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DETERMINANTS OF EFFECTIVE INVENTORY MANAGEMENT IN HEALTH PROJECTS IN KENYA: A CASE OF HOMABAY COUNTY

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ABSTRACT

Despite efforts being made by the Ministry of Health and its partners to provide the country with health commodities (medicines and medical logistics) to meet the requirements of clients (people who need the healthcare), these commodities are often wrongly managed or inadequate. These therefore leave the clients with no alternatives than to fall on the traditional medicines or travel over long distances in search of health care. The main objective of this research was to establish the determinants of effective inventory management in health project in Kenya. To achieve the objective, study adopted a census survey of the 75 respondents. A pilot study was conducted and questionnaire was used to collect data. Quantitative data gathered was coded and analyzed using Statistical Package for Social Sciences (SPSS) version 22 computer software. Descriptive statistics was used to analyze the data in frequency distributions and percentages. Multiple Regression analysis and ANOVA aided to analyze the degree of relationship between the variables in the study at 5% level of significance. The analysis showed that supplier management had the strongest positive (Pearson correlation coefficient =.887 and p-value =0.000) influence on effective inventory management health projects. In addition, health financing, monitoring & evaluation and information communication and technology were positively correlated to effective inventory management health projects with Pearson correlation coefficient of .775, .690 and .506 with p-values of 0.010, 0.011, 0.023 and 0.035 respectively. The study established that supplier management was the most significant factor. The findings of this study served as a basis for future studies on effective inventory management in health projects. This study confined itself to the health projects in Homabay County, Kenya. This study recommended an improvement of supplier relationship within the health projects to avoid delays in delivery of inventories. The county of Homabay should also monitor and evaluate the projects being implemented in the county to ensure that they meets their objectives and is sustainable. A comparative study should be carried out to compare whether the findings also apply for other projects in other counties in Kenya in order to validate the findings of this study. Further, there is need to undertake another research to examine the other factors which could be influencing effective inventory management in health projects in Kenya.

Key words: Inventory Management, Health projects, Supplier Management, Health Project Financing, Monitoring and Evaluation, Information Communication and Technology.

Background of the Study

Today, inventory management is more crucial to success and sustainability of health project. Kotler (2000) defines inventory management as to activities involved in developing and managing the stock levels of commodities so that adequate supplies are available and the costs of over or under stocks are reduced. It involves the recording and monitoring of stock level, forecasting future demand and deciding on when and how to order (Adeyemi and Salami, 2010). According to Acheri and Ochiri, (2014) commodities usually cannot go directly from their source to the end user. They frequently must be held in the warehouse at some points along the way. It is therefore important that hospitals ensure smooth supply of the required stock to ensure uninterrupted supply of essential drugs. World Health Organization (WHO 2002) defines essential drugs (medicines) as those that meet the priority health care needs of the population, carefully and systematically selected using evidence based process. These drugs are meant to be always available in a functioning health care system.

According to WHO (2004), it is estimated that 30% of world's population in 1999 had no access to essential medicines. Although access to essential medicines has considerably improved in a number of countries, a large fraction of the world's population still has no effective access to modern medicines or vaccines. The majority of these people are either extremely poor or are living in remote rural areas where the supply of drugs is limited (Foster et al 2006). In a study done by Gray (2012) on shortages of medicines: a complex global challenge showed that United States of America (USA) is facing shortage of essential drugs. Research done by Mahyadin (2015) in Malaysia showed that a lot of medicine is lost due mismanagement involved and theft. It showed that the situation is critical and needs proper inventory management practices to control it. Efficient inventory management is essential for assuring access to health project supplies and thereafter positive health outcomes. This is mainly important in developing countries like Kenya where large population is served by public

and private health sectors (Mungu 2013). A study done by Githinji *et al* (2013) on reducing stock outs of life saving malaria commodities using mobile phone text messaging: SMS for life reveals that use of simple SMS technology ensued high reporting rates of reasonably accurate, real time facility stock data in 5 health facilities in Kenya.

