ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT

ASSESSMENT OF HEALTH COMMODITIES INVENTORY MANAGEMENT PRACTICES AND CHALLENGES: THE CASE OF ZEWDITU MEMORIAL HOSPITAL, ADDIS ABABA, ETHIOPIA

A THESIS SUBMITTED TO ADDISABABA UNIVERSITY, SCHOOL OF COMMERCE, DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE MASTERS OF DEGREE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

BY

AZEB SEMAHEGN

ADDISABABA, ETHIOPIA

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ADVISOR

TARIKU JEBENA (PhD)

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"Assessment on Health Inventory Management Practices and challenges: The Case of Zewditu Memorial Hospital"

By

Azeb Semahegn

Approved by Board of Examiners and Advisor

Advisor	Signature	Date
Tariku Jebena /PhD/	_____	_____
Internal examiner	Signature	Date
Teklegiorgis	_____	_____
Examiner	Signature	Date
Abebe Ejigu/ _____	_____	_____
Chairman of Graduate Committee	Signature	Date
_____	_____	_____

DECLARATION

I hereby declare that the work which is being presented in this thesis entitled An Assessment on health commodities inventory management practices & challenges: The case of Zewditu Memorial Hospital is original work of my own, has not been presented for a degree of any other university and that all sources of material used for the thesis have been duly acknowledged.

Azeb Semahegn _____ Date_____

CERTIFICATION

This is to certify that the thesis prepared by Ms. Azeb Semahegn, entitled "An Assessment on Health Commodities inventory management practices and challenges: The case of Zewditu Memorial Hospital", a thesis submitted to Addis Ababa University, school of commerce, department of logistics and supply chain management in partial fulfillment of the requirements for the Degree of Master of Arts in Logistics and Supply chain Management, complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

Advisor	Signiture	Date	Place
Tariku Jebena (PhD)	_____	_____	Addis Ababa,Ethiopia

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Contents

ABSTRACT

Background: Health commodities inventory management practices provide current information on quantities of health commodities consumed as well as enables to accurately estimate requirements for future use. A poorly functioning health commodities inventory management can lead to frequent stock outs leading to services interruptions or overstock.

The objective of the study was to assess the health commodities inventory management practice of the Zewditu Memorial Hospital using primary data that was collected through a semi-structured questionnaire, observation check list & interview. Out of the 91 questionnaires that were distributed to the purposively elected employees of the hospital, 77 (84.6%) of them were collected back and used for the analysis .Besides 4 hospital stores were visited & all the required information were included in this study .Data was analyzed using descriptive statics . The study found that ZMH health commodities to be long-term agreements between the hospital and its suppliers, 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, obsolete, expired, or damaged inventories properly identified and segregated, inventory records reconciled to advantage reports on a regular basis and management have review the reconciliation of physical inventory counts to the inventory records applied at ZMH but ,uses automatic stock tracking and adequate detailed written inventory instructions and procedures exist, uses Enterprise Resource Planning system, maintains a data base for all suppliers, uses Just In Time stock control system and an integrated information sharing system were not applicable at ZMH. Finally from the study it can be concluded that the main challenges of the hospital in managing inventory are: 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. In general the consequences of the above were occurred high level of stock out which might have leaded to services interruptions at ZMH health commodities.

Based on these findings, the study recommends that government allocates more funds to public hospitals to be invested in modern information technologies because this will lead to increased information sharing, reduction of costs and improved quality of health services. In addition, inventory management training should be given to improve the availability and the quality of services in ZMH.

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

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ACRONYMS

AAHB	Addis Ababa Health Bureau
AIDS	AIDS Acquired Immune Deficiency Syndrome
ARHC	Addis Ababa Region Health Centre
ART	Anti retroviral Therapy
DLMS	District level management of store
EOQ	Economic order quantity
FEFO	First expire first out
FMOH	Federal Ministry of Health
FP	Family Planning
HC	Health center
HIV	Human immunodeficiency virus
IM	Inventory Management
ITR	Inventory turnover ratio
JIT	Just-In Time
MSH	Management Science for Health
NLSM	National level management of store
PFSA	Pharmaceutical Fund and Supply Agency
SCM	Supply Chain Management
SOPs	Standard operation Procedure
TB	Tuberculosis
VEN	Vital, Essential & Non essential
VMI	Vendor managed inventory
WHO	World Health Organization
WMS	Warehouse Management System
ZMH	Zewditu memorial Hospital

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Inventory is the commodities, supplies, equipment, and other materials those are available in stock in an institution (Ministry Of Medical Services, 2016). Commodity management is the process of getting logistics, controlling, transporting, and storing up and distributing commodities through keeping the commodities financial records. Management of basic health commodities concepts is growing as it is very important in various countries (USAID/Deliver Project, 2016).

Efficient laboratory and medical commodities management ensures that hospital have an up to date inventory count at all times, giving good customer service, giving accurate information to customer and improve image of the hospitals(WHO,2016).Robust inventory management system allows managers to receive real time information on inventory. This will assist management to accurately made informed decisions, anywhere, anytime and save time and cost used for labor and thus working on inventory management properly(USAID | Delivery Project,2016).

