Assessment of Health commodities /materials Management Practices and Challenges: The Case of Nifas Silk Lafto Sub-city Health Center

A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Business Administration (MBA)

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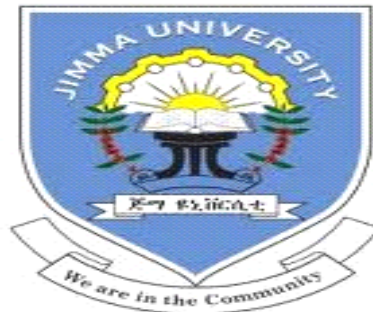
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DECLARATION

I hereby declare that this thesis entitled "**Assessment of Health Commodities Management Practices and Challenges: The Case of Nifas Silk Lafto Sub-city Health Center**", has been carried out by me under the guidance and supervision of **Daniel Amente (PhD Candidate)**.

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

Researcher's Name	Date	Signature
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CERTIFICATE

This is to certify that the thesis entitles "**Assessment of Health Commodities Management Practices and Challenges: The Case of Nifas Silk Lafto Sub-city Health Center***",* submitted to Jimma University for the award of the Degree of Master of Business Administration (MBA) and is a record of research work carried out by Mr. *Daniel Habite*, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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List of Acronyms and Abbreviations

AST	Adaptive Structure Theory
CMS	Central Medical Store
EOQ	Economic Order Quantity
FEFO	First Expired First Out
FMOH	Federal Ministry of Health
IPLS	Integrated Pharmaceuticals Logistics System
IM	Inventory Management
JIT	Just In Time
LMIS	Logistics Management Information System
MRP	Material Requirement Planning
PFSA	Pharmaceuticals Fund and Supply Agency
PSTP	Pharmaceuticals Supply Transformation Plan
RDF	Revolving Drug Fund
SCM	Supply change management system
SOP	Standard Operating procedures
TCE	Transaction cost economics
VMI	Vendor Managed Inventory

Abstract

The purpose of this study examined the inventory management practices and challenges on healthcare delivery taking Nifas Silk Lafto Sub-city health center as a case. To this end, both primary and secondary data was collected through semi-structured questionnaire, observation, review of reports and interview. The collected data were analyzed using narrative analysis and descriptive statistics. Many respondents recognize and appreciated some of the challenges asked indicated areas of focus for improvement and action. The top five challenges encountered while managing health commodities include: delays in delivery of drugs leading to insufficient inventories , lack of modern technologies, insufficient funding, lack of inventory management training, the length of bureaucratic processes in the procurement system and stock out of health commodities. Such challenges have been reflected through frequent stock outs leading to services interruptions atthe health center.The study revealed that the health center has long-term agreements with its suppliers, maintain proper store management, the majority of the store managers had adequate knowledge on health commodities management and they had also a positive attitude towards the importance of appropriate storage of commodities including handling of obsolete, expired, or damaged inventories.

Key words: Health commodities, inventory management, stores, medical supplies.

Table content

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Inventory management plays a decisive role in the enhancement of efficiency and competitiveness of business enterprises. Effective inventory management entails holding an appropriate amount of inventory. Too much inventory consumes physical space, creates a financial burden, and increases the possibility of damage, spoilage and loss. As Rajeev (2008) argues, there is increased need for business enterprises to embrace effective inventory management practices as a strategy to improve their competitiveness. As cited by Godana (2014), Kotler (2001) describes inventory management as activities involved in developing and managing the inventory levels of raw materials, semi-finished materials (work-in-progress) and finished good so that adequate supplies are available and the costs of over or under stocks are low. Inventories are essential for keeping the production wheels moving, keep the market going and the distribution system intact (Nyakeri&Ochiri, 2014).

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. It is also the number of units and/or value of the stock of goods a company holds. The basic reason why stock is held is so as to avoid stock out and it resulting problems. The extent of the stock is influenced by operational needs of the organization, time required to obtain deliveries of stock, availability of capital, cost of storage and the need for detailed records in the form of stock issues which should be kept through the use of store records. Having considered funds available, storage facility available, rate of consumption of materials, lead time, margin of safety, and the stock level can then be set for each material. Stock

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levels should also be indicated on the stock records. Items should not be issued unless covered by Materials Requisition form.

Organization's inventory is an important component and its management is vital to the success and cost reduction of the firm's expenditure. Wild (2002) recommends, proper warehousing of inventory so that when goods are ordered, they are held at the warehouse for the least time possible minimizing holding cost of inventory. Consequently, other operational costs may increase inventory management costs like through the balance of ordering costs, holding costs, safety stock and stock outs (Palevich, 2012; Wisner, Tan and Leong, 2011). Once an organization realizes this, it can develop online inventory management tool to monitor its inventory information by breaking it down into groups by correlating the categories with its customers.

Efficient laboratory and medical commodities management ensures that health facilities have periodic inventory count, giving good customer service, giving accurate information to customer and improve image of the health center (WHO,2016). Besides, robust inventory management system allows managers to receive real time information on inventory.
The availability of drugs and medical supplies is critical to the success of any healthcare Program. Drugs and medical supplies are part of the final link between patients and health services. They play a key role in prevention, treatment and care programs, and in order to sustain these services, numerous medical commodities are required. A reliable and consistent supply of these commodities to health facilities at all levels of the health system will determine the success of these nationwide programs (Raja& Mohammad, 2005). Managing stock effectively is important for any organization, running a health center is no exception because without enough stock, health services to patients will come to a halt. Stock represents the largest investment in assets for most organizations.

1.2 Statement of the Problem

Wisner and Leong et al., (2011) define inventory management as the process of efficiently overseeing the constant flow of units into and out of an existing inventory. This process usually involves controlling the transfer in of units in order to prevent the inventory from becoming too high, or dwindling to levels that could put the operation of the company

into jeopardy. Agus and Noor (2010) states that proper inventory management also seeks to control the costs associated with the inventory, both from the perspective of the total value of goods included and the tax burden generated by the cumulative value of the inventory. To continue serving the demand of customers most firms have realized the need to maintain proper inventory management. Proper management of inventory enables firms to mitigate inventory costs, reduce lead time and on-time delivery of goods and services. According to Wisner et al., (2011) organizations that maintain proper inventory of raw materials are more likely to complete their production on time. Inventory management control is part of the inventory management that helps to maintain continuity of production operations by maintaining a smooth flow of raw materials without shortages(Njoroge,2015).

The efficient operation of any organization demands a planned flow of materials to service its activities. This can be successful when the organization holds stock of materials it uses. Health commodities management is critical in health facilities particularly in the public sector where millions are in need of quality of care but lacking practically. Public health facilities are struggling with stock outs, poor selection, quantification, procurement and inadequate stock control and management, delaying of purchasing procedure, weak/unknown consumption data, limited capacity of PFSA to avail needed health commodities, shortage of budget, many work load, unpredicted services demand or increased patient flow, transportation challenges, not ordering in time of needed commodities, and inadequate supply of essential drugs. Health commodities management has now become the major concern of the public sector since inventory is said to be the solid cash of resources been expanded annually lacking transparency and proper accountability.

Effective inventory management in a supply chain can play a vital role in cutting inventory holding costs across the different stages of the supply chain, this is especially so in developing countries like Ethiopia where budget for medicines are often tight. In a health facility overstocking of certain items may tie up a substantial portion of the medicine budget, leaving insufficient funds for other important perhaps lifesaving medicines. For this reason it is very important to control the building up of inventory. In addition to cost holding, excess inventory can lead to obsolescence and reduce an enterprise's flexibility. In case of a health facility excess inventory may lead to expiry of some medicines (Kagashe&Massawe,2012). The supply of medicines needs to be

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managed efficiently in order to prevent all types of wastage including overstocking, pilferage and expiry. This wastage reduces the quantity of medicines available to patients and therefore the quality of health care they receive. Both under stocking or overstocking and expiry of medicines highlight problems within the supply chain activities which include selection, quantification, procurement, storage, distribution and use (Kagashe&Massawe, 2012).

The Nifas Silk Lafto Sub-city health center is a service rendering institution and keeps a substantial resource in the form of health commodities to facilitate operations. Besides, it's pivotal to meet the expectations of the people, one can think of how to control inventory in the Health center to ensure availability of medical supplies at the right time and at the right quantity.Moreover, efficient and effective commodities management helps to avoid expiry of drugs and misuse of the supplies given resource limitations. This entails the need to institute and find the possible and effective ways of reducing cost of purchase and the cost of holding inventory in the public health sector so as to deliver services affordably to the majority and vulnerable.

Health facilities must provide 24-hour services and accordingly, the need to keep stocks of certain lifesaving medicines and other medical supplies to be able to discharge their duties effectively. It is factual that where stock management by health facilities is poor, delivery of healthcare is normally affected. Thus, this paper was try to assess the health commodities management practice and challenges at the public health facilities taking Nifas Silk Lafto Sub-city health center as a case and come up with recommendations. Poor pharmaceutical management medicines and not automated the system, without proper control exchange of health commodities from one health center to other health center, it leads to corruption in the public health facilities. These are among the issues that the study seeks to find answers to the gap.

1.3 Objective of the Study

1.3.1General Objective of the study

The major objective of the research was to assess health commodities inventory management practices and challenges at Nifas Silk Lafto Sub-city health center.

1.3.2 The specific objectives of the study

Under the umbrella of the general objective stated above, the research is also intended to achieve the following specific objectives.

- Assess the inventory control techniques used by the health center for health commodities
- Examine the practice of flow of stock and information management of health commodities at the health center.
- Evaluate inventory record & counting practiced of health commodities at the facilities
- Assess challenges related to inventory management of health commodities at the health center

1.4 Research Questions

The study is aimed at answering the following major research questions:

1. What are the inventory control techniques used by Nifas Silk Lafto Sub-city health center for health commodities?
2. How does Nifas Silk Lafto Sub-city health center manage the flow of stock and information of health commodities?
3. What are the mechanisms of inventory record & counting practiced by Nifas Silk Lafto Sub-city health center for health commodities?
4. What are the challenges related to managing inventory of health commodities at Nifas Silk LaftoSub-city health center?

1.5 Significance of the Study

This study was designed to assess health commodities inventory management practices and challenges at Nifas Silk Lafto Sub-city health center and thereby aimed at suggesting proper corrective measures to strengthen health commodities inventory system. This is mainly because health product inventory management in health center is fraught with many problems. Ineffective inventory management weaken the overall health system's ability to respond to the healthcare needs of the population and put treatment programs at risk. It also gives some highlights to governmental and nongovernmental organizations working in this area to focus on the problem and be involved in efforts to improve in their

inventory management by clearly articulating the areas that calls for their intervention. In addition to this, the study was useful to other researchers interested to undertake further research in the area of inventory management in the public sector.

1.6 Scope of the Study

This study focused on the practices and challenges of health commodities inventory management in six health centers in Nifas Silk Lafto Sub-city. The management of medicines, medical supplies, laboratory reagents was covered by this study. The study was conducted only six health center from ten health center underNifas Silk Lafto Sub city in Addis Ababa.

