

EFFECT OF INVENTORY MANAGEMENT PRACTICES ON ORGANIZATIONAL PERFORMANCE IN PUBLIC HEALTH INSTITUTIONS IN KENYA: A CASE STUDY OF KENYATTA NATIONAL HOSPITAL

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ABSTRACT

The purpose of this study was to investigate the effect of inventory management practices on organizational performance in public health institutions in Kenya. The specific objectives were to establish: the effect of inventory shrinkage, inventory investment, inventory turnover, and inventory records accuracy on organizational performance of Kenyatta National hospital: A descriptive case study design was used. Statistical analysis was carried out using SPSS. The study revealed that inventory investment and inventory records accuracy have a positive influence on organizational performance while inventory shrinkage have a negative effect on organizational performance of Kenyatta National hospital thus this study recommends that the hospital should ensure that losses resulting to inventory shrinkage related to medicines are reduced. This can be done by ensuring that inventory records are accurately kept. The hospital need to manage its inventory investment by ensuring that the right amount of stock is kept at all times.

Key words: inventory shrinkage, inventory investment, inventory turnover, inventory records accuracy, organizational performance

INTRODUCTION

With the ever increasing expenditure in healthcare sector, there is need to curb this challenge while ensuring that available resources are used to provide essentials medications to the ever increasing population. Pharmacy department is one of the most consumers of the hospital budget and one of the few areas where a large amount of money is spent on buying medicines and drugs. It is therefore important that hospitals ensure smooth supply of the required stock to ensure uninterrupted supply. This

calls for the effective and efficient inventory management of pharmacy stock by keeping a close supervision on important drugs, prevention of pilferage, and priority setting in purchase and distribution of drugs.

According to Miller (2010), inventory management involves all activities put in place to ensure that customer have the needed product or service. It coordinates the purchasing, manufacturing and distribution functions to meet the marketing needs and organizational needs of availing the product to the customers. Inventory management is primarily involved with specifying the size and placement of stocked goods. Inventory management is required at different locations within a facility or within multiple locations of a supply network to protect the regular and planned course of production against the random disturbance of running out of materials. The scope of inventory management also involves managing the replenishment lead time, replenishment of goods, returns and defective goods and demand forecasting, carrying costs of inventory, asset management, physical inventory, available physical space, demand forecasting, inventory valuation, inventory visibility, future inventory price forecasting and quality management. With a balanced of these requirements, it is possible to reach an optimal inventory level, which is an on-going process as the business needs shift and react to the wider environment. Ogbo et al, (2014)

1.2 Statement of the Problem

Effective inventory management in health care supply chains is one of the key factors for success. The challenge in managing inventory is to balance the supply of inventory with demand. An organization would ideally want to have enough inventories to satisfy the demands of its customers and not to loss customers due to inventory stock-outs. On the other hand, the organization does not want to have too much inventory staying on hand because of the cost of carrying inventory. Enough but not too much is the ultimate objective according to (Coyle, Bardi & Langley, 2003).

Office of the Auditor General, (2012)states that, “although the Hospital has established re-order levels for all types of drugs that it stocks, it occasionally experiences shortages of vital and essential drugs. For example, an analysis of the stock of drugs maintained at the pharmacy that serves the Accident and Emergency Centre indicated that the pharmacy did not have in store some vital and essential drugs for several periods lasting up to three months. Likewise, Ward 4B which caters for cardiac patients did not have in stock critical drugs (such as those used for blood thinning) for a period of three months”.

Despite the establishment of re-order levels order, quantities are still determined somewhat based on past usage. Yet, there is no specific policy to facilitate the determination of the quantities to be ordered, meaning that orders are placed based on the staff’s familiarity of the process. Improper quantities ordered occasionally leads to unexpected situations of stock out and overstocking. Shortage of medicines are occasionally attributed to long procurement procedures, occasional shortages of vital drugs in the market, lack of sufficient funds with which to purchase new supplies, unwillingness of suppliers to supply hospitals due to delayed payments, inadequately trained staff in the inventory management section and the inadequacies of the Hospital’s stock management system that is Office of the Auditor General, (2012).