The availability of drugs and medical supplies is critical to the success of any healthcare programme. 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 programmes, and in order to sustain these services, numerous medical commodities are required. programmes. 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 programmes (Raja & Mohammad, 2005).

Managing stock effectively is important for any organization, running a hospital is no exception because without enough stock, health services to patients will come to a halt. Stock represents the largest single investment in assets for most organizations. In most organizations, employees have become habituated with high levels of commodity availability resulting in higher stock

holding levels (Chopra and Meindl, 2007). The terms “stock” and “inventory” can be used interchangeably. 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 levels should also be indicated on the stock records. Items should not be issued unless covered by Materials Requisition form (Esther, 2015).

1.2 Statement of the Problem

According to Wisner and Leong et al (2011) define inventory management is 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. Shapiro et al 2009 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).

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 life saving 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 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 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. ZMH is a service rendering institution and one that keeps stock to facilitate operations.

To meet the expectations of the people, one can think of how to control inventory in the hospitals to ensure availability of medical supplies at the right time and at their right quantity in other to avoid expiry of drugs and misuse of the supplies. The resources are limited and hence the need to find the possible and effective ways of reducing cost of purchase and the cost of holding inventory in health sector.

Health facilities must provide 24 hour services and accordingly, the need to keep stocks of certain medicines and other medical supplies to be able to discharge their duties effectively. This thesis was focus on assessment the practices and challenges of health commodities inventory management at ZMH.

1.3 Research Questions

The thesis was initiated to provide answers fort of the study:

1. What are the inventory control techniques used by ZMH for health commodities?

2. How does ZMH manage the flow of stock and information of health commodities?

3. What are the mechanisms of inventory record & counting practiced by ZMH for health commodities?

4. What are the challenges related to managing inventory of health commodities at ZMH?

1.4 Objective of the Study

1.4.1 General Objective of the study

The major objective of the research is to assess health commodities inventory management practices and challenges at ZMH.

1.4.2 The specific objectives of the study are:

1. To assess the inventory control techniques used by ZMH for health commodities
2. To assess the practice of flow of stock and information management of health commodities at ZMH.
3. To assess inventory record & counting practiced of health commodities at ZMH.
4. To assess challenges related to inventory management of health commodities at ZMH

1.5 Significance of the Study

This study is designed to address health commodities inventory management practices and challenges at ZMH and proper corrective action measures to strengthen health commodities inventory system. Because health product inventory management in hospitals 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.

The study is come up with appropriate suggestions on the right goods in the right condition and right quantity are at the right place, at the right time and for the right cost would be managed in Zewditu memorial hospital healthcare delivery so as to be able to satisfy their requirement

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. In addition to this, the study will be useful to researchers to undertake further research into the area of inventory management in the public sector.

1.6 Scope of the Study

This study focuses on the practices and challenges of health commodities inventory management at ZMH. Zewditu memorial hospital is one of public hospital in Addis Ababa directly under supervisory Addis Ababa City Health Bureau/AACHB/. Also, this hospital becomes the highest referral hospital for Addis Ababa Health Centers/AHCS/.

The management of medicines, medical supplies, laboratory reagents was also cover by this study. The Data are gathered from store keepers, pharmacy professionals, laboratory specialists, head of OPD and department head of the ward in the hospital staffs with specific focus on those officers responsible for acquiring and managing the hospital stocks.

1.7 Limitation of the Study

Firstly, the study only focuses on a single hospital in Addis Ababa under AACHB. Secondly, time constraints and material resources will challenges that limit the depth of coverage of the research work. Finally limited number of health commodities in inventory management in similar study especially in Ethiopia made it difficult for comparing results.

1.8 Operational definition of Terms

Inventory management

The process of efficiently overseeing the constant flow of units into and out of an existing inventory:- Commodities include drugs, medical supplies and laboratory reagents

Stock out:-Depleted supply of a given product a zero stock balance.

Overstock:- A supply imbalance that occurs when stocks exceed the established maximum level may result in losses due to expiry.

Stock card:-A generic name for an inventory control card

Bin card:-Which records received or issued data

Inventory :- Store of goods

The lead time:-Between the placement of an order and delivery is one of factors which influence the customer satisfaction

1.9 Organization of the Study

The research is organized in such a way that, the background, literature review and research design and methodology are presented in chapter one, chapter two and chapter Three respectively. Chapter four briefly present data analysis, interpretations and discussions. The last chapter five contains summary of findings conclusions, recommendations and Suggestions for future research are found at the end.

CHAPTER II

RELATED LITRATURE REVIEW

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, an apt 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 Nzuza et.al (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 is a very important function that determines the health of the supply chain as well as the impacts the financial health of the balance sheet. Every organization constantly strives to maintain optimum inventory to be able to meet its requirements and avoid over or under inventory that can impact the financial figures(http://www.managementstudyguide,2017).

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 co-operation ,ranging from informal trading relationships through to partnerships (waters, 2003).
T 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, the cost associated with inventory (Eucnice,2011).

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 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).

2.3 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 labour 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).