1.7 Limitation of the Study

Because of time and financial constraints the study only focused on six health centers in Addis Ababa under Nifas Silk Lafto Sub-city health center, it may not significantly represent the entire the bigger picture in the country.

1.8 Organization of the Study

This study was organized in to five chapters. The first chapter consisted of the introductory part which includes background of the study, statement of the problem, objective of the study, research questions, scope, and significance of the study, limitations of the study as well as organization of the thesis. Chapter two deal with the review of theoretical and empirical literatures on the subject. It also presents the conceptual framework for the research. In chapter three, the research methodology adopted to conduct the study including research design, sampling design and techniques, data sources and collection instruments as well as ethical issue are presented. Chapter four focused on data presentation, analysis and interpretation. The final chapter deals with the summary of the major findings of the study, conclusion and recommendation.

CHAPTER TWO

REVIEW OF RELATED LITRATURE

This chapter gives an extensive review of the available theoretical and empirical literature to the problem being investigated, critique of the existing literature relevant to the study, summary of the literature review and finally the research gaps. The aim of the literature review is to provide a context for the entire research study. Reviewing existing literature, on the aspect in question, allows the researcher to identify the "gap" that exists. The available literature was reviewed in order to gain an understanding the inventory management practice in the health care supply chain. The influence of various factors on the effectiveness of inventory management was studied by researchers even though most of them are not specific to the health center inventory management. The chapter begins by a theoretical review followed by Empirical literature and conceptual framework.

2.1 Inventory management concepts

Inventory: These are the stores of materials they keep until needed (Waters, 2003). Inventory or stock (in common terms) is considered to be the central theme in managing materials. The inventory turnover ratio (ITR) is a barometer of performance of materials management function. In the generally understood term, inventory means a physical stock of goods kept in store to meet the anticipated demand. However, from materials management perspective, definition of inventory is "a usable but idle resource having some economic value" (Springer India, 2014). 'Inventory' and 'stock' are often used to relate to the same thing Wild et.al, (2002); yet when inventory management is mentioned, there is however a slight difference with stock. Stock is usually an amount of goods that is being kept at a specific place (in a warehouse for example), sometimes referred to as inventory. Conversely, inventory management is primarily about specifying the size and placement of stocked goods. Inventory management is necessary at different locations within an organization or within multiple locations of a supply chain, to protect (the production) from running out of materials or goods (Guido, 2009). Inventory management is very crucial to any organization that is improving on its performance and attaining high levels of customer satisfaction. According to Nzuzaetal.,

(2015) the material held by an organization makes up for most of the organization assets. Most organization invests so much money in materials and it is important for the organization to put in place a good material management system in order to manage the stock properly (Wangari, 2015).

Inventory management can be viewed as one of the tasks of logistics. It is very closely related to `other activities in the supply chain .As materials move through a supply chain, stocks are held at varies points .The best results come when organizations with in the same supply chain co-operate to insure final customer satisfaction. There are several ways of achieving this cooperation, ranging from informal trading relationships through to partnerships (Waters, 2003). Lucy et.al, (1996) states that inventory management is defined as the system in a firm to control the firm's investment in inventory. It involves the recording and monitoring of stock level, fostering future demand and deciding on when and how to order. The objective of inventory management is to minimize in total cost associated with inventory (Eucnice, 2011). Inventory management has to do with art and science of maintaining stock levels of a given group of items incurring the least cost consistent with other relevant targets and objectives set by management (Lwiki et al., 2013). It refers to the integration of information, transportation, acquisition, inspection, material handling, warehousing, packaging and control of supplies and ensuring security of inventory (Munyao, 2015). According to Noor-Ajian et al., (2014), inventory management relates to the question of how much stock of materials is needed to buffer against change of state in forecast, customer demands and supplier's deliveries. It is a terminology adopted by a firm to take charge of her investment in inventory (Stevenson, 2010).

Adeyemi and Salami (2010) described inventory management as a process of recording and monitoring the level of stocks, forecasting the future demand and a decision on when and how order could be executed. Naliaka and Namusonge (2015) see inventory management as a fine lines between the replenishment lead time, carrying costs, asset management, inventory forecasting, valuation of inventory, future inventory price forecasting, physical inventory, inventory visibility, available space for inventory, quality management, replenishment, returns, defective goods and demand forecasting.

The researchers further described inventory management as planning and control. The planning facet involves looking ahead in terms of the determination in advance of the following: What quantity of items to order; how often (periodicity) should firm order for them to maintain the overall stock coordination in an economically efficient way? The

control facet, otherwise regarded as control means following the procedure, set up at the planning stage to achieve the objective of stock management.

Aro-Gordon and Gupte (2016) pointed out that inventory management is the supervision of supply, storage and accessibility of items in order to ensure an adequate supply without excessive oversupply, whereas Miller (2010) defines inventory management as all activities put in place to ensure that customers have the needed product or service. In other words, inventory management coordinates the functions of purchasing, manufacturing and distribution to meet the marketing needs and organizational needs of making the product available to the customers (Oballah et al., 2015).

According to Odiri (2015), inventory management is an application of management tools and techniques with a view to ensuring the required quality of stock is always available at the minimum costs. Kimaiyo and Ochiri (2014) asserted that inventory management consists of three basic issues namely: the number of units of inventory items a firm should hold in stock; units ordered or produced at a given time; and point at which inventory should be ordered or produced. These issues can be realized through the inventory techniques implemented by the organization (Wanke&Salishy, 2009).

In the view of Tom, Akhileshand Sijo (2013), inventory management is an integrated functioning of an organization dealing with supply of materials and allied activities in order to achieve the maximum co-ordination and optimum expenditure on materials capture the essence of inventory management to business organization. Flynn (2011) defines inventory management as managing the flow of information and establishing operational design of the physical flow of goods and services. It is an effort to balance between costs of inventory and customer satisfaction (Karori& Walter, 2016).

Angel, Gomathi, and Chitra (2014) added that inventory management is the continuing process of planning, organizing and controlling inventory that aims at minimizing the investment in inventory while balancing supply and demand. The several activities within the scope of inventory management comprise purchasing, classification, inspection, codification, store keeping and stock taking which include stock control (Kamau&Kagiri, 2015)

Sandeep and his associates in their study defined inventory management as set of policies, procedures, and techniques employed by firms to maintain an optimum number or amount of each inventory item (Sandep et al., 2012). In a similar context, Olowe (2010) defines inventory management as an efficient management of stocks to achieve

an optimum level of stock in the firm's working capital. Also, Parang (2009) describes inventory management as an optimum investment in inventories striking a balance between adequate stock and that too by keeping investment at minimum level.

Berling (2011) reaffirmed the claims that optimum level of inventory is crucial to an organization because excess inventory leads to stock holding cost (such as rental charges, opportunity costs, obsolescence costs, breakages, pilferage) and inadequate inventory (like stock outs) is also costly because customers may leave to competitors.

Inventory management provides solutions to a large number of organizations problems such as fixation of minimum and maximum levels of inventory, determining the size of inventories to be carried, deciding about receipts and inspections procedure and keeping check over obsolescence and ensures control over movement (Abdulraheem et al., 2011). In many organizations, the prominence of inventory management is to assists to maintain a smooth flow of production; meet the requirements of numerous customers; sustain firm's method of production, which gives rise to inventory level.

The objective of inventory management is all-encompassing. Inventory management enables organizations to determine and maintain the optimum level of investment in inventories which aids in realizing the required objective. Benjamin (2001) cited in Oladejo&Ajala, (2016) stated that inventory management aims at achieving the inventory level which minimizes the total cost associated with inventory, that is, the optimal and most economical level. Because too much inventory consumes physical space, creates financial burden, and increases possibility of damage, spoilage and loss.

2.2 Purpose of inventory

The main purpose of stock is to give a buffer between supply and demand. This safety cushion is essential to ensure the smooth running of operations. Stocks can be row materials, work in process, finished goods, spare parts or consumables (Waters, 2003). Some of the purposes of inventories were discussed below:

1. To maintain independence of operations. A supply of materials at a work center allows that center flexibility in operation. A supply of materials at a work center allows that center flexibility in operation.
2. To meet variation in product demand. If the demand for the product is known precisely, it may be possible to produce the product to exactly meet the demand
3. To allow flexibility in production scheduling. A stock of inventory relieves the pressure on the production system to get the goods out. This causes longer lead

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times which permit production planning for smooth the flow and lower-cost operation on through larger lot- size production-high set up costs

4. To provide a safe guard for variation in raw material delivery time. When material in order to a vendor delay can occur for a variety of reason. A normal variation in shipping time, a shortage of material at the vendor's plant causing backlogs, unexpected strike at one of the shipping companies, a lost order, or a shipment of incorrect or defective material.

5. To take advantage of economic purchase order size. There are costs to place an order: labor, phone calls, typing, postage, & soon. Therefore, the larger each order is the fewer the orders that need be written (Meng, 2006).

2.2.1 Classification of inventory

Stock and Lambert (2001) states that categorized inventories into six main types, namely:

i. Cycle Stock is the inventory that results from the replenishment process and is required in order to meet demand under conditions of certainty. That is when the firm can predict demand and replenishment times (lead times) perfectly.

ii. In-Transit Inventory (Pipeline) is the inventory that is en route from one location to another. It may be considered part of cycle stock even though it is not available for sale and or shipment until after it arrive at the destination.

iii. Safety or Buffer Stock is the stock held in excess of cycle stock because of uncertainty in demand or lead time. The notion is that a portion of average inventory should be devoted to cover short-range variations in demand and lead time.

iv. Speculative Stock is inventory held for reasons other than satisfying current demand. That is inventories purchased as a result of speculations of price hikes.

v. Seasonal Stock is a form of speculative stock that involves the accumulative of inventory before a season begins in order to maintain a stable labor force and stable production runs or in the case of agriculture products, inventory accumulated as a result of a growing season that limits availability throughout the year.

vi. Dead (obsolete) Stock is the set of items for which no demand has been registered for some specified period of time. They are out of date,

deteriorated or no longer useful as a result of advancements in technology (Esther, 2015).

2.2.2 Benefits of inventory

Stock and Lambert (2001) state that inventory is a major use of capital and, for this reason; the objectives of inventory management are to increase profitability, to predict the impact of corporate policies on inventory levels, and to minimize the total cost of logistic activities inventory serves basic benefits in the firm include:

1. Protection from uncertainty Inventory is held as protection from uncertainties. Raw materials inventories in excess of those required to support production can result from speculative purchases made because management expects either a future price increase or a strike, which includes stock (Lambertet et al., 2001). Raw materials will allow the firm to achieve the following benefits: to take advantage of quantity discount of market prices, to guard against inflation, to provide strategic stocks of items which could be in short supply due to strikes or other supply problems ,as a form of investment when price increases are anticipated ,to cater for the variability of supply .