Statement of the Problem

In spite of the legal, policy and institutional reforms undertaken so far in the public health procurement sector in Kenya, health project still find it hard to effectively manage the inventory. United Nations (2013) indicated that over 65 percent of key government health project in Kenya are being affected due to poor inventory management practices. This implies that only 35% of major health projects are successful due to effective inventory management in this country. This implies that despite efforts so far undertaken in the health project sector in Kenya, health project are still unable to effectively deliver health services. The inability to effectively manage inventory affect health project in the country consuming about 20% of the GDP and up to 60% of the annual budget (RoK, 2013) it is a serious problem given that health s are the engine of a healthy nation, economic growth and development needed to move the country to a middle level economy as envisaged in the development blue print of Vision 2030 (ACEPD, 2011). According to World Bank report (2014) on the effective delivery of health project services in Kenya, it was established that 60% of the health projects were not performing well due to poor inventory management. The issues included lack of monitoring & evaluation, health project financing, information communication & technology and poor procurement processes. It is on this premise the study seeks to find out if supplier relationship management, health project financing, monitoring and evaluation of health projects and ICT influence inventory management in health projects in Kenya, specifically health projects in Homa Bay County.

Homabay County

Homa Bay is located in the former Nyanza Province, along the south shore of Lake Victoria and has a population of 963,794 (male-48% and female- 52%).

Homa Bay County is characterized by a rapidly growing population and high population density. The combined effects of climate change and rapid population growth are increasing food insecurity, environmental degradation, and poverty levels in the county. Due to the discussed factors, Homa Bay County has attracted several private, government and donor funded s to help serve its residents, reduce mortality rate and improve economic status of the county, Kenya National Bureau of Statistics (KNBS) and United Nations Children’s Fund (UNICEF) (2013). According to AIDS Response Progress Report 2014, Kenya has an average HIV prevalence rate of 6% and with about 1.6 million people living with HIV infection, it is one of the six HIV ‘high burden’ countries in Africa. The western part of the country through Homabay, Siaya and Kisumu are the most affected with HIV with rates of 25.7%, 23.7% and 19.3% respectively. The counties with the least infection rates are Wajir, Tana River and Marsabit with rates of 0.2%, 1% and 1.2%. These statistics imply that many health projects are being implemented in Homabay County to help reduce the HIV prevalence rate. In this case, a lot of commodities are being used to implement health projects and hence the research to examine the determinants of effective inventory management in health projects in Kenya.

Research objective

The general objective of this research was to examine determinants of effective inventory management in health projects in Kenya: A case of Homabay County. The specific objectives were:

The study pursued the following specific objectives:

- To establish how supplier management affect effective inventory management in health projects in Kenya.
- To find out how health project financing influence effective inventory management in health projects in Kenya.
- To examine how monitoring & evaluation influence effective inventory management in health projects in Kenya.

- To examine how information communication & technology influence effective inventory management in health projects in Kenya.

LITERATURE REVIEW

This section reviews relevant literature on determinants of effective inventory management in health projects. The chapter further describes the theoretical review and conceptual framework.

Theoretical Framework

Theory is a set of interrelated concepts, definitions and propositions, which provide systematic view of a phenomenon. (Anfara &Mertz, 2006).

Transaction Cost Theory

Transaction cost theory (TCT) or transaction cost economics (TCE), has become an increasingly important anchor for the analysis of a wide range of strategic and organizational issues of considerable importance to firms (Jones, 2001) in particular, the TCT has been employed in studying firms’ boundaries, vertical integration decisions, the ration for conducting an acquisition, the networks and other hybrid governance forms. The critical dimensions in which transaction differ can be classified as the frequency with which transactions occur, asset specificity and the degree of uncertainty.

Efficiency in TCT is conceptualized as Pareto efficiency where governance mode are compared according to their ability to facilitate transactions until the point at which it is impossible to make one party better off without making the other party worse off (Jones, 2001). TCT claims that the firm, in many cases, provides a relatively more efficient method of organizing relative to the market because of optimization of transaction costs or overall value. Therefore, TCT is about efficiency and views economic organization as being principally concerned with the relative efficiency of optimizing on transaction costs (Williamson, 2000). The TCT is useful in analyzing and the operation of a firm. The theory will therefore be used to determine the effect supplier management on effective inventory management

Resource Based View Theory (RBV)

Penrose (1959) provided initial insights of the resource perspective of the firm. However, the resource-based view of the firm (RBV) was put forward by Wenerfelt (1984) and subsequently popularized by Barney's (1991). The theory emphasized the importance of organization resources and their influence on performance and competitive advantage in the market. According to RBV, every organization has its own unique resources that enable it to remain competitive in the market, by addressing the rapidly changing environment (Helfat, 2007). These resources may be financial, human, physical, technological and information. These may be valuable, rare and non-substitutable (Crook, Ketchen, Combs & Todd, 2008). Critiques of the RBV have pointed out that some resources contribute to competitive advantage while others do not; hence, not all resources of an organization have the ability to contribute to competitive advantage. Secondly, the mere availability of resources are coordinated and integrated (Lopez, 2005). To execute inventory management function especially in the health project, there is need to have informed professionally trained and experienced staff in the field of financial management. Financial resources are necessary for effective inventory management of s (James, 2011).