2.4 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 . Thus, are

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, for example Stock and Lambertet.al (2001).

Raw materials will allow the firm to achieve the following benefits:

1. To take advantage of quantity discount of market prices..
2. To guard against inflation.
3. To provide strategic stocks of items which could be in short supply due, for instance, to strikes or other supply problems
4. 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

Buffer stock is a stock allowance to cover errors in forecasting the lead time or the demand during the lead time Luceyet.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)

2.5 Tips to effective inventory management for health care facility

Cutting costs in hospital 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. (JumpTech 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 (JumpTech Blog, 2013).

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 (JumpTech 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 (JumpTech Blog, 2013).

2.6 Inventory control system

Donnely (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. But what are the challenges Foster et.al, (1990)? Appropriate inventory management at the various levels of the supply chain is crucial for effective distribution from the various warehouses (Anna 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) .

2.7 Benefits for Inventory control in hospital

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 (start up bizhub, 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 (start up bizhub, 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 f 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 (start up bizhub, 2011).

2.8 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:

2.8.1 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

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 (Rachmania ,2012) .

2.8.2. 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 (http://businessjargons.com,2017).

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.

"When assigning VEN categories of medicines we used expert method", comments Lilia Ziganshina, Head of the Department of Basic and Clinical Pharmacology at Kazan Federal University", "the assignment of categories was carried out by clinical pharmacologists after

reviewing all available evidence on effectiveness, safety and cost-effectiveness compared to other drugs in this group".

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 consists 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." (http://businessjargons.com, 2017).

2.8.3. JIT

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 companies. 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).

2.8.4. 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 co-operation 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).

2.8.5 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 W(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).

2.9 Physical 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 (Smartturn,2014).

2.10 Benefits 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(www.software4manufacturers.com,2009).

2.11 Technology 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 as old 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).

2.12 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. There is also the time consuming task of planning the physical inventory. You've got to take many things into consideration –how many counting teams are required, how many man-hours it will take to get the job done, how much overtime you are willing to impose on your team on their day off, how many recounts are required, how much equipment is needed, whether you have enough gear or material, how much food you will need to buy – and if that isn't enough

to keep you busy, have you planned out strategies for "no-shows" and do you have enough instructions for everyone to understand what to do?(www.software4manufacturers.com,2009).

2 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)

2.13 Empirical literature

In Nigeria poor planning and forecasting, insufficient information about consumption and current stock levels, funding and capacity constraints and a poor infrastructure are reasons for inappropriate stock levels Transaid, et.al(2010). Public warehouse infrastructure in Nigeria consists of NLMS, DLMSs and HCs, whereas challenges increase further down the supply chain. In Nigeria there are eight NLMSs, which struggle with moisture, leaking ceilings, roofs, drains or taps, inappropriate cold storage capacity Federal Ministry of Health et.al (2010) and non-existent designated areas for reception, delivery and quarantined products. However, Federal Ministry of Health (2010) states that there are special areas for the storage of dangerous and narcotic medicine, products requiring cold storage, possibilities to secure products and stores are shaded from direct sunshine. Stock management is done manually with stock holding cards and follows the first-expired-first-out (FE-FO) strategy(Anna Schöpperle, 2013).

A study conducted in China by Jianling et al(2010) on the Analysis of inventory Management in the China enterprises reveals that, in order for organizations to maintain exuberant competitive advantages and higher profitability, they need to pay more attention on stocks control system. He adds that organizations need to adopt effective stocks control methods in their internal control system and implement scientific stocks control ways (Pallangyo, 2014).

A study conducted by Silumbe (2011) state that in Dar Es Salaam, Tanzania, shows that, despite the government efforts in ensuring availability of drugs, there is a significant stock out

period due to poor pharmaceutical management of ant malarial medicines in the public health facilities. This study does not address the weakness of stocks control system and their effects on the availability of drugs and medical supplies US Agency for International Development et.al (2003).

In Namibia there is Central Medical Stores (CMS) from which health facilities are expected to order products. An assessment conducted on the CMS distribution shows that stock records were not adequately maintained and physical inventory counts did not correspond with either stock records or computerised records. It is argued the cause is that, the regional stores and health facilities had no effective systems for deciding when, what, or how much to order, most facilities ended up placing many emergency orders. (MSH,2008).

In Malawi the Principal Secretary of Health Ministry et.al (2013) state that drugs stock outs was amounting to 95%. It was noted that causes were theft, tedious and bureaucratic process of procuring drugs and parallel system to purchase medication for treatment programmes. The identified causes of stock outs in this case are within the stocks control system and they are revealing the weakness of the system. (Pallangyo, 2014).

The reviewed literatures show that efficient health commodities inventory management is important for health facilities to achieve their establishment objectives which are provision of health services to the community.

CHAPTER III:

RESEARCH METHODOLOGY

3.1 Description of the Study Area

Zewditu Hospital is a hospital in central Addis Ababa, Ethiopia. It was built, owned and operated by the Seventh-day Adventist Church, but was nationalized during the Derg regime in about 1976. The hospital is named after Empress Zewditu, the cousin and predecessor on the throne of Emperor Haile Selassie. Today the Zewditu Hospital is operated by the Ministry of Health. Zewditu Hospital is Ethiopia's leading hospital in the treatment of ART patients

This study was conducted in Zewditu memorial hospital in Addis Ababa, Ethiopia. The hospital is providing comprehensive medical services under the management of Addis Ababa health bureau.