2. Balancing supply and demand

   Seasonal supply and/ or demand may make it necessary to hold inventory. For example, a producer of a premium line of boxed chocolate experiences significant sales volume increase at Christmas, Valentine's Day, Easter and Mother's day. In contrast, demand for a product may be relatively stable throughout the year but raw materials may be available only at certain times during the year. Such is the case for producers of canned fruits and vegetables Stevenson et.al (2009). This makes it necessary to manufacture finished products in excess of current demand and hold them in inventory, unless the raw materials can be purchased from part of the world within with different growing seasons (Esther, 2015)

3. Acts as a buffer

   Stock is a stock allowance to cover errors in forecasting the lead time or the demand during the lead time Luceyet et al.,(2009). It is held in individual workstations against the possibility that the upstream workstation may be a little delayed in long setup or change over time. This stock is then used while that changeover is happening. These classifications apply along the whole Supply chain, not just within a facility or plant.

Where these stocks contain the same or similar items, it is often the work practice to hold all these stocks mixed together before or after the sub-process to which they relate. This 'reduces' costs. Because they are mixed up together there is no visual reminder to operators of the adjacent sub-processes or line management of the stock, which is due to a particular cause and should be a particular individual's responsibility with inevitable consequences. Some plants have centralized stock holding across sub-processes, which makes the situation even more acute (Esther,2015)

4 Economic order scale

Inventory is required if a firm is to realized economies of scale in purchasing, transportation and manufacturing. For example, raw materials inventory is necessary if the manufacturer is to take advantage of the per unit price reductions associated with purchases. (Esther, 2015) However, increasingly when purchase volumes are sufficiently large, purchase contracts are been negotiated based on annual volumes not the amount purchased on an individual order. Purchase materials have a lower transportation cost per unit if ordered in larger volumes. The reason for this lower per unit cost is that full truckload and railcar shipments receive lower transportation rates than smaller shipment of less than truckload or less than carload quantity (Esther, 2015)

2.2.3 Tips to effective inventory management for health care facility

Cutting costs in health center inventory management is always a point of emphasis for financial decision-makers at health care institutions. Below are three tips administrators can use to maintain a lean supply chain and make inventory management strength of the institution(Blog, 2013). Collaborate with physicians: New medical devices come out every year, doctors and nurses prefer certain instruments that allow them to be as productive as possible. Supply chain managers should push to create a team of physicians who can speak for everyone else at the facility and provide insight into what they need to properly care for patients and other items that are sitting in storage for months on end, according to an article for Healthcare Global (Esther, 2015). Invest in the right tools: Supply chain managers who are able to effectively keep track of their files, stay updated on contract pricing and validate prices against purchase orders usually have access to the right technologies. Cloud-based inventory management solutions allow hospitals to quickly see a return on investment because they don't need to purchase expensive hardware and the technology doesn't require a lot of training to use (Blog, 2013). Reduce insignificant costs: Items that aren't vital can usually be eliminated to create a more streamlined supply chain. The Healthcare Global article stated that another

way to cut costs is to replace devices and equipment from expensive name brands with items from more generic companies that have lower prices. These cost reductions could give supply (Blog, 2013).

2.2.4 Inventory control system

Donnelly (1990) states that inventory management and control process are very useful in determining the optimum level of inventories and finding answers to the problem of economic order quality, the re-order point and safety stock(Eunice,2011).

Eckert (2012) argues that the standard operating procedures (SOPs) for inventory control consists of a step-by-step process that is easy follow and understand by the employees. These steps are inventory receiving, storage and product rotation and warehouse and inventory security. These steps also serve to hold employees accountable for adhering to inventory control policy expectations. Creating and following an SOP is essential to managing inventory and controlling inventory costs. Even small organizations should not underestimate the power of an inventory-control SOP (Njoroge, 2015). An appropriate inventory control system, good and secure storage facilities, an appropriate quantification and selection process improves medicine availability and reduce spoilage. Appropriate inventory management at the various levels of the supply chain is crucial for effective distribution from the various warehouses (Schöpperle, 2013). Inventory control is the process of managing inventory in order to meet customer demand at the lowest possible cost and with a minimum investment. Several objectives in inventory control such as minimize inventory investment; determine the appropriate of customer service level; balance supply and demand; minimize ordering cost and holding cost; also preservation of inventory control system (Rachmania, 2012).

2.2.5 Benefits for Inventory control in health center

One of the major benefits of inventory control in healthcare is controlling the losses of medical supplies and equipment. Obviously, healthcare equipment such as surgical instruments, ultrasound machines and computers are expensive to replace. There is an instance in which some individuals may take advantage to take the equipment for personal interest (Upbizhub, 2011). Another benefit of employing inventory control in healthcare facilities is to control the spread of disease. Studies proved that using

functional inventory control have prevented the affliction of mad-cow disease in a certain healthcare facilities in England. In like manner, effective tracking of surgical instruments can prevent using of infected instruments to other patients. Thus, prevention of disease starts from proper execution of inventory control. In addition, both administrators and employees should adapt inventory control system in tracking the stock levels of equipment and other supplies. In this way, effective services are guaranteed once the healthcare facilities have all the necessary supplies and equipment needed. Otherwise, without using the inventory control system it would be difficult to determine which supplies and equipment are depleted and need for replenishment. Keep in mind that being once there is inadequate supplies the quality of service will be affected. In like manner, inventory control system is also important in monitoring perishable items like medications (Solomon, 2011). In this sense, it is necessary to create a precise planning of inventory control. Healthcare facilities and organizations can hire an expert to plan the inventory control. In this way, it is assured that everything will be given attention. However, there should be direct supervision of the healthcare organization's head in conducting the inventory in order to determine the actual situation of the healthcare facility. Although it would require much of your time yet it would be for the advantage of the organization. This would not only spare the organization from the cost of supplies and equipment but inventory control can also help in carrying out effective healthcare services. Make sure that the inventory control system is effectively employed (Esther, 2015).

2.2.6 Inventory control Techniques

Inventory management relates to the tracking and management of commodities which includes the monitoring of commodities moved into and out of stockroom locations and the reconciling of the inventory balances. Some of the techniques used in managing inventories were discussed below:

2.2.6.1. EOQ

Economic Order Quantity (EOQ) which developed by F.W Harris in 1915 has been the most commonly used in practice. He mentioned that EOQ derives the optimal lot size for purchasing by minimizing the total operating cost. EOQ formula helps inventory manager to determine how many optimum products to buy. However, the classical EOQ model assumes such as: constant demand, constant lead time, fixed order cost per order, instantaneous replenishment, no stocks out allowed, no demand uncertainty and quantity

discount aren't available. In order to the above assumptions do not reflect in all situations, EOQ model must be modified in a real inventory system analysis (Rachmania, 2012). Replenishment process also one of common practices in inventory control. Replenishment divided two types, which is continuous review and periodic review. Continuous review placed the order when the inventory declines to the re-order-point (ROP). While periodic review placed the order at regular periodic intervals. ROP also used in inventory control to seek suitable level for replenishment. Another model in controlling inventory is safety stock. Safety stock must be considered where there is an uncertainty in demand; also safety stock is needed during the replenishment lead time when there is a mismatch between actual demand and expected demand (Esther, 2015).

2.2.6.2 ABC/VEN analysis

The ABC Inventory Control System is applied by those firms that have to maintain several types of inventories. Ideally, it is not desirable to keep the same degree of control over all the inventory types, since each vary in terms of its value of annual consumption(Njoroge, 2015).

ABC/VEN-analysis used for the investigation represents the simple and effective method of analysis of medicine expenditures, identifying priority groups of medicines, the use of which, when improved, may provide the greatest clinical and economic impact. ABC analysis provides an accurate and objective picture of budget expenditures on medicines. VEN-analysis helps to prioritize between various medicines in their selection for procurement and use within a drug supply system.

Sometimes there are insufficient funds to buy all the desired medicines. VEN analysis is a well-known method to help set up priorities for purchasing medicines and keeping stock. Drugs are divided, according to their health impact, into vital, essential and non-essential categories. VEN analysis allows medicines of differing efficacy and usefulness to be compared, unlike ABC and therapeutic category analyses, where only drugs of similar efficacy or action can be compared. Vital drugs (V): potentially life-saving or crucial to providing basic health services Essential drugs (E): effective against less severe but significant forms of disease, but not absolutely vital to providing basic health care

Non-essential drugs (N): used for minor or self-limited illnesses; these may or may not be formulary items and efficacious, but they are the least important items stocked Managing Drug Supply et.al (1997).

The items of high value are categorized as "A" and generally consist of 15%-25% of inventory items; that accounts for 60%-75% of annual usage value. The firm keeps strict control over these inventory items. The Category "B" is comprised of those items that are of relatively less value or has moderate importance and consists of 20%-30% of inventory items that accounts for 20%-30% of annual usage value. A reasonable control is kept on the "B" category inventory items. The least important items of the inventory are categorized as "C". It consists of 40%-60% of inventory items; that accounts for 10%-15% of annual usage value. Due to a low value of these items, a simple or an ordinary control is kept on them.

Thus, the ABC Inventory Control System focuses on significant items of the inventory and hence is also called as "Control by Importance and Exception." Since the categorization of the inventory items is done on the basis of their relative value, this approach is often known as "Proportional Value Analysis." (Njoroge, 2015).

2.2.6.3 Just-in-time (JIT)

Is one of the most talked about topics in materials planning primarily due to its tremendous success in the context of Japanese company? JIT or zero-inventory system is an idealized concept of inventory management wherein we are able to supply whatever material is required, wherever required, and whenever required just in time with 100 % supply assurances without keeping any inventory on hand. Obviously, from the resource management point of view, nothing can be better than this, as there are no inventories, no shortages, and no replenishment orders placed. However, this concept necessitates that the suppliers (vendors) are local and are 100 % dependable; orders splitting with small orders without additional transportation costs is feasible, i.e., frequent deliveries are economically viable, and the requirements are firmly known. This also calls for a single vendor base and having long-term relationship with the vendor who has to be a quality vendor. This also requires that the vendor has sufficient capacity to supply anytime without passing on the costs of overcapacity to the buyer(Springer India, 2014).

2.2.6.4 VMI

A vendor managed inventory system (VMIS) helps in minimizing the company's holding of stock and forces the distributor to maintain goods which in turn secures the level of service of the retailer. Zer and Wei (2006) argue that vendor inventory management can be described as supplier managed inventory or as continuous replenishment. According to Beamon et al (2006) the system is an initiative of partnering that encourages cooperation and the sharing of information between partners in a business. Davila et al., (2009) explain that bar coding is a type identification employed by the technology of capturing information. Bar codes are used in tracking items such as stock in retail, records, people and machines. Some control systems used for inventories apply this technology in order to make Stock tracking automatic this improves on efficiency and thus supply chain performance (Njoroge, 2015).

2.2.6.5 MRP

According to fuller (2003) states that material requirement planning is a scheduling procedure for production process that have several levels of production given information describing the production requirement of several finished goods of the system, the structure of the production system, the current inventory for each operation and the lot sizing procedures for each operation, MRP determines a schedule for the operation and raw material practice.

Robert (2002) states that the main function of material requirement planning is to guarantee material availability that is it used to procure or produce the requirement quantities on time both for internal purpose and for sale and distribution. This process involves the monitoring of stock and in particular, the automatic creation of procurement proposals for purchasing and production.MRP tries to strike the best balance possible between optimizing the service level and minimizing costs and capital lock up (Eunice, 2011).