Theory of Change

The Theory of Change advocates that a program should have assumptions to explain how activities will produce a change that contributes to the achievement of the output, how outputs will produce a change that contributes to the achievement of the outcome and how outcomes will produce a change that contributes to the achievement of the overarching goal. It requires the demonstration of program causal pathways (Bell, 2012). Theory(s) of change in its simplest form can be defined as, "we believe if we do action (x) then, we will achieve (y)". Monitoring and evaluation must build on appropriate and relevant baseline studies that provide the basis for comparative accounts of the impact that any has initiated (Kusters, Vugt, Wigboldus, & Woodhill, 2011). To

monitor and evaluate a /program, it is important to understand the underlying theories of change since they reveal how designer's and implementer's envisioned activities contributing to expected results (Davies, 2014).

A theory of change is a tool used for developing solutions to complex social problems. It provides a comprehensive picture of early and intermediate term changes that are needed to reach a long term set goal (Anderson, 2005). It therefore provides a model of how one should work, which can be tested and refined through monitoring and evaluation. A theory of change is also a specific and measurable description of change that forms the basis for planning, implementation and evaluation. Most projects have a theory of change although they are usually assumed (CARE, 2013). The theory of changes helps in developing comprehensible frameworks for monitoring and evaluation.

Technology Acceptance model (TAM)

The Technology Acceptance Model (TAM) is a theoretical model that explains how users come to accept/adopt and use a technological infrastructure. Original TAM was proposed by Davis in 1989. The model suggests that when a user is presented to a new technology, a number of factors influence their decision regarding how and when they will use it. This includes its perceived usefulness and its perceived ease of use. This model adopts well established causal chain of "beliefs, attitude, intention, actual behaviour", which was developed from the theory of reasoned action by social psychologists. In Davis's study, two important constructs are identified; perceived usefulness and perceived ease of use. The perceived usefulness (PU) is defined as "the degree to which an individual believes that using a particular system/technology would enhance his/her performance" (Davis, Foxall and Pallister, 2002).

The Perceived Ease of Use (PEU) is defined as "the degree to which an individual believes that using a particular system would be free of physical and mental efforts". These perceptions predict attitudes toward the system/technology adoption. Then the

attitude develops the intentions to use and the intentions cause actual system usage. In many recent studies regarding technology, TAM is adopted extensively. TAM was adopted and showed that it contributes to the prediction of individual usage of technology (Fishbein and Ajzen, 1989). Perceived ease of use of an infrastructure has a direct effect on it perceived usefulness and both determine the consumer's attitude toward use, which leads to behavioral intention to use the system and actual use of the system (Davis et al, 2002; Lu et al. 2003). The model supports adoption of ICT on effective inventory management in health projects.