3.2 Research Approach

Both of qualitative and quantitative data were collected. Qualitative data was gathered through observations and interviews & Quantitative data is gathered through questionnaires. Hence, this proposed study was use a mixed research approach.

3.3 Research Design

The study based cross sectional descriptive study design to assess the hospital 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 hospital pharmacy store conditions by direct visit and comparing the store condition against a standard check list.

3.4 Population of the study

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 hospital have 561 technical workers including 58 medical doctors including 15 specialized in different profession,332 nurses, 32 laboratory workers, 27 pharmacy staff, 52 other professions and 274 supportive staff. In addition, there were 60 technical staffs for further studies.

3.5 Sample size of the study

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 hospital. Convenience sampling was used to select a representative number of the different units of the hospital. The sample size for the study was 91 employees of direct related to inventory management such as all Pharmacy professionals (27) including all store keepers (4) &head of pharmacy (1), all laboratory professionals (32) including head of laboratory(1) and head of each department ward and OPD (32) who has present during the study period. On the other hand observation checklist has made on assessment of hospital pharmacy store conditions. Both quantitative and qualitative data collection techniques have used. This study includes all responsible staff of the hospital have involved in health commodities inventory management which fulfill the inclusion criteria during the study period.

3.6 Variable of the study

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.

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

3.7 Data Types, Sources & Collection

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.

3.8 Ethical Consideration

Ethical clearance was obtained from Addis Ababa University School of Commerce. Permission was obtained from ZMH. 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 will unnecessary.

3.9 Data Analysis plan

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.

3.10 Validity and Reliability

Validity of the study

To ensure validity of a study, a pilot study was conducted and the results were scrutinized by both the researcher and statistician. 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 5 persons from the Stores (2) Dispensary pharmacy (2)and head of pharmacy (1) in ZMH. The five persons were given twenty 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 researchers’ used. These reference states in questionnaires annex V.

Reliability

In this study, a reliability test was performed in order to see whether the study was given similar results if the same study is repeated. Reliability refers to the degree to which the instrument was given the same results if a survey is repeated on the same sample Parasuraman, Grewal & Krishnan et.al(2007: 133). To ensure reliability of this study, a Cronbach's Alpha was performed as a measure to see if the study repeats the same results if the same experiment is performed again and validity is an instrument to see if the study measures what it intended to measure. The reliability of the instruments &data was established following a pre-test procedure of the instruments before their use with actual research respondents by Cronbach's Alpha was be used to test reliability of the study.

Cronbach's Alpha	N of Items
.939	44

As per the above result found from the data collected from 77 respondents the overall Cronbach‟s alpha score is 0.939. Nunnally, (1978) has indicated 0.7 to be an acceptable reliability coefficient, since score of 0.940 is above the standard threshold level the questionnaire were reliable

CHAPTER FOUR

RESULT AND DISCUSSION

4.1 Introduction

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 ZMH.

A total of 91 questioners were distributed to 27 pharmacy professions within these 4 store keeper,1 department head or management, 32 laboratory professions and 30 ward and OPD head all hospital stores(4) were visited & all the required information were included in this study. Finally 77 questionnaires were returned but 14 questionnaires not returned which represents nearly 84.6% of the total sample size.

The findings of the study were presented to answer the leading research questions. The results are categorized according to various inventory management issues dealt with in this study. Data collected through questionnaire were organized and analyzed using percentage and mean scores.

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. Based on the assertion, the response rate was considered to be excellent.

4.2 Socio-Demographic Characteristics of Study Participants

In this section of the research report, a brief description of sample at ZMH with respect to their personal and general information is presented.

Demographic Characteristics

The results as shown in the table 1 below, females(62.3%) & males (37.7%) majority of the respondents were females at 62.3% while male were (37.7%).This indicates that majority of the staff working in the organization were female.

Age in years

The respondents were asked to show their age in years,34 (44.2%) were between ages 21-30 years; 26(33.8%) were between 31 to 40 years of age& 17(22.1%) 41 were between ages41-50

Educational level

The respondents were asked to show their education level. The results as shown in the table 4.1educational background of the respondents 3 (3.9%) were Master's degree holders; 53(68.8) were degree and were followed by diploma 21 (27.3%).

This means that majority of those working in the organization had attained education up to university level and had gained rich information and they were conversant with the process, therefore they were appropriate for responding to our study questions.

Work experience

The respondents were asked to show their work experience 1(1.3%) of respondents had less than one year's work of experience, 14 (18.2%) between 1-3 years;33(42.9%) between 4-6 years, 9(11.7%)between 7-9 years and 20 (26.%) were greater than 10 years of experiences.

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 our study questions

Profession

The respondents were asked to show their professions 25 (32.5%) were pharmacy professional's, 28(36.7%) were laboratory professional's;21(27.3)were Nurses/health officer's and 3 (3.9%) other's.