2.2.6.6Physical Inventory Management

A physical inventory is a "wall-to-wall" count of your warehouse so map it in advance. Create a map indicating the location of every shelf, pallet rack and all other places where material is stored. One of the best ways to increase accuracy is to assign counters by area in the warehouse rather than product lines. (It is more difficult to account for

misplaced material when counting by product line). Make sure all inventory is clearly identified and located in its assigned location. If you have multiple locations for the same items, consolidate them into as few locations as possible. By combining smaller quantities into larger aggregated units, you reduce their counting time. Preparation also includes a through clean-up. Clean up (lots of sweeping, aggregating and organizing) before you count (Smart turn, 2014).

2.2.6.7Benefits of Inventory Counting

Anyone who has ever planned or participated in an inventory count knows what a frustrating, tedious and time consuming activity it can be. The actual process of counting requires you to remove employees from their regular jobs for hours, if not, days in every inventory location. Depending on your warehouse operation, this could affect shutdowns in other parts of your business such as manufacturing. While the frustration of counting every item, and hunting for items and material that are nowhere to be found or once found, unidentifiable, can be acute, the organizational value of stock accuracy is considerable(Smartturn,2014).

Whether through cycle counting or conducting an annual tally, the accuracy of your inventory data enables your sales, customer service and financial management systems to operate much more efficiently and effectively. Your annual count confirms what you actually have in stock and then adjusts your database records to reflect reality. Do the on-hand product quantities in your computer reflect what is actually on the shelves in your warehouse? If your buyers or sales personnel make replenishment decisions or customer promises using inaccurate stock balances, mistakes will happen. When your database indicates less stock than there actually is, you'll end up ordering sooner than necessary and more than you require. You commit capital to products you don't currently need. When your database indicates more stock than there actually is, you may not re-order in time and produce a stock-out. To help avoid both of these undesirable results as well as satisfy tax obligations and financial and insurance requirements, you need to account for the cost of your inventory.

2.2.6.8Technology and counting materials

How you choose to count may require investing in some technology such as bar code readers. If you choose the old school method of paper, you'll still need to buy necessary

supplies (such as pencils, pens, markers, stickers, clip boards, calculators, scales, and the food and drinks to fuel the counters). Buy all of these items in advance.

Depending upon what material handling equipment you already have in your warehouse, you may also have to rent or borrow equipment such as pallet jacks, forklifts, and ladders. Automation during inventory can appreciably increase accuracy of your data entry, shorten counting time, decrease costs if you use outside auditors, and reduce your shut down period (Smartturn, 2014).

1. Bar code readers

    These are probably your best choice to automate your annual inventory. You can download data captured by readers directly into your computer system, eliminating opportunities for data entry clerical errors. If bar code is your technology of choice, make sure to affix bar code labels to all cartons. These labels should include an ID number, item description, unit of measurement, and quantity. The counter scans the item, and enters the unit of measure and quantity. Open cartons are manually counted, with the tally entered into a handheld computer (Smartturn, 2014).

2. Counting Card

If you are using paper, you are either using count (index) cards or counting sheets. The typical count card method prior to the actual day is to place one in each bin that needs to be counted. Counters progress through their assigned counting areas and note quantities on each card. Providing each counter with a supply of blank cards enables them to note incorrectly stocked material which then can be quickly relocated to its proper location following the count(Smartturn, 2014).

3. Count Sheets

This as old a school gets. Up to 25-30 inventory items are listed on each page. Organize the items by location area and number the pages in the order they be counted. Use count sheets with caution if you have no other alternative because data entry errors tend to increase (Smartturn, 2014).

2.2.6.9 Types of Inventory counting

You can either do a periodic physical inventory count, which is usually an annual event, or you can implement a cycle count program. There are two ways

1 Counting Once/Annual physical count

On the surface, physical counts provide a measure of reassurance to your financial auditors. However, one-time annual physical counts are expensive, and can shut down production or shipping functions for one or more days. There are some important downsides to physical counts, which include the temptation to cut corners. In many ways, a one-time annual count such as this often introduces new errors that may not be found for several months. This is particularly aggravated if you are counting on a day-off like a Saturday and no one wants to be there. Counting Many Time/ cyclic physical count In contrast, cycle counting, when properly implemented and managed, delivers more accurate inventory data. According to the American Production & Inventory Control Society Online Dictionary, cycle counting is: "An inventory accuracy audit technique where inventory is counted on a cyclic schedule rather than once a year. A cycle inventory count is usually taken on a regular, defined basis (often more frequently for high-value or fast moving items and less frequently for low-value or slow moving items). Most effective cycle counting systems require the counting of a certain number of items every work day with each item counted at a prescribed frequency. The key purpose of cycle counting is to identify items in error, thus triggering research, identification, and elimination of the cause of the errors." The elimination of errors is one of the benefits of auditing inventory accuracy and choosing to reconcile errors on a cyclical schedule rather than annual. Organizations that implement cycle counting increase the probability of highly accurate real-time merchandise inventory(Smatrturn, 2014). The advantages of keeping inventory in any organization are to ensure continuity of supplies of materials needed in production to prevent stock out; to meets customers expected needs; to meet production requirements in times of scarcity of raw materials; to prevents operational delay; to guard against temporary close down of manufacturing (that is, buffer between demand and supply); to reduce the risk of shortages through existence of safety stocks; to enjoy benefits of quantity discounts, thereby increasing company net profit margin and minimization of extra costs emanated from processing and buying of more purchased material (Adedayo, Ojo, &Obamiro, 2006). It also promotes savings on negotiation costs when large quantities of goods are ordered at once. The disadvantages of keeping excess of materials as inventories include

unnecessary use of capital and money that cannot generate income. There is storage cost and insurance to be considered if the inventory is not properly planned which could lead to reduction in profits (Adedayo et al., 2006). There is also the risk of deterioration of goods and obsolescence of the finished goods.

2.3 Theoretical review

As good research is grounded in theory and in order for a discipline to progress beyond the pre-paradigmatic stage and be considered a mature discipline it must use and develop theory. As the inventory management is under the influence of external environment, it is recommended that researches would be located within the content of inventory control theories (Defee, et al., 2010). This section explores the theories that have been identified as modeling behavior for the problem being tackled by the study and indicating where the study originates. In their study of inventory of theory in logistics and supply chain management, Defee, et al., (2010) found that theory will explicitly use in approximately 53 percent of the sampled articles and suggests that there is a need for continuous theory-based research in the discipline. Seuring, et al., (2005) recommended researchers in the field of supply chain management have to account for conceptual and theoretical developments. Hence, this study uses stock diffusion theory, Transaction Cost Economics (TCE) and Adaptive Structuration Theory (AST) which are more relevant with the problems identified in this study.

2.3.1 Stock Diffusion Theory

A stock diffusion theory was pioneered by Braglia, Gabbrielli and Zammori (2013) with an intention to derive the probability distribution of the stock consumption and that of the reorder time. These authors further explained that the importance of stock diffusion theory is to assess and evaluate the required inventory levels in theory and practice. There are three considerations of the stock diffusion theory: (1) storage space required; (2) how quickly inventory is sold or used; and (3) how to avoid inventory from becoming outdated before it is used. These considerations can prevent shortages and wasteful spending. In addition, the stock diffusion theory has been confirmed to lower inventory level and has a direct impact on cost savings emanating from storage costs including stock insurance premiums (Unegbu and Mohammed, 2011: 304).

2.3.2 Adaptive Structuration Theory (AST)

Based on Structuration theory, the study intends to determine the effects of information technology on effective stores management. Structuration theory was first proposed by Anthony Giddens in his constitution of society in 1984, which was an attempt to reconcile social systems and the micro/macro perspectives of organizational structure. De Sanctis and Poole (1994) borrowed from Giddens in order to propose AST and the rise of group decision support systems. AST provides the model whereby the interaction between advancing information technologies, social structures, and human interaction is described, and which focuses on the social structures, rules, and resources provided by information technologies as the basis for human activity. AST is a viable approach in studying how information technology affects inventory management practice in an organization because it examines the change from distinct perspectives.

2.3.3 Transaction Cost Economics (TCE)

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 transactional Economics (TCE). According to (Halldorson et al., 2007), TCE is a theory that ensures that costs across the supply chain are kept at a minimal. In the early 1970s, the mathematical economist, Williamson, incorporated TCE into the general equilibrium model in the new theory of a firm. 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 and 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 (Williamson, 2008).

One might expect the seemingly infinite stream of inventory theory related research to be a key resource for managers seeking to gain a competitive advantage through inventory control. However, some have suggested that managers who turn to inventory theory research may find it to be of little significance or that it has little to offer in terms of enhancing inventory practices according to Krautter, as cited by Ng'ang'a,2013.

This has led many to suggest a gap exists between inventory theories and practice (Lenard & Roy, 2005; Silver, 2001; Wagner, 2002). While the varied solutions offered to bridge this gap represent valuable research, input from practitioners is noticeably absent (Patton & Steele, 2010). Therefore, an empirically derived agenda founded on practitioner-identified issues, is needed. There is no study that have been comprehensively been done on factors influencing inventory management practice in Ethiopia and hence the study intended to fill this gaps.

2.4 Empirical Literature Review

2.4.1 Inventory Management

Inventory management is the management of materials in motion and at rest (Coyle et al., 2003). The following activities all fall within the scope of inventory management (Wikipedia, 2014) the fine lines between replenishment lead time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods, and demand forecasting. Balancing these competing requirements leads to optimal inventory levels, which is an ongoing process as the business needs shift and react to the wider environment.

Inventory management basically serves two main goals (Reid & Sanders, 2007). First of all good inventory management is responsible for the availability of goods. It is important for running operations that the required materials are present in the right quantities, quality and at the right time in order to deliver a specific level of service. The second goal is to achieve this service level against optimal costs. Poor inventory management system can negatively affect the service level of an organization. In most cases where inventory management decisions have been effective, inventory planning models have been developed and implemented focusing especially on the twin problems of inventory size and timing (Thummalapalli, 2010). To perform in competitive environment, companies have to design and maintain effective inventory management system. Inventory management systems enable an organization to determine and maintain an optimum level of investment in inventory in order to achieve required operational performance (Rossetti, 2008). Scholars have come up with various

techniques used in managing inventory (Ross, 2003), (Baily, 2003), (Monczka, 2005), (Lyson, 2006). ABC analysis, Just in Time (JIT), Material Requirement Planning (MRP), Vendor Managed Inventory (VMI), and Economic order quantity (EOQ) are the most familiar techniques which are used to manage inventory. Researchers argue that inventory control practice has paramount importance for the effective inventory management. They proceed with their argument that it tells how much to order, how many have been used, what is remaining and when to place the next order so that the enterprises would not lack materials to work with at any point in time. They further argue that inventory control would ensure adequate supply of products to customers and avoid shortages and ensure timely action for replenishment (Sharma, 2004, Kumar & Suresh, 2008).

