Mukopi and Iravo (2015) who revealed a strong positive relationship between ABC inventory management systems and supply chain performance.

Table 7. Regression Coefficient Results

Predictors	B	Standard error	Beta	T	Sig
(constant)	0.420	0.318		1.362	0.177
ABC	0.321	0.0089	0.330	3.440	0.0001

CONCLUDING REMARKS

Summary of findings

From the research, it was deduced that Activity Based Costing had a positive and significant relationship with supply chain performance, which implied that effective Activity Based Costing practices results to a positive supply chain performance.

Supply Chain performances in the health facility was strongly attributed to inventory optimization, inventory accuracy and timely delivery of supplies which enhanced customer satisfaction and minimize the storage capacity

Conclusions

The study sought to determine if Activity Based Costing inventory practices were carried out in Homa-Bay County Teaching and Referral hospital. The study sought to establish whether the health facility applies Activity Based Costing to manage their inventory and the findings indicated that 42% and 0% of the respondents agreed and strongly agreed respectively. The results further revealed that the statement had a mean of 4 confirming majority of the respondents agreed and a standard deviation of 1.15 implying variation in the responses.

On whether, Activity Based Costing reduces space in supply chain in the health facility, the findings revealed that 46.1% and 2% of the respondents agreed and strongly agreed respectively. Similarly, the findings revealed a mean of 4 and standard deviation of 1.16 which confirmed majority respondents agreed and the response slightly varied from the mean.

The study further sought to establish whether due to activity Based Costing there is Improvement in customer satisfaction, the findings showed that 46% and 12% of the respondents agreed and strongly agreed. Those who disagreed and very strongly disagreed were 38.5% and 0% respectively.

Therefore it's concluded that an improvement in Activity Based Costing inventory management practices can enhance supply chain performance of Homa-Bay county Teaching and Referral hospital in Homa-Bay.

Recommendations

The study established that Activity Based Costing inventory practices had the effect on supply chain performance in Homa-Bay Teaching and Referral hospital; the study therefore recommended that other government health facilities that have not adopted the use of ABC in their operations should adopt the same to enhance performance of their supply chain. The adoption should be done in line with the existing legislation to avoid legal conflicts. The study established that averagely there was an decrease in space utilization in Homa-Bay County

Teaching and Referral hospital while applying ABC therefore, based on these findings the study recommended that County Assemblies should legislate for progressive policies that will provide a road map on medical and non-medical supplies storage criteria to enhance supply chain performance in Government health facilities specifically Homa-Bay Teaching and Referral hospital. The study further recommended that the management of Homa-Bay Teaching and Referral hospital should frequently conduct count of a number of medical and non-medical supplies and attach value based on customer urgency in different parts of facility to reduce storage space capacity.

Suggestion for further research

A review of literature indicated that there has been a limited amount of research done on reasons that determine organization's choice for inventory management practices in Kenya .Thus, the findings of this study serves as the basis for future studies on inventory management practices in health facilities. The three independent variables that were studied explain 62.10% of inventory management practices in health facilities. This therefore means that other factors not studied in this study contributed 37.90% hence there is need to carry out further studies in other factors affecting supply chain performance.

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