Problems are likely to raise when inventory is not tracked properly, inefficiency and additional costs mount. Supplies get lost, shrinkage can go unchecked, stock-outs occur, critical equipment locations are uncertain, billing is inefficient since supplies are used without being associated to patient’s record, and on-hand inventory can balloon unnecessarily. All of this leads to inefficiency and additional costs.

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of the study is to determine the effect of inventory management practices on organizational performance of health institutions in Kenya. A case study of Kenyatta national hospital

1.3.2 Specific Objectives

1. To determine the effect of on inventory shrinkage organizational performance of Kenyatta National hospital.
2. To establish the effect of inventory records accuracy on organizational performance of Kenyatta National hospital.
3. To determine the effect of inventory investment on organizational performance of Kenyatta National hospital.
4. To establish the effect of inventory turnover on organizational performance of Kenyatta National hospital.

1.4 Research Questions

1. What is the effect of inventory shrinkage on organizational performance of Kenyatta National hospital?
2. What is the effect of inventory records accuracy on organizational performance of Kenyatta National hospital?
3. What is the effect of inventory investment on organizational performance of Kenyatta National hospital?
4. What is the effect of inventory turnover on organizational performance of Kenyatta National hospital?

1.5 Significance of the study

From the findings of the study the researcher hope that the findings will help the hospital (KNH) identifies areas where costs can be reduced while ensuring overall efficiencies in the hospital is maintained. The study therefore seek to propose to the management of the hospital the current inventory control systems to implement in order to reduce costs associated with drugs inventories of the hospital without reducing the service level while improving efficiencies at the same time.

The researcher hopes that the findings of this research will enlighten the inventory management practitioners in healthcare industries on the effect of inventory management and its importance in improving the organisational performance and also help the inventory mangers in decision making concerning the suitable level of inventory to be kept in the hospital so as to ensure the customers are accorded appropriate service level.

The study can also be used as basic information by pharmacist and inventory control staff to develop friendly policies and procedures for purchasing drugs and controlling their levels as well. Therefore, this paper serves as a proposal to propose the feasible improvements to the pharmacy department in the area of drugs inventory management at KNH and the healthcare industry. The researcher also hopes that the findings of this study will form the basis on which future researchers could be built in the area of inventory.

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature of the study. It's organized under the following parts: theoretical framework, conceptual framework. Literature will be reviewed in line with the stated study objectives. The review will relay greatly on data obtained from published reference materials such as books, online magazines, and journals. The review will provide an overview of major past activities that had earlier been studied in relation to inventory management and how it affects organizational performance.

2.2 Theoretical framework

2.2.1 Strategic choice theory (SCT)

Strategic choice theory shows the relationship between top management choices and organization performance as well as interaction of the internal and external organization. The theory stresses the importance of management decisions on organizational performance, Child (1972). Campling and Michelson (1998) established a strategic choice model that depicts the interdependence among the environment and organizations, actions and overall firm performance. The model aim at achieving high performance standards in order to increase efficiency where there are a limited resource, the theory failed to give much importance contextual factors like environment, technology and scale of operation into consideration and only considered how organizational structure aid in performance of organization. Child (1972) further suggest that any organization with managers given power and responsibilities to direct and make decision regarding factors like inventory investment and the amount of inventory to carry have significant effects on organizational outcomes as well as performance SCT argues that the right management choice will depend on environmental factors like suppliers, purchasing and inventory management decision made by the management. Ketchen & Hult (2007) suggest that SCT views managers as personnel who are downstream decision makers directing decision and changing process in organization. Change or variations can be caused by contextual factors including environmental conditions and technology. Using new technology in inventory management such as RFID, bar codes and ERP systems are some technological changes that require decision making at corporate level with support from both business and functional level.