Conceptual framework

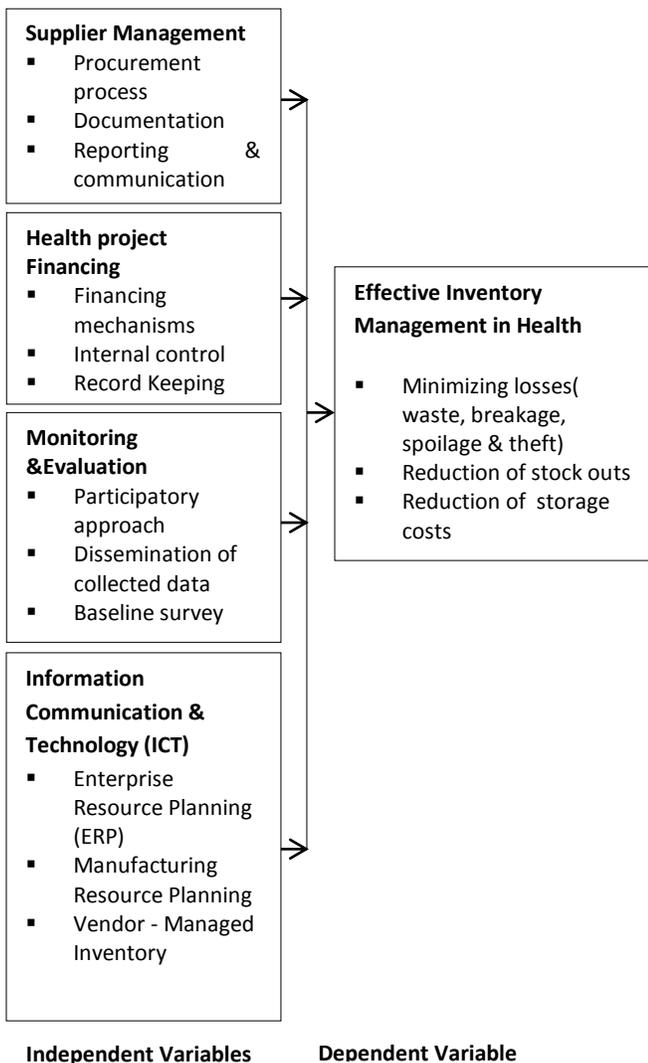


Figure 1: Conceptual Framework

Supplier Management

According to Liker *et al.* (2004), actively developing the supplier relations is important. Understanding r suppliers and utilizing suppliers mutual competition has proven to be a very effective way of supplier relationship development. Other development ideas include managing suppliers to improve their performance and abilities. It’s important to keep the managing role to yourself when conducting shared project development. Effective supplier management can make the procurement process more cost and time efficient. Having supply market intelligence and applying a correct competition situation are ways to implement a good supplier management strategy. Other issues that should be accounted are a reliable source for supplier performance and evaluation as well as developing the suppliers. With the help of common procurement approaches and development the supplier relationship is utilized to the maximum. Supplier management succeeds the best when all the different factors have been taken into account. It is important to consider issues like delivery, packaging, logistics, time management, documentation and reporting and communication. In most cases the problems with suppliers are due to the fact that the contract lacks of detailed information about daily supplier management. Selecting a contact person for the buying and selling organization is essential to ensure the information flow between the organizations (Iloranta 2008).

The benefit of the long-term relationships with the supplier in this case is the fact that the supplier will learn about the real needs and requirements of the buyer. This can result is optimization and rationalization of its own operations. The evaluation and measurement of these sorts of activities is hard which makes it a gain for the supplier since it can hide from the buyer and use it as an advantage for its own good (Iloranta 2008).

Health Project Financing

Health project financing is a key determinant of health performance in terms of equity, efficiency, and quality. Health project financing encompasses resource mobilization, allocation, and distribution at all levels (national to local), including how providers are paid. Health project financing refers to “the methods used to mobilize the resources that support basic public health programs, provide access to basic health project services, and configure health project service delivery systems (Schieber and Akiko 2007). In many developing countries, household out-of-pocket payments form a large source of health financing and although user fees can prevent excessive use of services it can at the same time, create barrier into access health care when most needed (Zellner, O’Hanlon, and Chandani 2005).

A key factor in the effectiveness of local decentralized governments is the provision of an adequate level of revenue, as well as the authority to make decisions on expenditure (Collins *et al.*, 2004; Dhakal, 2007). Fiscal decentralization may also be designed to bring about cost containment and greater financial control. Here local priorities are mainly focused on streamlined and targeted programmes that should lead to greater efficiency when compared to programmes run by the centre (Mills *et al.*, 1990; Salton *et al.*, 2007). Health project lack appropriate capacities for proper program based budgeting, and although Sub-Saharan Africa has seen injection of enormous amount of dollars in support to health care sector, but in many instances funds are allocated only to disease specific projects (“vertical programming”) rather than to broad based investments (“horizontal programming”.) Furthermore, the problem of corruption and mismanagement of these funds in many of the recipient countries are issues warranting urgent solutions (Ejughemre 2013).

Monitoring and Evaluation

Monitoring can be defined as the ongoing process by which stakeholders obtain regular feedback on the progress being made towards achieving their goals and objectives while evaluation is a rigorous and independent assessment of either completed

or ongoing activities to determine the extent to which they are achieving stated objectives and contributing to decision making (UNDP, 2009). Monitoring and evaluation is conducted for several purposes namely to learn what works and does not to make informed decisions regarding programme operations and service delivery based on objective data; to ensure effective and efficient use of resources; to track progress of programmes; to assess extent the programme is having its desired impact; to create transparency and foster public trust; to understand support and meet donor needs; and to create institutional memory. Citing Thomson and Hoffman (2003), Montgomery and Zint (2010) argued that evaluation should not be encouraged in the following circumstances: when a programme is unstable, unpredictable and/or has not achieved a consistent routine; when those involved cannot agree about what the programme is trying to achieve; and when a funder and/or manager refuse to include important and central issues in the evaluation..