Position

In the position of the respondents 1(1.3) were management,58(75.3%) were senior staff's,18(23.4%)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 our study questions

Department

In the department of the respondents 8(10.4) were OPD, 4(5.2%)were store,20(26%) were pharmacy ,28(36.4) were laboratory,16(20.8%) were ward & 1(1.3%) were management(head of pharmacy).

This means that all responsible staff of the hospital have involved in health commodities inventory management.

Marital status

Furthermore, As indicated in the table 1;, marital status of the respondents'32(41.6%) were nevermarried;37(48.1%) were married;7(9.1%) were divorced;1(1.3) were separated.

Table 4.1: Socio-demographics Characteristics of Respondents at ZMH

Socio-demographics	Socio-demographics Characteristics	Frequency	%
Sex	Female	48	62.3
	Male	29	37.7
Age	Less than 20 years	0	0
	21-30 years	34	44.2
	31-40 years	26	33.8
	41-50 years	17	22.1
	51years and above	0	0
Marital Status	Never married	32	41.6
	Married	37	48.1
	Divorced	7	9.1
	Separated	1	1.3
	Widowed	0	0
Education	Master's degree	3	3.9
	Degree	53	68.8
	Diploma	21	27.3
	Certificate	0	0
Profession	Pharmacy Profession	25	32.5
	Laboratory Profession	28	36.7
	Nurse/Health officer	21	27.3
	Other	3	3.9
Position	Management	1	1.3
	Senior Staff	58	75.3
	Junior Staff	18	23.4
Department	OPD	8	10.4
	Stores	4	5.2
	Pharmacy	20	26
	Laboratory	28	36.4
	Ward	16	20.8
	Management	1	1.3
Work experience	Less than 1 years	1	1.3
	1-3 years	14	18.2
	4-6 years	33	42.9
	7-9 years	9	11.7
	10 years and above	20	26

Source: Own survey,2017

4.3 Result and Discussion on inventory management practices at ZMH

In this part of the study‘s report, analysis conducted on data gathered to assess the inventory management practices & challenges at ZMH is presented in relation to the objectives of the study. Descriptive statistics was used to analyze the data in this study is based on the responses of sample respondents on their in to account that numbers 1, 2, 3, 4 and 5 represent strong disagree, disagree, neutral, agree and strong agree, respectively. The result of the study in inventory management practices and challenges showed that the scores of strongly disagree have been taken to represent a variable which had a mean score of 0 to 1.5, the scores of disagree have been taken to represent a variable with a mean score of 1.5 to 2.5, the score of neutral have been taken to represent a variable which had a mean score of 2.5 to 3.5, the score of agree have been taken to represent a variable which had a mean score of 3.5 to 4.5 and the score of strongly agree have been taken to represent a variable which had a mean score of above 4.5.A standard deviation of >0.9 implies a significant difference on the impact of the variable among respondents. The findings are presented in the below:

4.3.1 Health Commodities Inventory Control Techniques Practices of ZMH

Table 4.2 shows the descriptive statistics of inventory control techniques of health commodities inventory management practices at ZMH based on arithmetic mean and standard deviation.

In terms of maintain maximum, minimum and re-order levels for health commodities, established procedures for placing emergency orders, uses of periodical replenishment of stocks , practices vender managed inventory system, long-term agreements between the hospital and its suppliers , use of suppliers to manage inventory on behalf of the hospital (Vendor managed Inventory) , uses Enterprise Resource Planning system , an integrated information sharing system , maintains a data base for all suppliers, uses Just In Time stock control system (where no safety stocks are kept), uses ABC/VEN(Vital, Essential& Non essential) analysis to classify items according to their stock value, use of ABC/VEN(Vital, Essential& Non essential) analysis leads to efficient management of resources , the mean scores of the respondents were 2.03,2.29,2.4,2.48,2.64,2.68,2.91,2.95,3.13,3.19,3.29 and 3.61respectively. The standard

deviation show the spread of ideas of the respondents and from the table the standard deviation ranges from 0.811 to 1.396 indicating that it is a small value thus respondents were agreeing to the same idea. Generally, based on the above concept the average mean and standard deviation of the total item of inventory control techniques represents 2.80 and 1.1137 respectively, which shows that inventory control technique neither applied below nor above or neutral and standard deviation indicating that it is a small value thus respondents were agreeing to the same idea. However, long-term agreements between the hospital and its suppliers with mean score 3.61 which shows that agree at ZMH to applied. In 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 with mean score2.03, 2.29, 2.40 and 2.48 respectively, which shows that disagree to applied at ZMH.

As observed in our study ZMH health commodities all stores were applied for inventory practices of minimum & maximum stock level, but used manually because of this not accurate stock level. In addition to that found in our study by interview, majority of interviewee were agreed uses consumption data and Stock replenished manually. In this study was comparable with the study done in China the Analysis of inventory Management in the China enterprises reveals that, in order organizations to maintain exuberant competitive advantages and higher profitability, they need to pay more attention on stocks control system. He adds that organizations need to adopt effective stocks control methods in their internal control system and implement scientific stocks control ways (Pallangyo,2014).