2.2.2 Theory of Economic Order Quantity (Wilson's EOQ Model)

F.W.Haris is among authors within operation management who have developed models to determine optimal inventory levels that should be kept by organization. Blackburn (2010), is among authors who agree that EOQ is one of the models widely used to manage inventory in many industries. EOQ model was developed by F.W.Haris in 1913 and is also known as Wilson EOQ model, who critically analyzed the model in detailed, that is according to Arsham (2006). The use of the model has shown increase in some costs as other costs decline, an example of ordering costs decline with the inventory holdings, while holding costs rise and the total inventory associated costs curve have a minimum point. It is also known as the point where total inventory costs are minimized. EOQ is the level of inventory that minimizes the total of inventory holding costs and ordering costs.

Coleman (2002) and Ogbo (2011) define the model as one that order quantities which minimize the balance of cost between inventories holding costs and re-order costs. Ogbo (2011) describes the basic EOQ, assumptions that are necessary to calculate EOQ as follows: That stock holding costs are known, and constant; there is a known, constant ordering costs; the rate of demand are known and constant; lead time cycle is known and constant; the price per unit constant; the replenishment is made instantaneously, the whole batch is delivered at once and no stock-outs are allowed. One disadvantage of EOQ is that it ignores the need to have buffer stocks, which are maintained to cater for variations in lead-time and demand making it difficult to be observed in practice.

The EOQ model requires that for every item stocked in the stores, there is need to determine the point of order and that of the most cost effective quantity to order. The model assumes that all other variables are constant even though uncertainties are common and regular all business. For example uncertainty includes change in demand, damage during transportation and delay in delivery. Uncertainty in demand, will therefore force EOQ to be adjusted to buffer against uncertain business atmosphere.

Due to uncertainties experienced in business environment adjusted economic order quantity is an EOQ model that can be used where fluctuation in demand is a common occurrence. Especially in healthcare industry where demand cannot be accurately forecasted since it depends on several external factors. Regarding hospital pharmacy, there are several key factors, both internal and external, that affect inventory level in the pharmacy store. These factors can influence fluctuation in drug consumption rate in hospital pharmacy, some internal factor, for instance, prescribers' preference, can be controlled, but it is impossible to control some external factors such as war.

As previously noted regarding the restrictive assumptions of simple EOQ model, the situation that would meet all the assumptions is an ideal. The fact that uncertainty in demand seems to be encountered in most situations, EOQ model should be fixed to cope with this uncertainty.

2.2.3 Transaction Cost Analysis (TCA)

The study of inventory management calls for an organization to ensure all costs are kept at a minimum hence the need to apply the theory of (TCA). According to Halldorsson et al (2007), (TCA) is a theory that ensures that costs across the supply chain are kept at a minimal. Transaction cost approach– has been widely used in different areas, especially in economics and organizational studies. In the early 1970s, the mathematical economist, Williamson, incorporated TCA into the general equilibrium model and set up his transaction cost economics in the new theory of the firm. Williamson (1975, 1981) suggests that organizations can reduce their transaction costs by vertical integration and increasing the level of trust at the same time. This kind of integration can reduce the costs of inventory management while increasing the service level of both internal and external customers while releasing capital to be used in other areas of the organization. Organizational supply chain can however reduce transaction not only through vertical integration and increasing the level of trust among supply chain participants, but also through horizontal integration and economy of scale gained from the aggregation of supply and/or demand.

TCA has some criticisms and one of the criticisms focuses mainly on dependent and independent economic factors and fails to include personal and social relations. Another criticism suggested by (Skjoett-Larsen (1999).

2.3 Conceptual Framework

Jabareen (2009) defines “Conceptual framework as a network, or “a plane,” of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena” The conceptual framework is a set of broad ideas used to explain the relationship between the independent variables (factors) and the dependent variables (outcome). Conceptual framework provides the link between the research title, the objectives, the study methodology and the literature review Jabareen (2009). Figure 2.1 highlights the relationship between the independent and dependent variables.