Information Communication Technology (ICT)

ICT is defined as an array of primarily digital technologies designed to collect, organize, analyze, store, process and communicate information. (Ritchie and Bridley, 2005) As a broad concept ICT includes; Information systems, information technology and digitization. ICT can be categorized into old that include telephones, radio, television, films, audio and video cassettes and new ICT that include, computers, mobile phones, faxes, point of sale systems, global positioning systems, Informational geographical systems, satellites, networked environments and Internet (Lashgarara *et al.*, 2011). ICT evolution has been and will keep on acting as the major driving force for inventory management development (SimchiLevi *et al.*, 2004).

An important aspect of good inventory management is effective use of information. Knowing how to use information effectively also enables a manager to decide what data to collect, buy and store, and what information technology to invest in. Note that information has no value, if it is not used effectively. For example, an inventory manager can obtain order progress information

through the use of a tracking technology. If this information is not used to improve replenishment decisions, then neither the information nor the technology used to obtain it has any value. In this chapter, we provide some examples of how information is incorporated into classical inventory management problems

Effective Inventory Management

Coyle et al (2003), defines Inventory as raw materials, work-in-progress, finished goods and supplies required for creation of a company's goods and services. The number of units and/or value of the stock of goods a company hold. Chopra and Meindl (2003), suggests that since inventory plays a significant role in a supply chain's ability to support a firm's competitive strategy and that the firm's competitive strategy requires very high level of responsiveness. Another very important role that inventory plays in an organization is to avoid stock-out costs. This is very important to all organizations, especially in the healthcare delivery where delay by a few seconds can cost a life. Inventory management practices are activities employed in maintaining the optimum number or amount of each inventory item. The objective of inventory management is to provide uninterrupted production and customer-service levels at the minimum cost. Since for many organizations inventory is the largest item in the current assets category, inventory problems can and do contribute to losses (Oballah 2015). Part of inventory management in a health facility set up is to ensure an optimal stock level of medicines in general and essential medicines in particular so as to enable a satisfactory service to the clients. Unfortunately in most organizations in the healthcare sector in developing countries, the inventory management is not accorded central role in the overall strategy of the organizations. For example, the National Malaria Strategy for Kenya lacked inventory component until it was reviewed in 2009. Due to this omission, supply of Malaria commodities was erratic in spite of good planning at the program level. There was a clear mismatch between commodity availability at central level and to health facilities. Health facilities in the periphery would run

out of anti-malarial stocks for months even when the central stores had sufficient stocks (Mungu 2013).

RESEARCH METHODOLOGY

This study used descriptive survey designed to establish the determinants of inventory management in health project in Kenya. The target population of this study was 75 health projects in Homabay County. The study chose a 5 year period to cover the implementation of inventory management period for all the 75 health projects implemented between 2011 and 2015. The study adopted a census technique with respect of unit of analysis which is the health projects in Homabay County. The study used a census since the population of 75 health projects was small and the study reached out to all the heads of inventory management of the health projects.

Structured questionnaires were used to collect primary data from the field. Equivalent to mean score of 3.5 to 5.0. The score of 'Moderate Extent' was taken to represent a statement agreed upon moderately, equivalent to a mean score of 2.6 to 3.4. The score of 'Small Extent' and 'Very Small Extent' was taken to represent a statement highly agreed upon equivalent to a mean score of 1.0 to 2.5.

This study gathered quantitative data, which was coded and analyzed using Statistical Package for Social Sciences (SPSS) version 22. The analyzed data was presented in the form of frequency distribution tables and bar graphs where necessary.

Descriptive statistics were used to analyze the influence of each of the independent variables on effective inventory management of health projects in Kenya. Multiple regression analysis and Analysis of Variance (ANOVA) were used to analyze the degree of relationship between the variables in the study. This provided an indication to the strength and direction of association between the variables. In this study, the statistical model was developed from the conceptual framework.

RESULTS

Response Rate

From the data collected, out of the 75 questionnaires administered, 65 questionnaires were fully completed and returned making a response percent of 86.67%. For generalization purposes a response rate of 50% is adequate for analysis and reporting.