2.4.2 Supply Chain Information Systems

According to Wilson (2015), utilization of information technology improves the performance of inventory management thereby improving the firm's competitiveness. The use of IT in supply chain and logistics management has attracted increasing attention of the business and academic world. Lee & Wang (2011) as cited by Wilson (2013) addressed the possibilities of reducing the bullwhip effect in supply chains through internet based collaboration. Technology application in supply chain context may provide benefits in the following areas: improve supply chain agility, reduce cycle time, achieve higher efficiency, and deliver products to customers in a timely manner (Lee & Wang, 2011). Furthermore, IT may further reduce existing wastes and inefficiencies along the supply chain through increasing real-time movement of shipment and operational control of logistics activities. Qualified staff that is competent and skilled will help the organization to achieve its goals and objectives by being efficient and effective when carrying out their various functions. For an organization to succeed, qualification is therefore a pre-requisite and must be matched with job requirement, hence the need to hire and develop ambitious personnel (Carr&Hesketh, 2000). If staff involved in stock control is not qualified and competent, and then there will be ineffectiveness in inventory control (Ng'ang'a,2013). Bailey and Farmer (1982) indicated that for stock control function to achieve a superior performance, it's necessary to recruit, train and develop personnel with the capacity and motivation to do better job as incompetent employees can render stock control virtually ineffective.

2.4.3 Theoretical or Conceptual Framework

Bradley (2008) defines conceptual framework as a visual or written product that explain either graphically or in a narrative, the key factors and the presumed relationship among them. It is therefore a model used in research to outline possible courses of action or to present a preferred approach to an idea or thought. A conceptual framework is very important in any research study being undertaken. It shows the relationship between the dependent variables and the independent variable.

The study uses the elements of the logistics cycle developed by JSI handbook (JSI, 2019). The six elements are serving customers, product selection, quantification, procurement, inventory strategy and warehousing and distribution.

Serving customers: Everyone who works in supply chain must remember that they select, procure, store, distribute, or dispense products to meet customer needs, and that each customer receives the right product based on established protocols. In addition to serving the needs of the end customer the customer seeking health services each person in the process is also serving the needs of more immediate customers. Storekeepers provide customer service when they issue medicines to the health facility, and the central medical stores provide customer service when they issue commodities to the district. The supply chain ensures customer service by fulfilling the six rights. Each activity in the logistics cycle, therefore, contributes to excellent customer service and to ensuring better health outcomes.

Product selection: In any public health supply chain, health programs must select products. In most countries, a national formulary and therapeutics committee, with membership drawn from medicines regulatory agencies as well as pharmacy, medicine, and nursing professional practice regulatory bodies, and other government-appointed persons may be responsible for product selection. Most countries have developed essential medicine lists patterned on the World Health Organization (WHO) Model List. Products selected for use will impact the supply chain, so the supply chain requirements must be considered during the product selection. The output of product selection is a national essential medicines list that is guided by standard treatment guidelines and recommended protocols for service delivery.

Quantification: After products have been selected, the required quantity and cost of each product must be determined. Quantification is the process of estimating the quantity and cost of the products required for a specific health program (or service), and determining when the products should be procured and delivered to ensure uninterrupted supply of products.

Procurement: After a supply plan has been developed as part of the quantification process, products must be procured. Health systems and programs should be strategic about their procurement activities, which should be carefully researched, planned, and monitored, all while abiding by the applicable rules and regulations. This will enable the procurement to be carried out in a timely manner, according to an open, fair, and competitive process and to ultimately supply quality-assured products for the best value of the program.

Inventory strategy: Inventory plays a key role in meeting the objectives of the supply chain, and it is the responsibility of the supply chain manager to ensure that inventory policies are in place to support the organization's mission, goals, and objectives related to health. The decision to hold inventory provides organizations with a means to balance supply and demand. A cohesive inventory strategy will define policies that determine which products to hold in inventory, how much inventory to hold, and where to hold them, and ensures that inventory management decisions are documented and applied consistently across the system.

Warehousing and distribution: After an item has been procured, its physical management, through various levels of an in-country supply chain, must be carried out in a structured way to ensure that it will be protected from harmful environmental conditions or handling and is available, accessible, and in good condition while posing no risk of injury to workers. To meet this requirement a combination of interventions requiring both physical infrastructure and structured procedures must be maintained.
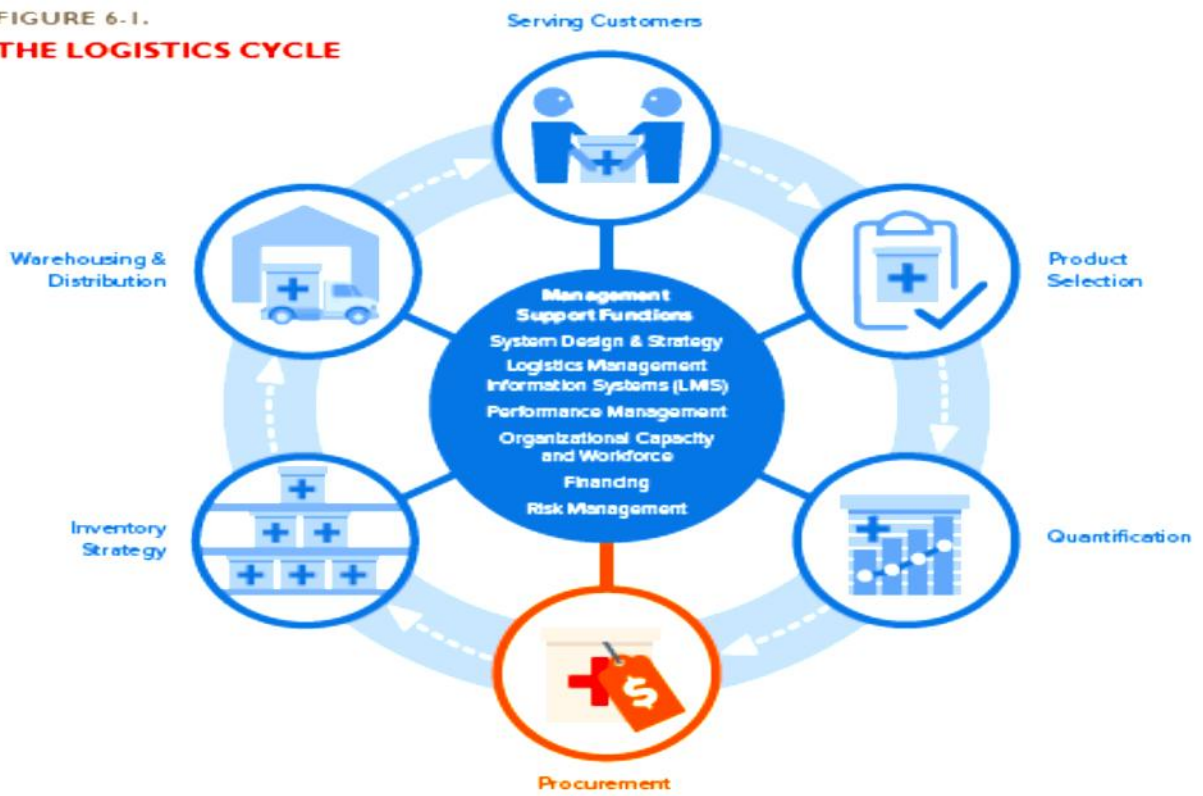
Figure 2.1: Health commodities logistics cycle (JSI, 2019).

CHAPTER THREE
RESEARCH DESIGN AND METHODS

In this chapter, the research methodology used in the study is described. The research design, population and sample are described. The instrument was used to collect the data, including methods implemented to maintain validity and reliability of the instrument are also described.

3.1Research Design

Research design is the plan and structure of investigation so conceived as to obtain answers to research questions. A descriptive survey is selected because it provides an accurate portrayal or account of the characteristics, for example behavior, opinions, abilities, beliefs, and knowledge of a particular individual, situation or group.A quantitative approach was followed. Burns and Grove (1993) define quantitative research as a formal, objective, systematic process to describe and test relationships and examine cause and effect interactions among variables. A descriptive survey design was used. A survey was employed to collect original data for describing a population too large to observe directly (Mouton, 1996). A survey obtains information from a sample of people by means of self-report, that is, the people respond to a series of questions posed by the investigator (Polit and Hungler, 1993). In this study the information was collected through self-administered questionnaires distributed personally to the subjects by the researcher. The study based cross sectional descriptive study design to assess the health center health commodities inventory management practices &challenges. The study data was collected used questionnaire & interviews for one month. On the other side the study has also include assessment of health center pharmacy store conditions by direct visit and comparing the store condition against a standard check list.

3.2Population of the study

According to Burns and Grove (1993), a population is defined as all elements (individuals, objects and events) that meet the sample criteria for inclusion in a study. The study population of this study consist 10 health centers of all Staff and Management

in the Nifas Silk Lafto Sub-city health center .The target population of the study consisted of staff from the medical doctors, nurses, laboratory workers, pharmacy staff, other professions and supportive staff. In all, the Nifas Silk Lafto Sub-city health center has about1650 staff. Leedy and Ormrod et.al (2012: 35) state that the target population should be a set of all individuals relevant to a particular study and must be defined in terms of elements, geographical boundaries and time. The health center have technical workers 1000 including 10 medical darctor,300 nurses, 90 laboratory workers, 110 pharmacy staff, 490other professions and 650 supportive staff.

3.3 Sampling techniques and Sample Size

Sampling is a key component of any investigation and involves several considerations. The aim of most investigations is to obtain information about a population. A census or sample of the population is taken for analysis. The sampling techniques used for this study were purposive and convenience sampling techniques. Purposive sampling technique was used to select staff and departmental personnel who acquire and manage stock at the health center. Convenience sampling was used to select a representative number of the different units of the health center. The sample size for the study was 85 employees. The selection of the sample was based on chance selection and the readiness and availability of the respondents. A total of 85 questionnaires were administered in order to ascertain the perceptions of both staff and management with respect to inventory management by Nifas Silk Lafto Sub-city health center. In this study, a sample size of 85 was considered adequate for the study. According to Pallant (2007), a sample size of 30 and above didn't violate or cause major problems in statistical measures even if the responses are not normally distributed.

In addition to the above mentioned, a purposive sampling technique was used to select staff and departmental personnel who acquired and managed stock at the health center. Convenience sampling was used to select a representative number of the different units of the health center. The sample size for the study was 102 employees of direct related to inventory management such 23 pharmacy professions within these 6 store keeper , 25 laboratory professions and 19 clinical nurse ,16 health officer,10 health urban workers ,and 9 others professions & all the required information were included in this study. On the other hand observation checklist has made on assessment of health center pharmacy store conditions.

Regarding data collection techniques, both quantitative and qualitative data collection techniques have been used. This study included all responsible staff of the health center have involved in health commodities inventory management which fulfill the inclusion criteria during the study period.

3.4 Variables in the study

3.4.1 Independent variable

Socio-demographics of interviewees, training, presence of guideline, educational background of the interviewee, order allocation, storage condition, stock procedure, planning for space requirement, rotation Method, EOQ, ABC/VEN analysis, ERP, VMI, stock record, stock storage, annual count, cyclic count, damage or obsolete inventory, inventory counting process, expired commodities, stock out, employees theft, constraint of fund, insufficient storage.