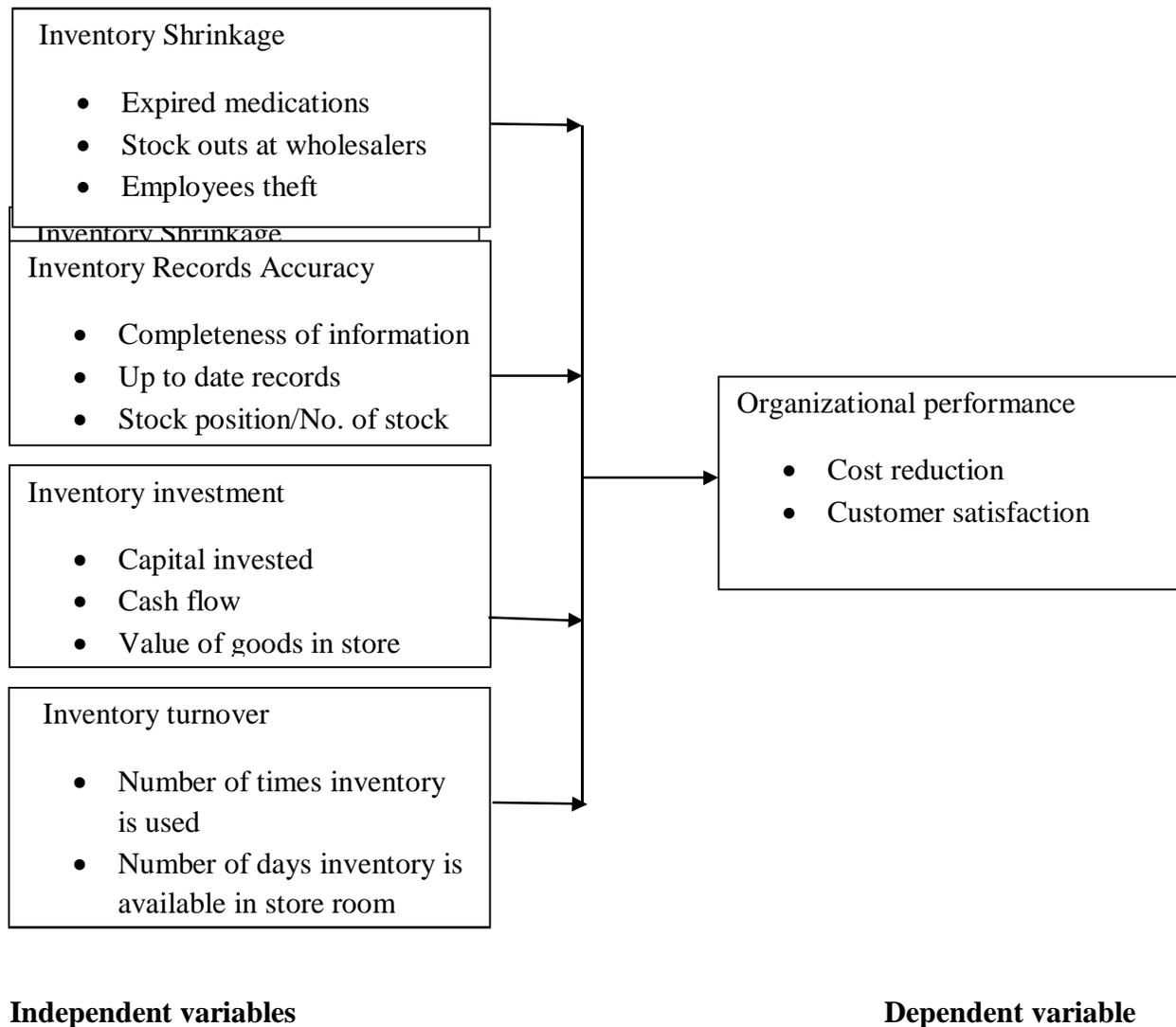


Figure 2.1 conceptual framework

RESEARCH METHODOLOGY

The study adopted a case study approach to investigate the current phenomenon in the organization. According to (Yin, 1994), a case study approach is an appropriate methodology when one wishes to answer the study’s research question from the perspective of current practice, versus theoretical