Table 4.2 : Descriptive Statistics for inventory control techniques

#	Items	N	Mean	Std. Deviation
1	The hospital Establish Maximum, Minimum, and Re-order levels for the health commodities	77	2.95	1.224
2	The hospital established procedures for placing emergency orders	77	3.19	1.396
3	The hospital uses of periodical replenishment of stocks	77	2.64	1.157
4	The hospital practices vender managed inventory systems	77	2.68	1.219
5	Long – term agreements between the hospital and its suppliers	77	3.61	1.053
6	Use of suppliers to manage inventory on behalf of the hospital (Vendor managed Inventory)	76	2.91	1.11
7	The hospital uses Enterprise Resource Planning system	77	2.03	0.811
8	The hospital has an integrated information sharing system	77	2.48	1.021
9	The hospital maintains a database for all its suppliers	77	2.29	1.086
10	The hospital uses Just In Time stock control system (where no safety stocks are kept)	77	2.4	1.055
11	The hospital uses ABC/VEN(Vital, Essential& Non essential) analysis to classify items according to their stock value	77	3.13	1.196
12	Use of ABC/VEN(Vital, Essential& Non essential) analysis leads to efficient management of resources	77	3.29	1.037
	Valid N (listwise)	76		
	Aggregate mean and Average standard deviation		2.8	1.114

Source: Own survey, 2017

4.3.2 Health Commodities Flow and Information Management Practice of ZMH

Table 4.3 shows the descriptive statistics of flow stock & information of health commodities inventory management practices at ZMH based on arithmetic mean and standard deviation.

Table 4.3: Descriptive Statistics for flow stock & information

#	Items	N	Mean	Std. Deviation
1	Separation of damaged or expired products and removal from stock	77	3.17	1.342
2	Maintain separate records for all health commodities	77	3.79	0.978
3	There are list of essential health commodities	77	3.74	1.140
4	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.	77	3.58	1.196
5	Separate location for quarantine commodities?	77	3.87	0.991
6	Logistics Management Information System formats and Job Aides are available at the ZMH	77	3.42	1.116
7	Head of department have determines the quantity of commodities to be ordered	77	3.53	1.008
8	Head of department of pharmacy have responsible for procurement	77	3.86	1.243
9	The hospital have standard guide line for health commodities storage and management	77	3.39	1.248
10	Products are stored and organized in a manner accessible for first-to-expire, first-out counting and general management	77	3.68	0.818
	Valid N (listwise)	77		
	Aggregate mean and Average standard deviation		3.603	1.108

Source; Own survey,2017

Table 4.5 shows the descriptive statistics of challenges of inventory management of health commodities inventory management practices at ZMH based on arithmetic mean and standard deviation.

In terms of damaged or expired products and removal from stock Separation of damaged or expired products and removal from stock, the hospital have standard guide line for health commodities storage and management, LMIS formats and job aides are available, head of department have determines the quantity of commodities to be ordered, products are stored and organized in a manner accessible for first-to-expire, first-out counting and general management, there are list of essential health commodities, maintain separate records for all health commodities , storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel, head of department of pharmacy have responsible for procurement and Separate location for quarantine commodities, with the mean scores of the respondents were 3.17,3.39,3.42,3.53,3.58,3.68,3.74,3.79,3.86, and 3.87 respectively. The standard deviation show the spread of ideas of the respondents and from the table the standard deviation ranges from 1.818 to 1.342 indicating that it is a small value thus respondents were agreeing to the same idea. Generally, based on the above concept the average mean and standard deviation 3.603 and 1.108 respectively, which shows that flow of stock and information awareness and responsible at ZMH to be agree and standard deviation indicating that it is a small value thus respondents were agreeing to the same idea. However, separation of damaged or expired products and removal from stock , the hospital have standard guide line for health commodities storage and management and logistics management information system formats and job aides are available with mean score 3.17,3.39 and 3.42 respectively which shows that neutral.

As observed in our study ZMH health commodities all stores were applied for inventory practices such as arrangement of items in the store, products are stored & organized in FEFO(first expire first out) & space , secured storage practices , separate expired/damaged products, knowledge of responsible person, store room maintain in good condition. But program store only were written guideline available in the store.

Majority of interviewee were agreed uses consumption data fill for internal facilities by IFRR/Internal Facility Resupply requisition & agree the long term supplier from PFSA/pharmaceutical fund & Supply Agency direct procurement by RRF/ RRF/Report requisition form. The study found that total inventories held by ZMH constitute mostly medical consumables. Stock is replenished manually at internal customer request form and for supplier requisition by RRF/Report requisition form & the program store kept an item highly government & at global focus area such as ART,TB & FP .In addition to that the program store is collaborate with PFSA & donors (Delivery Ethiopia, MSH &JHU Tsehay) by system upgrade & facilitate stock availability. In this study was comparable with the study done In Nigeria there are eight NLMSs, which struggle with moisture, leaking ceilings, roofs, drains or taps, inappropriate cold storage capacity Federal Ministry of Health et.al (2010) and non-existent designated areas for reception, delivery and quarantined products. Stock management is done manually with stock holding cards and follows the first-expired-first-out (FE-FO) strategy.