3.4.2 Dependent Variables

Knowledge, attitude and practices of pharmacy, department heads, laboratory professionals and store managers toward the appropriate inventory management of health commodities Inventory management practices such as availability of health commodities, timely delivery, reduced lead time, reduction of waste, greater accuracy of information, improve accuracy of data and efficiency.

3.5 Data Collection Instrument

A questionnaire was chosen as the main data collection instrument. A questionnaire is a printed self-report form designed to elicit information thatcan be obtained through the written responses of the respondents. The information obtained through a questionnaire is similar to that obtained by an interview, but the questions tend to have less depth (Burns and Grove, 1993). Data was collected with the aid of questionnaires to evaluate themanagement and staff knowledge and views the subject matter and how it affects service delivery in the health center. The questionnaire was designed to meet the objectives of the study. It was adopted from previous works (Oballah et al., 2015 and Anichebe and Agu, 2013) but the researcher designed it to suit the objectives of the

study in order to solicit answers that would meet the objectives. Questionnaires were personally distributed by the researcher to top management officials and their staff to complete. The data was collected over a period of one month. Before the questionnaires were administered, the researcher sought permission from the health center and interviewed a few staff of which the researcher derived the research topic and objectives. The researcher interviewed some staff to know the activities of the health center. From that, the questionnaire was designed for the respondents. The study first did a pre-test of the questionnaire to ensure that the objectives were being met. The purpose of the pre-test activity is to ensure that the questionnaires are meaningful, easily understood and appropriate for the main fieldwork. The activity enabled the researcher to become more familiar with items of the questionnaires and prepare them accurately for the main work. After corrections were made, the questionnaires were distributed to staff and management. Both of qualitative and quantitative data were collected .The study relied on both primary and secondary data. Primary data was collected with the use of questionnaires, interviews and semi structure observations and secondary data was also obtained from external sources such as the internet, Journals of change and other documentations. The purpose of sourcing for secondary data was to help in the formation of problems, literature review and construction of questionnaire. The interviews follow a questionnaire, which is attached in annex II. These check list and questionnaire are adopted with some modification

3.6 Data Analysis

The data were collected from the fields from any outlier information by visual inspection by setting the minimum and maximum values before the data analysis. The quality of the data was analyzed by using different types of data analysis especially by frequency counts, mean and standard deviation. Finally, all the data was processed using SPSS. Subsequent, research questions, literature, questionnaire questions, findings from interviews and recommendations was connected to each other and are visualized in percentages, rates by tables. Finally good practice examples and challenges were extracted from interviews and literature, and future research identifies.

3.7 Pre-test of Questionnaires

The rationale behind this exercise was to ascertain the level of understanding of the items in the questionnaire and to achieve face validity of the data collection instrument.

Also, it was to find out whether the feedback from the pre-test provides the type of information needed or whether the respondents were misinterpreting any of the questions. After this exercise, some of the items in the questionnaire were deleted and others were improved upon.

3.8 Reliability of the Data Collection Instrument

Polit and Hungler (1993) refer to reliability as the degree of consistency with which an instrument measures the attribute it is designed to measure. The questionnaire was answered staff of Nifas Silk Lafto Sub-city health center revealed consistency in responses. Reliability can also be ensured by minimizing sources of measurement error like data collector bias. Data collection bias was minimized by the researcher's being the only one to administer the questionnaires, and standardizing conditions such as exhibiting similar personal attributes to all respondents, e.g., friendliness and support. The physical and psychological environment where data was collected made comfortably by ensuring privacy, confidentiality and general physical comfort. Respondents were informed not to write their names on the questionnaires to ensure confidentiality.

3.9 Validity and Reliability

In order to ensure validity of a study, a pilot study was conducted and the results were scrutinized by the researcher. The term "pilot study" was defined by Welman et al., (2011: 148) as a preparatory dress rehearsal for the actual study. The purpose of a pilot study is to identify possible flaws in the measurement procedures such as ambiguous instructions and inadequate time limit of the intended study. Secondly, a pilot study identifies unclear or vaguely formulated statements. To test validity of the questionnaire, conducted a pilot study with 6 (six) persons from the Stores (2) Dispensary pharmacy (2) and head of pharmacy (2) in Nifas Silk Lafto Sub-city health center. The six persons were given twenty five minutes to complete the questionnaire and the researcher was available to assist. Respondents were also asked to comment on the format and wording of the questionnaire. A few changes were made to the questionnaire after a pilot study. Some of the changes were related to questionnaire's format and spelling errors. A questionnaire was needed to be tested in order to ensure that all items are clear and understandable. This happened before the main study was conducted. The results were showed that the respondents have a good understanding of

the questions and concepts of the study posed to them. In addition to this the questionnaire was adapted from different researches used.

3.10Ethical Consideration

Ethical clearance was obtained from Jima University. Permission was obtained from Nefase-selk-lafto sub city health center. An official letter of co-operation was writing to respective departments. The necessary explanation about the purpose of the study and its procedure was give and verbal consent obtains from the respondents. To assure confidentiality, anonymous questioners were conduct after explaining to the respondents name was unnecessary.

CHAPTER FOUR
DATA PRESENTATION, ANALYSIS AND INTERPRETATION

This chapter consists of the analyzed data and the findings that were obtained from the primary data which was collected using a semi-structured questionnaire. Data analysis was done in line with the objectives of the study which were: to determine the inventory management practices and challenges used by Nifas-Silk-Lafo sub city health center. A total of 102 questionnaires were distributed to 23 pharmacy professions including 6 storekeeper,25 laboratory professionals and 19 clinical nurses,16 health officers,10 health urban workers, and 9 others professions. Finally, 85 questionnaires were returned while the remaining 17 questionnaires were not returned and found incomplete. The response rate represents nearly83.3% the total sample size. According to Mugenda and Mugenda (1999) this represents response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent. Hence, based on the assertion, the response rate is encouraging and suffices. The findings of the study were presented to answer the leading research questions. The results are categorized according to various inventory management issues deal with in this study. Data collected through questionnaire were organized and analyzed using percentage and mean scores.

4.1 Socio-Demographic Characteristics of Study Participants

In this section of the research report, a brief description of the socio-demographic characteristics of the respondents for a sample taken at Nifas-Silk-Lafo sub city health center has been presented.

The gender composition of the respondents was, as indicated on Table4.1 below, females account for around 65% whereas the rest were male employees. The majority of the respondents were female implying that the majority of thestaff working in the organization was females. As to age, 31 respondents (36.5%) were between ages 21-30years; 39(45.9%) of them were between 31 to 40 years of age and the rest 15(17.6%) were between ages of 41-50. Therefore, the majority of the respondents were the youth within the age range of 21-30 years. Furthermore, as to marital status of the respondents, 33(38.8%) were single; 44(51.8%) married; 8(9.4%) were divorced. Therefore, the majority of the respondents were married.

The educational credential of the respondents seems strong as the majorities do have university level qualification. As shown in the table4.1 22(25.9%) of the respondentshave Master's degree holders; 40(47.1) with first degree and the remaining 15 (17.6%) with diploma. This means that majority of those working in the organization had attended university level education. Thus, they were conversant with the study area and the process making them suitable in responding to and furnishing invaluable information related to the study questions.

The respondents were also asked regarding their work experience of whom 4(4.7%) of them had less than one year's work of experience; 23(27.1%) between 1-3 years; 25(29.4%) between 4-6years, 18(21.2%) between 7-9 years and 15 (17.6%) were having over 10 years of experience. This means that majority of those working in the organization had experienced and gained rich information they were conversant with the process; therefore they were appropriate for responding to my study questions. In terms of professional qualification, 6(7.1%) of them do have other profession, 8(9.4%); health urban workers, 13(15.3%); health officers 15 (17.6%) clinical nurse, 21 (24.7%) pharmacists and 22(25.9%) laboratory technicians. This means that majority of those working in the organization had graduated in different professional qualification.

As to managerial position, 30(35.3%) respondents were management; 35(41.2%) senior staff; 20(23.5%) were junior staffs. This means that majority of those working in the organization had senior staffs and gained rich information they were conversant with the process; therefore, they were appropriate for responding to my study questions. The functional unit or department the respondents were working with indicated 6(7.1%) of the respondents were ART; 12(14.1)were laboratory; 8(9.4%) were TB;9(10.6%)were EPI;12(14.1%)were store; 18(21.2%) were pharmacy;14(16.5%) were OPD, and 6(7.1%)were management(management of health center).This means that all responsible staff of the health center have involved in health commodities inventory management.

Table 4.1: Socio-demographics Characteristics of Respondents at Nifas-Silk-Lafto sub city health center

Socio-demographics	Socio-demographics Characteristics	Frequency	Percent (%)
Gender	Male	30	35.3
	Female	55	64.7
Age of employees	21-30 years	31	36.5
	31-40 years	39	45.9
	41-50 years	15	17.6
Marital status	never married	33	38.8
	Married	44	51.8
	Divorced	8	9.4
Level of education	Diploma	15	17.6
	Degree	40	47.1
	Masters	22	25.9
	other	8	9.4
Profession of employees	Pharmacy	21	24.7
	clinical nurse	15	17.6
	health officer	13	15.3
	Laboratory	22	25.9
	health urban workers	8	9.4
	other profession	6	7.1
Position of employees	Management	30	35.3
	junior staff	20	23.5
	senior staff	35	41.2
Department of employees	ART	6	7.1
	Laboratory	12	14.1
	TB	8	9.4
	EPI	9	10.6
	Store	12	14.1
	Pharmacy	18	21.2
	Management	6	7.1
	OPD	14	16.5
Experience of	less than 1 year	4	4.7

		N	Mean	Std. Deviation
employees	1-3 year	23		27.1
	4-6 year	25		29.4
	7-9 year	18		21.2
	10 years and above	15		17.6

Source: Own survey result(2020)

4.2 Inventory Control Techniques

Table 4.2: Inventory control techniques

	N	Mean	Std. Deviation
The health center maintain Maximum, Minimum, and Re-order levels for health commodities	85	4.7	0.458
The health center uses of periodical replenishment of stocks	85	5	0
The health commodities stock not coded	85	1.1	0.31
Long – term agreements between the health center and its suppliers	85	5	0
The health center store activities have automated	85	1.4	0.481
The health center uses Enterprise Resource Planning system	85	1.2	0.383
The health center has an integrated information sharing system	85	1	0
The health center maintains a data base for all suppliers	85	1	0
The health center uses Just In Time stock control system (where no safety stocks are kept)	85	1.5	0.502
The health center uses ABC/VEN(Vital, Essential & non-essential)analysis to classify items according to their stock value	85	4.2	0.383
Use of ABC/VEN(Vital, Essential &Non-essential) analysis leads to efficient management of resources	85	5	0
Aggregate mean and Average standard deviation		2.8	0.22

Source: Own survey result (2020)

Optimal inventory management is critical for ensuring seamless service delivery with significant implications on financial performance. Policies and procedures related to determination of minimum and maximum stock levels prevents holding of excess inventories resulting in holding costs or stock outs leading to disruption in service

provisions particularly in the health sector. Hence, the data collected from the study revealed mixed results. As summarized on Table 4.2, the average mean and standard deviation of the total item of inventory control techniques represents 2.82 and 0.22 respectively, which shows that inventory control technique applied   due need adequate attention at the health center. Issues related to uses of periodical replenishment of stocks, long-term agreements between the health center and use of ABC/VEN(Vital, essential and non-essential) analysis leads to efficient management of resources with mean score 5.00, 5.00, and 5.00 respectively which shows that Nifas-Silk-Lafo sub city health center is performing well.