reasoning. Mustaffa. N.H & Potter.A.(2009), wrote that a case study can help the researcher gain an in depth knowledge and understanding on what is going on within an organization .According to Lockesh (1984), descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and whenever possible to draw valid general conclusions from the facts discovered. The target population for this study included 2 senior stores managers, 10 stock controllers, 10 pharmitists, 15 stores and supplies officers, 10 senior stores assistant, 12 stores assistant and 15 stores clerks making a total of 74 respondents. The research study used census method for the study due to the limited number of respondent which allowed for the whole population to be included in the study.

The researcher used open and closed questionnaire as research instrument for this study. The data collected was analysed using descriptive statistics in form of tables. Quantitative data was analysed using the statistical package for social sciences (SPSS). Pearson's correlations coefficients were run to examine the relationship among the study variables which are set out in the objectives of the study.

5.2 Summary

The study explored contributions of inventory management to organizational performance. The reason was to establish whether respondents were aware that inventory management practices would greatly contribute to the performance of KNH. The study deduced that performance metrics help organization to ensure that performance objectives agreed upon by the inventory management team helps achieve organizational performance that is, if the performance metrics are met. Further, organization considering to achieve inventory objectives must evaluate their performance metrics in doing so such aspects like clear inventory objectives must be established and aligned to business strategy and organizations strategic plan, the performance criteria must be agreed upon by the concerned management team. This is in agreement with the assumption of [Franceschini and Varetto \(2009\)](#) who indicate that performance metrics assist firms in determining the performance levels in the process under scrutiny. Another aspect of inventory management that contribute greatly to performance is inventory planning and scheduling in KNH whereby, of respondents agree that it greatly contribute to inventory management practices

Further the hospital must consider the effects of long procurement procedures and how it impacts inventory management. It is therefore necessary for the hospital to consider doing away with unnecessary procurement procedures which leads to delays in procurement thus impacting negatively on inventory management.

The study further deduced that inadequately trained staff in the inventory management section and insufficient funds given for Inventories use contribute greatly to the poor performance of KNH .The study further found out that improved customer service can be realized with proper inventory management at KNH . These findings agree with those of A yad(201) who reported that majority of workers in Taso Mbarara Hospital in Uganda agree that inventory management practices contribute greatly to the performance of the hospital.

On effects of inventory management practices on inventory shrinkages, the research findings deduced that losses resulting from medicine expiration leads to increased inventory shrinkage, losses resulting from medicine damages leads to increased inventory shrinkage, losses resulting from medicine obsolesce (medicine purchased not meeting intended purposes leads to increased inventory shrinkage and that losses resulting from medicine theft leads to increased inventory shrinkage. Healthcare Distribution Management Association report (2009). Inventory shrinkage results from a number of issues including employee theft, backorder/ drug shortages, stock outs at

the wholesalers and manufacturing points, product recalls, expired medication, medication spills, broken pills and obsolescence, Healthcare Distribution Management Association report (2009). Thus, inventory shrinkage in the long run is uneconomical to the organization and largely affects performance negatively.

Further the study observed that apart from losses resulting from medicine obsolescence (medicine purchased not meeting intended purposes leads to increased inventory shrinkage where respondents from other departments strongly agree, all the departments' ratings show that they agree to all the items measuring the effects of inventory management practices on inventory shrinkage.