Respondent Characteristics

The majority of the respondents were male 55% whereas 45% of the respondents were female

(Table 1). Most of the respondents (38%) were aged between 41 to 50 years, 17% between 20 to 30 years, 21% were above 50 years and 25% of the respondents were aged between 31 to 40 years (Table 1). The findings showed that majority of the respondents had worked at the institution for less than 5 years representing 89.23% and only 10.77% had worked at the health project between 6-10 years (Table 1). From the study findings most of the respondents (47%) had a bachelor's degree, 31% of the respondents had a diploma certificate, 21% had postgraduate level education and 1% of the respondents had reached secondary level (Table 1).

Table 1: Respondent Characteristics

| Gender | Response | Percentage | Cumulative Percentage |
|--------------|-----------|-------------|-----------------------|
| Male | 36 | 55% | 55% |
| Female | 29 | 45% | 100% |
| Total | 65 | 100% | - |

| Age(years) | Percentage | Cumulative Percentage |
|--------------|------------|-----------------------|
| 20-30 | 17 | 17 |
| 31-40 | 25 | 42 |
| 41-50 | 38 | 80 |
| 51 and Over | 20 | 100 |
| Total | 100 | - |

| Years of experience | Frequency | Percentage |
|---------------------|-----------|-------------|
| Less than 5 Years | 58 | 89.23% |
| 6-10 years | 7 | 10.77% |
| 11- 15 years | - | - |
| Above 15 years | - | - |
| Total | 65 | 100% |

| Education Level | Frequency | Percentage |
|-----------------|-----------|-------------|
| Post graduate | 13 | 21 |
| Bachelors | 31 | 47 |
| Diploma | 20 | 31 |
| Secondary | 1 | 1 |
| Total | 65 | 100% |

Supplier Management

We sought to assess the influence of supplier management on effective inventory management. As tabulated in table 2, a majority of respondents responded that to a small extent adequate procurement process has led to minimization of losses associated with wastage, breakage, spoilage and theft in the health projects (1.993); Efficient

documentation of suppliers influenced the reduction of stock outs in health project (1.923); Reporting and communication of inventory matters enhance the quality of supplied goods in health projects (1.714); adequate procurement process has lead to minimization of supplier cost in health (1.572); Documentation of suppliers reduce inventory stock out in health (1.234); Effective reporting and communication enhance the reduction of storage costs in health (1.564).

Table 2: Supplier Management

| Statement | Mean | Std. Dev |
|--|--------------|--------------|
| Adequate procurement process has led to minimization of losses associated with wastage, breakage, spoilage and theft in the health | 1.993 | 0.987 |
| Efficient documentation of suppliers influenced the reduction of stock outs in health project | 1.923 | 0.268 |
| Reporting and communication of inventory matters enhance the quality of supplied goods in health project | 1.714 | 0.034 |
| Adequate procurement process has lead to minimization of supplier cost in health | 1.572 | 0.167 |
| Documentation of suppliers reduce inventory stock out in health | 1.234 | 0.525 |
| Effective reporting and communication enhance the reduction of storage costs in health | 1.564 | 0.560 |
| Composite Mean | 1.342 | |

Health Project Financing

We sought to assess the influence of health project financing on effective inventory management. The respondents stated to a small extent that standard financing mechanism enhanced minimization of losses (Wastage, breakage, spoilage and theft) in the health (1.224); adequate internal control influenced the minimization of losses (waste, breakage, spoilage and theft) in health (1.891); timely record keeping of finance documents enhanced the reduction of stock outs (1.109); Adequate financing mechanism enhanced the reduction of storage costs in health (1.052),

Internal control of health financing helped in enhancing the reduction of storage cost (1.643)(Table 3)

Table 3: Health Financing

| Statement | Mean | std |
|---|--------------|-------|
| Standard financing mechanism enhance minimization of losses (Wastage, breakage, spoilage and theft) in the health | 1.224 | 0.682 |
| Adequate internal control influence the minimization of losses (waste, breakage, spoilage and theft) in health | 1.891 | 0.134 |
| Timely record keeping of finance documents enhance the reduction of stock outs | 1.109 | 1.067 |
| Adequate financing mechanism enhance the reduction of storage costs in health | 1.052 | 0.225 |
| Internal control of health financing helps in enhancing the reduction of storage cost | 1.643 | 0.360 |
| | 1.234 | |

Composite Mean

Monitoring & Evaluation

According to the study results in Table 4, majority of the respondents to a small extent indicated that the participatory approach in health enhanced the minimization of losses (waste, breakage, spoilage and theft) in the (1.013), the participatory approach enhanced reduction of stock outs in health (1.713); the participatory approach led to reduction of storage costs in health (1.357);

Dissemination of collected data helped in minimization of losses (waste, breakage, spoilage and theft) in the (1.701); Dissemination off collected data in health project enhanced the reduction of stock outs (1.7452); The baseline survey data helped in minimization of storage costs incurred by the s (1.276); Baseline survey data enhanced the reduction of stock outs in health (1.791).