However, it lags behind in most of the other key indicators. For instance, having integrated information sharing system, maintaining a data base for all suppliers, health commodities stock not coded, use of Enterprise Resource Planning system, automation of health center store activities, adoptionof Just In Time stock control system (where no safety stocks are kept), with mean score .00, 1.00, 1.11, 1.18, 1.35, and1.53 respectively, which shows gaps in instituting strong systems at Nifas-Silk-Lafo sub city health center. This implies that for ensuring health center is periodically replenished stocks, maintain health commodities ,use ABC analysis ,long-term agreement between health center and suppliers those are helps the health center but the store is not automated ,not applied integrated information system ,not maintain data base for all suppliers and stock not coded .So it implies the system is poor and needs improvement.

4.3 Physical Inventory Management

Table 4.3:-**Physical inventory management**

Item	N	Mean	Std. Deviation
The health center uses automatic stock tracking	85	4.64	0.484
Adequate detailed written inventory instructions and procedures Exist	85	4.82	0.383
Obsolete, expired, or damaged inventories properly identified and segregated	85	4.61	0.49
The health center uses Electronic Data Interchange Technology (EDI)	85	1	0
Adequate procedures in place to identify inventory counted, ensure that all items have been counted, and prevent double counting	85	4.76	0.427
Inventory records reconciled (and differences explained) to Advantage reports on a regular basis (Current inventory is adjusted at year-end by fiscal year-end physical counts.)	85	4.53	0.502
Aggregate mean and Average standard deviation		4.06	0.381

Source: Own survey result(2020)

The physical inventory management of health commodities at Nifas-Silk-Lafosub city health center is encouraging except the need to automate the information system. As indicated on Table 4.3, the basic elements expected to comply with in physical inventory

management are with a mean average of above 4 which implies that the systems are functioning well For instance, inventory records are reconciled periodically against counts ,obsolete, expired or damaged inventories are properly identified and segregate ,adequate detailed written inventory instructions and procedures do exist, adequate procedures in place to identify inventory counted ensuring that all items have been counted and preventing double counting. Yet, it is advisable for the Health Center to consider automation of its system using Electronic Data Interchange Technology (EDI) as indicated witha mean score of 1.00.It could be seen that the highest response indicating agreed good physical inventory management but small response the health center not uses Electronic Data Interchange Technology(EDI).

4.4 Flow of stock and Information Management

Flow of stock and information management is another area revealed through the study. The key areas of focus are on identifying the inventory technique the health center is using, record keeping and adequate maintenance of stock at hand. Besides, the practice of reverse logistics in terms of segregation of damaged and expired commodities has been assessed. The results of the response are depicted on Table 4.4 as arithmetic mean and standard deviation. In inventory method followed at item of issuance is determined to be stored and organized in a manner accessible for first-to-expire, first-out counting and general management. Separation of damaged or expired products and removal from Stock is properly handled. There are list of essential health commodities including maintenance of separate records for all health commodities. The health center has standard guide line for health commodities storage and management. Besides, the head of department determines the quantity of commodities to be ordered. Access to health commodities is restricted to assigned staff and authorized personnel only ensuring security of the stored. The store is accessible during normal working hours. The head of department of pharmacy is responsible for procurement of drugs and other medical supplies. Generally, based on the above concept the average mean and standard deviation 4.85 and 0.30 respectively, which shows that flow of stock and information awareness and responsible at Nifas-Silk-Lafo sub city health center respondents were more agreeing to the same idea.

Table 4.4 Flow of stock and information

Item	N	Mean	Std. Deviation
Separation of damaged or expired products and removal from Stock	85	4.73	.447
Maintain separate records for all health commodities	85	4.88	.324
There are list of essential health commodities	85	4.82	.383
Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel	85	4.94	.237
Head of department have determines the quantity of commodities to be ordered	85	4.94	.237
Head of department of pharmacy have responsible for procurement	85	5.00	.000
The health center have standard guide line for health commodities storage and management	85	4.88	.324
Products are stored and organized in a manner accessible for first-to-expire, first-out counting and general management	85	4.64	.484
Aggregate mean and Average standard deviation		4.85	0.30

Source: Own survey result (2020)

4.5 Challenges of Inventory Management

Although the commodities management practice of the Health Center are encouraging, it's not immune from challenges and pitfalls that require due attention from concerned stakeholders including the management at the health center. As indicated on Table 4.5, the respondents recognize and appreciatedsome of the challenges asked indicating areas of focus for improvement and action. The top five challenges encountered while

managing health commodities include: delays in delivery of drugs leading to insufficient inventories, lack of technology, bureaucratic process in procurement, insufficient funds for procurement, and gaps in tracking experience for exchange of health commodities. On other hand, the magnitude of the following challenges related to the risk of loss of health commodities occurs through theft, weak management system, experience for overstocks health commodities, experience for expire of health commodities, lack of proper training in inventorymanagement, stock outs of essentialmedicine is a regular situation, long time it take your unit to receive commodities once a request has been placed are lesser compared to the above problems they encounter.

This necessitates devising ways of alleviating and justifying the critical problems the health center is currently facing related to delays in delivery of drugs leading to insufficient inventories, bureaucratic process in procurement, lack of technology, and insufficient funds for procurement and setting mechanisms to approachexchange of health commodities between other health facilities. Besides, the majority of the respondents concur on the identified reasons for stock outs as weak selection, quantification, procurement and inadequate stock control and management, delaying of purchasing procedure, weak/unknown consumption data, limited capacity of PFSA to avail needed health commodities, shortage of budget, many work load, unpredicted services demand or increased patient flow, transportation challenges, not ordering in time of needed commodities, and inadequate supply were the reasons for stock outs.

Table 4.5: Challenges of Inventory Management

Item	N	Mean	Std. Deviation
Delays in delivery of drugs leading to insufficient inventories	85	5	0
Use of manual inventory management system/Lack of technology	85	5	0
Bureaucratic process in procurement	85	5	0
Losses of health commodities occurs through theft	85	1.12	0.324
The health center have weak management system	85	1	0
Insufficient funds for procurement	85	5	0
Experience for overstocks of health commodities	85	1.12	0.324
Experience for expire of health commodities	85	1.12	0.324
Experience for exchange of health commodities	85	5	0
Lack of proper training of inventory management	85	1.22	0.419
The Stock outs of essential medicine is a regular situation	85	1	0
Long time it take your unit to receive commodities once a request has been placed	85	1	0
Aggregate mean and Average standard deviation		2.71	0.11

Source: Own survey result (2020)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter gives a summary of the findings of the study, the conclusions and the recommendations for health commodities inventory management practices and challenges in Nifas-Silk-Lafosubcityhealth center. These have been discussed in the next sub-sections.

5.1 Summary of Findings

The following major findings were found based on the study. First, the study of inventory control techniques result show mixed results of both strengths in a few of its attributes and areas of improvement in the future for better service delivery. The health center has established a long-term agreements and relationshipwith its suppliers. Besides, there is a need to work on having an efficient and sound integrated information sharing system , maintenance of a data base for all suppliers, coding of health commodities, use of Enterprise Resource Planning system , automation of health center store activities and adoption of Just In Time stock control system for agile and lean inventory management practice.

Secondly, the study of stock flow & information results showed that health commodities are stored and organized in a manner accessible for first-to-expire, first-out, periodic verification of stock through physical counting and general management, separation of damaged or expired products and removal from stock, and keeping list of essential health commodities are exercised. Besides, the health center maintains separate records for all health commodities with standard guide line for health commodities storage and management. The Head of the Department is responsible in determining the quantity of commodities to be ordered. The store for commodities is well secured is secured with a lock and key being open for clients during normal working hours; access is limited to authorized personnel. The head of department of pharmacy is responsible to ensure timely procurement of health commodities requested.

The third key finding was related to physical inventory management as results shows the descriptive statistics of physical inventory management of health commodities inventory management practices at Nifas-Silk-Lafosub city health center based on arithmetic mean

and standard deviation. The health center uses Electronic Data Interchange technology (EDI), inventory record reconciled ,obsolete, expired or damaged inventories properly identified ,the health center uses automatic stock tracking, adequate detailed written inventory instructions and procedures exist, adequate procedures in place to identify inventory counted, ensures that all items have been counted and prevent double counting and with the mean scores of the respondents were 1,4.53,4.61,4.64,4.82 and 4.76 respectively. However, inventory record reconciled ,obsolete, expired or damaged inventories properly identified ,the health center uses automatic stock tracking, adequate detailed written inventory instructions and procedures exist, adequate procedures in place to identify inventory counted, ensures that all items have been counted and prevent double counting and with the mean scores of the respondents were 1,4.53,4.61,4.64,4.82 and 4.76   respectively. On the other hand the health center uses Electronic Data Interchange Technology (EDI) with mean score1.00 which shows that there respondents disagree to apply at Nifas-Silk-Lafosub city health center.

Finally, the study revealed challenges while undertaking inventory management results shows mixed results where some requires management attention in terms of commodities risk management and systems revision related to setting inventory levels as minimum and maximum stock balances. Some of the challenges that demand due attention include delays in delivery of drugs leading to insufficient inventories, lack of technology, bureaucratic process in procurement, insufficient funds for procurement, and tracking exchange of health commodities with other facilities. On the other hand, a few of the issues do have minimal risk related to losses of health commodities occurs through theft , weak management system ,experience for overstocks health commodities, experience for expire of health commodities, lack of proper training in inventory management , frequent stock outs of essential medicine and delay in delivery of supplies requested.

5.2 Conclusion

Effective inventory management is upheld to be a potential driver for ensuring value for money and quality of care for clients. Minimizing total inventory of cost through identifying an optimum level of inventory that an organization holds is the way forward. A well-functioning inventories management will bring both economic benefit in terms of profitability and bring good image to the company. It will enable the company to undertake projects on time and bring out quality finished products of the company. When company implements effective inventories management systems, the firm's efficiency is enhanced

Inventory management ensures that the firm does planning ahead of time to avoid shortages and make sure that right quality of materials are at the right place at the right time. Inventory management is very important since it enables firms to avoid locking their money in inventories and help build good and permanent relationship with suppliers. To ensure that the inventory management plans and policies are being followed, it is important to set up effective and efficient monitoring systems. This would include recruiting well qualified personnel to manage the inventory system and set up functioning information systems which was used to manage the system. Inventory management should not be the preserve of the management and stores or logistics department only but every staff must be made to understand the importance of inventory management.