The study deduced that accuracy of records has a positive effect on inventory management with, the majority of the respondents strongly agreeing that up to date records and proper accounts records have a positive effect on inventory accuracy. Further, majority agree that stock taking and inventory spot check/surprise check have a positive effect on inventory accuracy. However the percentage of agreement on the effect of record accuracy on inventory management varied across department. According to (Brooks et al 2007). Inventory recording is undertaken by organizations to reduce the errors of stock management. To ensure accurate and reliable stock records there is need to do spot checks/ surprise checks, stock taking, which is the physical counting and measuring of quantity of each item in stock and recording the results. It is therefore apparent that effective record management is essential function of inventory management thus in order to improve inventory process there is need to ensure that all records kept by the organization are accurate.

In an effort to find out the effect of inventory turnover on organizational performance, the researcher evaluated whether Inventory turnover have effect on insurance cost, Inventory turnover have effect on holding costs, Inventory turnover have effect on service level and Inventory turnover leads to low cost of operation of KNH. The findings also indicate that majority of the respondents agree that inventory turnover have an effect on insurance cost, holding costs and service level of KNH and also that high asset turnover leads to low cost of operation of KNH. Depending on the ratios of inventory turn, the hospital can have a positive or negative impact on its performance. The higher the turnover the better the performance of the organization and Vis versa

5.3 Conclusions

The role of inventory management has been consistently increasing in the healthcare industry arena and in pharmacy purchasing and inventory management. It should therefore be understood that proper inventory management starts with an understanding of purchasing rights products in the right quantity at the right price, and the right time from the right vendor. Applying these concepts along with the practices such as the right stock valuation, and ABC results in optimal inventory levels and ensures customer satisfaction. The hospital pharmacy management teams should adopt inventory management practices which have positive effects on the performance of the hospital. Using these key concepts and practices to gain insight will enhance pharmacy inventory record accuracy, inventory investment and inventory turnover in the pharmacy purchasing departments and will go a long way to improve optimal inventory management as well as organizational performance.

5.4 Recommendations

The researcher established that inventory management practices had a positive influence on the organization performance, but for the practices to effectively make a positive impact on organizational performance, a number of recommendations have been made here;

The hospital management need to modernize its inventory management system to increase efficiency. Improving inventory practices calls for a high degree of collaboration and visibility across all parties as well as utilizing sophisticated technologies. Use of technologies such as bar-code scanners, point-of-sale/use scanners, and web-based technologies in the pharmacy and stores should be adopted.

The researcher recommends that the management should constantly expose its staff to training in order to improve their skills on inventory management. The research recommends that the management of the KNH invest in training of its staff to enable the employees to understand the current inventory systems which when used will help the organization reduce on costs associated with holding inventory.

To curb various challenges in the hospital, the hospital should consider implementation of a vendor managed inventory to lower incidences of stock-out situations, increase the levels of customer services and reduce costs due to an increase in inventory turns and a decrease in the levels of safety stock and greater transparency in supply chain management. VMI also helps in the establishment of a long trustworthy relationship between the supplier and customer resulting in more loyal customers and thus secured sales

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Table 4.1: Effects of Inventory Management on Organization Performance of KNH

Effects of Inventory Management on Organization Performance of KNH	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	f	%	f	%	f	%	F	%	f	%
Inventory Management practices contribute greatly to the performance of KNH	40	64.5	21	33.9	1	1.6	0	0.0	0	0.0
Inventory Management practices helps in inventory planning and scheduling in KNH	25	40.3	33	53.2	4	6.5	0	0.0	0	0.0
Long Procurement procedures affect inventory management and performance of KNH.	13	21.0	45	72.6	4	6.5	0	0.0	0	0.0
Insufficient funds towards Inventories contribute greatly to the poor performance of KNH	25	40.3	31	50.0	6	9.7	0	0.0	0	0.0
Inadequately trained staff in the inventory management section at KNH contribute greatly to the poor performance of KNH	10	16.1	40	64.5	11	17.7	1	1.6	0	0.0
Improved customer service can be realized with proper inventory management at KNH	17	27.4	27	43.5	17	27.4	1	1.6	0	0.0