Table 4: Monitoring and Evaluation

| Statement | Mean | Std |
|--|--------------|-------|
| Participatory approach in health enhance the minimization of losses (waste, breakage, spoilage and theft) in the health projects | 1.013 | 0.523 |
| The participatory approach enhance reduction of stock outs in health projects | 1.713 | 1.017 |
| The participatory approach lead to reduction of storage costs in health projects | 1.357 | 0.634 |
| Dissemination of collected data helping in minimization of losses (waste, breakage, spoilage and theft) in the health projects | 1.701 | 0.431 |
| Dissemination off collected data in health project enhancing the reduction of stock outs | 1.452 | 1.317 |
| The baseline survey data help in minimization of storage costs incurred by the health projects | 1.276 | 0.612 |
| Baseline survey data enhance the reduction of stock outs in health projects | 1.791 | 0.529 |
| | 1.234 | |
| Composite Mean | | |

Information Communication & Technology (ICT)

The study findings as shown in Table 5 show that enterprise resource planning system enhanced minimization of losses associated with waste, breakage, spoilage and theft (1.613); the Enterprise resource planning system enhanced the reduction of stock outs in health project (1.717); Manufacturing resource planning system minimize losses due to waste, breakage, spoilage and theft

(1.307); Manufacturing resource planning system help to reduce storage costs associated with inventory (1.876); Vendor managed inventory system help in minimization of losses associated with waste, breakage, spoilage and theft (1.765); Vendor managed inventory system enhance the reduction of stock outs within health project (1.700); Enterprise resource planning system enhance minimization of losses associated with waste, breakage, spoilage and theft (1.345).

Table 5: Information Communication & Technology

| Statement | Mean | Mode |
|--|-------|-------|
| Enterprise resource planning system enhance minimization of losses associated with waste, breakage, spoilage and theft | 1.613 | 0.546 |
| Enterprise resource planning system enhance the reduction of stock outs in health project | 1.717 | 0.765 |
| Manufacturing resource planning system minimize losses due to waste, breakage, spoilage and theft | 1.307 | 0.654 |

| | | |
|--|-------|-------|
| Manufacturing resource planning system help to reduce storage costs associated with inventory | 1.876 | 0.876 |
| Vendor managed inventory system help in minimization of losses associated with waste, breakage, spoilage and theft | 1.765 | 0.987 |
| Vendor managed inventory system enhance the reduction of stock outs within health project | 1.700 | 0.802 |
| Enterprise resource planning system enhance minimization of losses associated with waste, breakage, spoilage and theft | 1.345 | 0.009 |

Multiple Regression Analysis

Multiple regression analysis was used to test relationship among variables (independent) on the effective inventory management of health projects. The study applied the statistical package for social sciences (SPSS V. 22) to code, enter and compute the measurements of the multiple regressions for the study. A strong relationship exist between the independent variable and effective inventory management (R=0.783, p =0.03). The independent variables account for 61.3% of effective inventory management in health projects from our model. This therefore means that other factors not studied in this research contribute 38.7% to the effective inventory management in health projects.

Multiple regression analysis (Table 6) was conducted to determine the relationship between effective inventory management in health projects and the four variables. According to the regression equation established, taking all factors into account (Supplier management, Health project Financing, Monitoring & Evaluation, ICT) constant at zero effective inventory management in health projects

was 15.098. The data findings analyzed also showed that taking all other independent variables at zero, a unit increase in supplier management will lead to a 0.887 increase in effective inventory management in health projects; a unit increase in health financing will lead to a 0.775 increase in effective inventory management in health projects, a unit increase in monitoring & evaluation will lead to 0.690 increase in effective inventory management in health projects and a unit increase in ICT will lead to 0.506 increase in effective inventory management in health projects. This infers that supplier management contributed most to effective inventory management in health projects. At 5% level of significance, supplier management had a 0.010 level of significance; health financing showed a 0.011 level of significance, monitoring and evaluation showed a 0.023 level of significance and ICT showed a 0.035 level of significance hence the most significant factor was supplier relationship in relation to effective inventory management in health projects.