4.3.3 Health Commodities Physical inventory management Practices of ZMH

Table 4.4 shows the descriptive statistics of physical inventory management of health commodities inventory management practices at ZMH based on arithmetic mean and standard deviation.

In terms of The hospital uses Electronic Data Interchange technology (EDI), the hospital uses automatic stock tracking, adequate detailed written inventory instructions and procedures exist, management monitor and approve the write-offs of obsolete and inactive inventories, inventory procedures give appropriate consideration to the location and arrangement of inventories segregated, adequate procedures in place to identify inventory counted, ensure that all items have been counted, and prevent double counting ,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 year-end physical counts.) with the mean scores of the respondents were 2.06,2.43, 2.79, 3.18, 3.47, 3.47, 3.51, 3.55 ,3.64 and 3.64 respectively.

The standard deviation show the spread of ideas of the respondents and from the table the standard deviation ranges from 0.823 to 1.343 indicating that it is a small value thus respondents were agreeing to the same idea. Generally, based on the above concept the average mean and standard deviation of the total item of physical inventory managements represents 3.048 and 1.144 respectively, which shows that physical inventory control neither applied below nor above or neutral and standard deviation indicating that it is a small value thus respondents were agreeing to the same idea. However, 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 year-end physical counts.) with mean score 3.51, 3.55 ,3.64 and 3.64 which shows that the respondents agree to applied at ZMH. In other hand the hospital uses Electronic Data Interchange Technology (EDI) and the hospital uses automatic stock tracking, with mean score2.06 and 2.43 respectively, which shows that the respondents disagree to apply at ZMH.

As observed in our study ZMH health commodities all stores were applied for inventory practices of use of bin cards. Program & budget stores uses automated stock tracking, but only program store updated bin cards. But all stores were not applied inventory management practice of hard copies of stock cards. In this study was comparable with the study done in Namibia there is Central Medical Stores (CMS) from which health facilities are expected to order products. An assessment conducted on the CMS distribution shows that stock records were not adequately maintained and physical inventory counts did not correspond with either stock records or computerized records (MSH,2008). All interviewee agree by physical inventory at regular basis by annually. In addition to this pharmacy department & stores

ministry of health developed a manual (APTS: Auditable pharmaceutical transaction & services) by this manual count the stock every two months

Table 4.4: Descriptive Statistics for Physical inventory management

#	Items	N	Mean	Std. Deviation
1	Management monitor and approve the write-offs of obsolete and inactive inventories	77	3.18	.823
2	The hospital uses automatic stock tracking	77	2.43	1.33
3	Adequate detailed written inventory instructions and procedures exist	77	2.79	1.056
4	Obsolete, expired, or damaged inventories properly identified and segregated	77	3.51	1.263
5	The hospital uses Electronic Data Interchange Technology (EDI	77	2.06	0.908
6	Inventory procedures give appropriate consideration to the location and arrangement of inventories	77	3.47	1.273
7	Adequate procedures in place to identify inventory counted, ensure that all items have been counted, and prevent double counting	77	3.47	1.273
8	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.)	77	3.64	1.146
9	Management have review the reconciliation of physical inventory counts to the inventory records	77	3.55	.953
10	Keep one location in the same health commodity item	77	3.64	1.146
	Valid N (listwise)	77		
	Aggregate mean and Standard deviation		3.174	1.1171

Source: Own survey, 2017

4.4 Challenges of Inventory Management Practices

As a final objective, the researcher sought to determine the challenges faced by ZMH in the implementation of inventory management practices. The results are presented in the table 4.5 below:

Table 4.5: Descriptive Statics for Challenges of inventory management

#	Item	N	Mean	Std. Deviation
1	Delays in delivery of drugs leading to insufficient inventories	77	3.34	1.382
2	Use of manual inventory management system/Lack of technology	77	3.71	1.356
3	Bureaucratic process in procurement	77	3.97	0.917
4	Losses of health commodities occurs through theft	77	2.71	.886
5	The hospital have weak management system	77	3.87	1.203
6	Insufficient funds for procurement	77	3.97	0.648
7	Experience for overstocks	77	3.16	.947
8	Experience for expire	77	3.22	1.154
9	experience for stockout	77	4.05	.776
10	Lack of proper training of inventory management	77	3.77	1.395
11	The Stock outs of essential medicine is a regular situation	77	3.14	1.035
12	Long time it take your unit to receive commodities once a request has been placed	77	3.39	1.248
	Valid N (listwise)	77		
	Aggregate mean and standard deviation		3.53	1.077