Table 4.3: Effects of Inventory Management Practices on Inventory Shrinkage

Effects of Inventory Management Practices on Inventory Shrinkage	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	f	%	f	%	f	%	F	%	f	%
Do you think that losses resulting from medicine expiration leads to increased inventory shrinkage?	8	12.9	52	83.9	1	1.6	0	0.0	1	1.6
Do you think that losses resulting from medicine damages leads to increased inventory shrinkage?	6	9.7	51	82.3	4	6.5	1	1.6	0	0.0
Do you think that losses resulting from medicine obsolesces (medicine purchased not meeting intended purposes) leads to increased inventory shrinkage?	15	24.2	44	71.0	3	4.8	0	0.0	0	0.0
Do you think that losses resulting from medicine theft leads to increased inventory shrinkage?	17	27.4	42	67.7	2	3.2	1	1.6	0	0.0

Table 4.5: Challenges Faced in Management of Drugs/Medicine at the Hospital

Challenges	f	%
Delays in delivery of drugs leading to insufficient inventories	1	1.6
Use of outdated storage facilities	11	17.7
Use of manual inventory management system/Lack of technology	33	53.2
Lack of training	15	24.2
Holding too much/too little inventory	1	1.6
Bureaucratic process in procurement	4	6.5
Loss of drugs through inventory shrinkages	7	11.3
Conflict of interest	2	3.2
Weak management system	6	9.7
Insufficient funds for procurement	1	1.6
Purchase of drugs with a near expiration date	1	1.6
Overstocking/under stocking	1	1.6

Table 4.8: Effects of Inventory Management Practices on Inventory Records Accuracy

Effects of Inventory Management Practices on Inventory Records Accuracy	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	f	%	f	%	f	%	F	%	f	%
	Do you think that up to date records have an effects on inventory records accuracy?	39	62.9	20	32.3	3	4.8	0	0.0	0
Do you think that complete accounts records have an effect on inventory records accuracy?	32	51.6	25	40.3	5	8.1	0	0.0	0	0.0
Do you think that proper records management have an effect on inventory records accuracy?	9	14.5	39	62.9	14	22.6	0	0.0	0	0.0
Do you think that regular updating of records has an effect on inventory records accuracy?	5	8.1	35	56.5	22	35.5	0	0.0	0	0.0

Table 4.10: Effects of Inventory Management Practices on Inventory Investment

Effects of Inventory Management Practices on Inventory Investment	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	f	%	f	%	f	%	F	%	f	%
	Proper procurement/reorder practices contribute greatly to inventory investment of KNH	31	50	27	43.6	1	1.6	0	0.0	3
Effective stores management contribute greatly to inventory investment of KNH	24	38.7	34	54.8	4	6.5	0	0.0	0	0.0
Inventory turnover contribute greatly to inventory investment of KNH	10	16.1	34	54.9	16	25.8	0	0.0	2	3.2
Proper management of inventory holding costs contribute greatly to inventory investment of KNH	9	14.5	30	48.4	20	32.3	3	4.8	0	0.0

Table 4.14: Effects of Inventory Management Practices on Inventory Turnover

Effects of Inventory Management Practices on Inventory Turnover	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree	
	f	%	f	%	f	%	F	%	f	%
	Inventory turnover has an effect on insurance cost of KNH	16	25.8	43	69.4	2	3.2	1	1.6	0
Inventory turnover has an effect on holding costs of KNH	11	17.7	43	69.4	7	11.3	1	1.6	0	0.0
Inventory turnover has an effect on service level of KNH	6	9.7	31	50.0	23	37.1	2	3.2	0	0.0
Inventory turnover leads to low cost of operation of KNH	8	12.9	33	53.3	16	25.8	3	4.8	2	3.2