Table 6: Regression Coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | P-value. |
|---------------------|-----------------------------|------------|---------------------------|-------|----------|
| | B | Std. Error | Beta | | |
| 1 (Constant) | 15.098 | .023 | | 6.615 | .003 |
| Supplier Management | .887 | .093 | .602 | 4.098 | .010 |
| Health Financing | .775 | .150 | .554 | 3.087 | .011 |

| | | | | | |
|-------------------------|------|------|------|-------|------|
| Monitoring & Evaluation | .690 | .177 | .516 | 2.908 | .023 |
| ICT | .506 | .273 | .463 | 2.546 | .035 |

The model equation would be ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$) becomes: $Y = 15.098 + 0.887X_1 + 0.775X_2 + 0.690X_3 + 0.506X_4$. This indicates that Effective inventory management in health project = $15.098 + 0.887(\text{Supplier Management}) + 0.775(\text{Health Financing}) + 0.690(\text{Monitoring \& Evaluation}) + 0.806(\text{Information Communication \& Technology})$

Discussion

The major findings from this study showed that supplier management and health project financing had the highest influence in effective inventory management in health projects at 0.887 and 0.775 and at 5% level of significance, supplier management had a 0.010 level of significance; health financing showed a 0.011 level of significance, respectively. This is in line with literature review by Iloranta (2008) who observed that effective supplier management can make the procurement process more cost and time efficient. With the help of common procurement approaches and developments the supplier relationship is utilized to the maximum. Supplier relationship management succeeds the best when all the different factors have been taken into account. The study findings corroborates with literature review by Schieber and Akiko (2007) who established that health project financing is a key determinant of health project performance in terms of equity, efficiency, and quality which affects effective inventory management if not taken into account during implementation of projects.

The study further found out that monitoring and evaluation also influenced effective inventory management at 0.690 and significance level of 0.023 and is in agreement with literature review by Montgomery and Zint (2010) argued that evaluation of inventory should not be encouraged in the following circumstances: when a programme is unstable, unpredictable and/or has not achieved a consistent routine; when those involved cannot

agree about what the programme is trying to achieve; and when a funder and/or manager refuse to include important and central issues in the evaluation. This implies that these variables are very significant therefore need to be considered in any effort to improve effective inventory management in health project in Kenya. The study therefore identifies these variables as critical determinants of effective inventory management in health projects.

Conclusion

The study established that supplier relationship management influence effective inventory management in health projects in Kenya. Further, the study revealed that the variable (Pearson correlation coefficient = 0.887) and p-value (0.010 < 0.05) statistically, strongly and significantly correlated to effective inventory management in health project at 5% level of significance as it had a positive relationship with the effective inventory management in health projects followed by health project financing at (Pearson correlation coefficient = 0.775) and p-value (0.011 < 0.05), the study established that monitoring and evaluation also influenced effective inventory management at (Pearson correlation coefficient = 0.690) and p-value (0.023 < 0.05) and finally information communication and technology at (Pearson correlation coefficient = 0.506) and p-value (0.035 < 0.05). Therefore, from these quantitative results it can be deduced all the variables strongly and significantly correlated to effective inventory management in health project at 5% level of significance had a positive influence in effective inventory management of health project

Recommendations

The study recommends for better supplier relationship management to enhance effective inventory management in health projects. The procurement process, documentation and reporting and communication should be well managed so that

inventory management of the health projects can be improved. The health financing is also a key factor which can enhance effective inventory management in health projects. There is need to ensure that the financing mechanisms, internal control and record keeping are well managed to improve effective inventory management in health projects. Record keeping ensures that all the records pertaining to the inventory management are well kept and updated to avoid stock outs and minimize the costs incurred during storage. The study recommends an effective monitoring and evaluation which should include participatory approach, dissemination of collected data and baseline survey which are important factors which can enhance effective inventory management in health projects in Homabay County. Monitoring and

evaluation is important as it enables the management to identify and assess potential problems and success of the inventory management. The study also recommends for the use and improvement of ICT designed to collect, organize, analyze, store, process and communicate information. It will act as the major driving force for inventory management development in the health project. An important aspect of good inventory management is effective use of information. Knowing how to use inventory systems such as ERP, MRP and vendor managed inventory systems effectively will enable a project manager to decide what data to collect, buy and store, and what information technology to invest in to solve inventory management problems in health related projects.

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