This study it can be conclude that inventory control technique at Nifas-Silk-Lafosub city health center is only applicable to long-term agreements between the health center and its suppliers, but other hand uses Enterprise Resource Planning system, maintains a data base for all suppliers, uses Just In Time stock control system (where no safety stocks are kept) and an integrated information sharing system were not applicable at Nifas-Silk-Lafosub city health center. These are because of poor support modern technologies. In addition to that there were no the use of an integrated information system by Nifas-Silk-Lafosub city health center to connect particularly between staffs in the organization.

The flow of stock and information practices at Nifas-Silk-Lafosub city health center health commodities to be of maintain proper store management the majority of the store managers had adequate knowledge how to store and practiced health commodities and they had also a positive attitude towards the importance of appropriate storage of

commodities. But program stores and service unit should only report actual stock level preferable on an electronic way, which feeds in to regular LMIS &is easy to use, example automatic transfer of actual consumption data immediately when used and appropriate persons should not be responsible for quantification. In other hand responsible for all health commodities quantified & purchase by head of pharmacy at Nifas-Silk-Lafosub city health center.

In addition to this it can be conclude more practiced physical inventory management at Nifas-Silk-Lafosub city health center were, obsolete, expired, or damaged inventories properly identified, management have review the reconciliation of physical inventory counts to the inventory records, keep one location in the same health commodity item and inventory records reconciled (and differences explained) to advantage reports on a regular basis (Current inventory is adjusted at year-end by fiscal yearend physical counts but, the health center uses Electronic Data Interchange Technology (EDI) and the health center uses automatic stock tracking not practiced at Nifas-Silk-Lafosub city health center.

Finally, from this study it can be concluded that inventory management skills level of personnel involved in health commodity in Nifas-Silk-Lafosub city health center studied was poor. Most of the personnel did not know methods to be used in controlling inventory and those for quantifying health commodities needed. Other challenges faced , weak management system, lack of proper training of inventory management, insufficient funds for procurement, experience for stock out of health commodities, the length of bureaucratic processes in the procurement system and lack of funds to procure the health commodities, lack of technology in inventory management is also another challenge andexchange of health commodities from other health center without properly record system it is leading to corruption and affect budget .In general the consequences of the above were occurred high level of stock out which might have leaded to services interruptions at Nifas-Silk-Lafosub city health center health commodities.

5.3 Recommendations

Based on the results of the study, the following recommendations are suggested for consideration. It strengthens the health commodity management practice of the health center if the following viable actions would have been taken through instituting a system of tracking mechanisms to account for swapping and exchange of health commodities with other health facilities , use of enterprise resource planning system and maintaining an updated database for all suppliers, and allocation of reasonable resources. Besides, it's mentionable to look for opportunities to deploy information technologies including open source applications to increase information sharing and reduce costs and ultimately improve quality of service. Adoption of enabling technologies such as a Logistics Information System (LIS), often in the form of Electronic Data Interchange (EDI) or Value Added Network (VAN) or the internet is desirable So that all staffs in the inventory management can gain access to timely information for sound decision-making. Using software technology for keeping records instead of manual methods can help in improving inventory management. Stock cards and bin cards should be updated regularly used for all products to track the level of stock and prevent stock outs to minimize services interruptions for all health commodities stores .It is also recommended that all stores should be adopted good inventory management practices by NGOs supported for program store. In addition to that members of staff should have been trained in inventory management. These had inventory management knowledge which improves the availability and the quality of services in Nifas-Silk-Lafosub city health center.

It is recommended that improving the management systems, processes and procedures coupled with appropriate personnel involved in demand quantification and procurement processes will pay off the efforts. Besides, it demands government commitment to simplify its bureaucratic processes in the procurement system, allocation of adequate budget to prevent stock out of health commodities. On other hand, strong engagement with other stakeholders like NGOs, PFSA and other suppliers will contribute in filling the gap related to health commodities management through in-kind donations and capacity building schemes through training.

5.4 Suggestions for Further Research

A similar study should be conducted in the other health centers under Addis Ababa to know the extent of implementation of inventory management practices. This will create a comparison on the findings upon which reliable conclusion can be made based on facts. Moreover, it would be interesting to investigate the extent to which private health centers implement inventory management practices and what public health centers can learn, if anything, from them in relation to quality health care service delivery on efficient and effective inventory management. This will provide insights into areas for improvement for the health sector as a whole.

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Annex I: Consent form in English

I_____ here by giving my consent for giving accurate information about the status of health commodities inventory management practice. Health facility as recommended by the researcher/data collector and to answer those commodities questions. I understand there is no problem within my position in the health facility by participating in this assessment at the beginning as well as at the end of the study. I believe that at the end of study the result will not refer individual facilities but rather will describe the overall picture of all facilities.

Participants Name _____ Signature_____ Date_____

Researcher's Name_____ Signature _____Date_____

Thank you in helping with this important study.

Annex II Questionnaires

Dear Respondents

This questionnaire is part of a project work required by Jima University College of Business and Economics as a partial requirement for the award of a Master of Business administration degree. The questionnaire is designed to gather relevant data for the thesis entitled "Health commodities Inventory Management Practices & Challenges at Nifas Silk Lafto Sub-city health center, Addis Ababa". All information you will provide can be used only for academic purpose and shall be treated strictly confidential. Please answer the following questions freely without indicating your name.

PART 1: Background Data

1. Your Gender?

MaleFem☐   ☐

2. Age category

Less than 20 years31-40 yea☐   ☐

21-30   years   41☐ears 51years& above ☐   ☐

3. Marital Status:

SingleDivorced   ☐   ☐

MarriedSeparated   ☐   ☐

4. Level of education

Certificate1st Degre☐   ☐

DiplomaMaster'sot☐………   ☐   ☐

5. Profession:

Pharmacy ☐   Clinical Nurse ☐   Health officer ☐

LaboratoryH☐   Urban WorkersPleasespe☐f other……..   ☐

6. Current position

Managementjuni☐aff   ☐

Senior staff ☐

7. 7. Department at which you are currently working

☐   ☐   ☐   ☐

ART   LaboratoryTuberculosis (TB)B   EPI

Stores P[   ]nacyManagement   [   ]   [   ] OPD   [   ]

8. How long have you worked for the health center?

Less than 1 year4 – [   ]ears   [   ]

1 – 3 years 7 – 9 ye[   ]0 years and above   [   ]   [   ]

	PART 2.INVENTORY MANAGEMENT PRACTICE								
	Strong Disagree	Disagree	Neutral	Agree		Strong Agree			
	1	2	3	4		5			
	Please the extent to which you agree with the following as practiced at health center								
	Inventory control technique			1	2	3	4	5	
1	The health center set and maintain stock levels defining safety stock , maximum level, minimum reorder level to avoid excess stock and being out of stock for levels for health commodities								
2	The health center uses of periodical replenishment of stocks								
3	The health commodities stocknot coded								
4	Long – term agreements between the health center and its suppliers								
5	The health center store activities have automated								
6	The health center uses Enterprise Resource Planning system								
7	The health center has an integrated information sharing system								
8	The health center maintains a data base for all suppliers								
9	The health center uses Just In Time stock control system (where no safety stocks are kept)								
10	The health center uses ABC/VEN(Vital, Essential and non-essential) analysis to classify items according to their stock value								
11	Use of ABC/VEN(Vital, Essential and Non-essential) analysis								

	leads to efficient management of resources					
	Flow Stock &information					
1	Separation of damaged or expired products and removal from Stock					
2	Maintain separate records for all health commodities					
3	There are list of essential health commodities					
4	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel					
5	Head of department have determines the quantity of commodities to be ordered					
6	Head of department of pharmacy have responsible for procurement					
7	The health center have standard guide line for health commodities storage and management					
8	Products are stored and organized in a manner accessible for first-to-expire, first-out counting and general management					
	Physical Inventory management					
1	The health center uses automatic stock tracking					
2	Adequate detailed written inventory instructions and procedures Exist					
3	Obsolete, expired, or damaged inventories properly identified and segregated					
4	The health center uses Electronic Data Interchange Technology (EDI)					
5	Adequate procedures in place to identify inventory counted, ensure that all items have been counted, and prevent double counting					
6	Inventory records reconciled (and differences explained) to Advantage reports on a regular basis (Current inventory is Adjusted at year-end by fiscal year-end physical counts.)					

	Challenges of inventory management					
1	Delays in delivery of drugs leading to insufficient inventories					
2	Use of manual inventory management system/Lack of technology					
3	Bureaucratic process in procurement					
4	Losses of health commodities occurs through theft					
5	The health center have weak management system					
6	Insufficient funds for procurement					
7	Experience for overstocks of health commodities					
8	Experience for expire of health commodities					
9	Experience for exchange of health commodities					
10	Lack of proper training of inventory management					
11	The Stock outs of essential medicine is a regular situation					
12	Long time it take your unit to receive commodities once a request has been placed					

Do you have any other additional suggestions and comments related to health commodities management at your facility?

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Thank you very much for your time and support

Annex III observation check list and results

Observation of health center medical commodities stores and answers

Description Yes/No Comments

1. Products that are ready for distribution are arranged so that identification of labels and expiry dates and/or manufacturing dates are visible. a) Yesb)No ☐ ☐

2. Products are stored and organized in a manner accessible for first-to-expire, first-out (FEFO)counting and general management. a) Yes b) No ☐ ☐

3. The facility makes it a practice to separate damaged and/or expired products from usable products and removes them from inventory. a) Yesb) No ☐ ☐

4. Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel. a) Yes b) No ☐ ☐

5. Knowledge of responsible personnel about the method how to store medical commodities. a) Yes b) No ☐ ☐

6. Store room is maintained in good condition (clean, all trash removed, sturdy shelves,organized boxes. a) Yes b) No ☐ ☐

7. The current space and organization is sufficient for existing products and reasonable expansion.a) Yes b) No ☐ ☐

8. Bin cards are Availability?a) Yes b) No ☐ ☐

9. Are bin cards updated a) Yes b) No ☐ ☐

10. Are there overstocks a) Yes b) No ☐ ☐

11. Are there exchange health commoditiesfrom other health center? a) Yes b) No ☐ ☐

12. Are there expired items a) Yes b) No ☐ ☐

13. Are stock cards available? a) Yes b) No ☐ ☐

14. Is the stock card match with the bin card? a) Yes b) No ☐ ☐

15. Are there written guideline for storing medical supplies or commodities according to their specification. a) Yesb) No ☐ ☐

16. Does this facility use a maximum stock level for medical commodities? a) Yes b)No ☐ ☐

17. Does this facility use a minimum stock level for health commodities.a) Yes b)No ☐ ☐

18. The health center uses automatic stock tracking.a) Yesb) No ☐ ☐

Annex IV Interview questions

1. Does this facility apply any methods for periodic replenishment of stock?

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2. Are there long term agreements between the health center and its suppliers? If yes who is the Supplier?

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3. Who is responsible for procurement & is that proper person? Why?

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4. Are there exchanges of health commodities from other health center? If yes, what are the reasons of exchange which type of commodities are exchanged?

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5. Are there count physical inventory at regular basis?

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