Source: Own survey,2017

Table 4.5 shows the descriptive statistics of challenges of inventory management of health commodities inventory management practices at ZMH based on arithmetic mean and standard deviation.In terms of losses of health commodities occurs through theft ,the stock outs of essential medicine is a regular situation, experience for overstocks of health commodities, delays in delivery of drugs leading to insufficient inventories , long time it take your unit to receive commodities once a request has been placed , use of manual inventory management system/lack of technology , lack of proper training of inventory management, weak management system, bureaucratic process in procurement, insufficient funds for procurement and experience for stock out of health commodities, the mean scores of the respondents were 2.71, 3.14, 3.16, 3.22, 3.34,3.39. 3.71, 3.77, 3.87, 3.97, 3.97 & 4.05 respectively. The standard deviation show the spread of ideas of the respondents and from the table the standard deviation ranges from 0.739 to 1.438 indicating that it is a small value thus respondents were agreeing to the same idea. Generally, based on the above concept the average mean and standard deviation of the total item of challenges of inventory management represents 3.53 and 1.077 respectively, this shows that most of the respondents shows their level of agreement on challenges of inventory management at ZMH to be agrees and standard deviation indicating that it is a small value thus respondents were agreeing to the same idea. However, in terms losses of health commodities occurs through theft , the stock outs of essential medicine is a regular situation, experience for overstocks of health commodities, delays in delivery of drugs leading to insufficient inventories and long time it take your unit to receive commodities once a request has been placed with mean score 2.71, 3.14, 3.16, 3.22, 3.34,3.39 respectively which shows that neutral. In this study was comparable with the study done in Nigeria poor planning and forecasting, insufficient information about consumption and current stock levels, funding and capacity constraints and a poor infrastructure are reasons for inappropriate stock levels. In addition to this, study was comparable with the study done in Malawi the Principal Secretary of Health Ministry et.al (2013) state that drugs stock outs was amounting to 95%.

As observed in our study ZMH health commodities budget, supply & medical equipment stores had challenges of health commodity inventory management practices such as, no uses

automated stock tracking use manually & not available written guideline. Even the budget store available automated stock tracking but not use properly.

Majority of respondent agree during interview identify the reasons for stock outs are weak selection, quantification, procurement and in adequate 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. In this case was comparable with the study done in Dar Es Salaam, Tanzania that showed there is a significant stock out period due to poor pharmaceutical management medicines in the public health facilities.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

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 ZMH. These have been discussed in the next sub-sections.

5.2 Summary of Findings

The following major findings were found because of the data analysis of the study.

First the study of inventory control techniques result show that long-term agreements between the hospital and its suppliers with mean score 3.61 which shows that the respondents to agree applied at ZMH .In 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 with mean score2.03, 2.29, 2.40 and 2.48 respectively, which shows that disagree to applied at ZMH

Second the study of stock flow & information results show head of department have determines the quantity of commodities to be ordered, Products are stored and organized in a manner accessible for first-to-expire, first-out counting and general management, , There are list of essential health commodities, maintain separate records for all health commodities Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel, head of department of pharmacy have responsible for procurement and separate location for quarantine commodities, with the mean scores of the respondents were 3.53,3.68,3.74,3.79,3.86, and 3.87 respectively., which shows that awareness and responsible at ZMH to be agree .

Third the study of physical inventory management results shows that 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 year-end physical counts.) with mean score 3.51, 3.55,3.64 and 3.64 which shows that the respondents agree to applied at ZMH. In other hand the hospital uses Electronic Data Interchange Technology (EDI) and the hospital uses automatic stock tracking, with mean score2.06 and 2.43 respectively, which shows that the respondents disagree to apply at ZMH.

Finally the study of challenges of inventory management results shows that Use of manual inventory management system/lack of technology, lack of proper training of inventory management, weak management system, bureaucratic process in procurement, insufficient funds for procurement and experience for stock out of health commodities with mean score 3.71, 3.77, 3.87, 3.97, 3.97 & 4.05 respectively which shows that the respondents to be agreed the challenges of inventory management at ZMH.

5.3. CONCLUSION

The following conclusions were drawn based on the results of the study.

This study it can be conclude that inventory control technique at ZMH is only applicable to long-term agreements between the hospital 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 ZMH

These are because of poor support modern technologies. In addition to that there were no the use of an integrated information system by ZMH to connect particularly between staffs in the organization.

The flow of stock and information practices at ZMH 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 ZMH.

In addition to this it can be conclude more practiced physical inventory management at ZMH 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 year-end physical counts but, the hospital uses Electronic Data Interchange Technology (EDI) and the hospital uses automatic stock tracking not practiced at ZMH.

Finally from this study it can be concluded that inventory management skills level of personnel involved in health commodity in ZMH 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. In general the consequences of the above were occurred high level of stock out which might have leaded to services interruptions at ZMH health commodities.

5.4 RECOMMENDATIONS

Based on the results of the study, the following recommendations are suggested for consideration:

This study it can be recommended that uses enterprise resource planning system and maintains a data base for all suppliers at ZMH should be applied & allocates more funds to public hospitals to invest in modern information technologies because wide inventory control techniques to increase information sharing 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 the needed. It is recommended that improve the management system , appropriate personnel involved in quantified & procurement process ,it need the government to review the public procurement policy for minimize bureaucratic processes in the procurement system, adequate budget should be available because of to prevent stock out of health commodities. In other hand engagement with, NGOs, PFSA and other supplies to work strongly to avail all health commodities required for health commodities and to minimize if possible to avoid stock out.

Finally, using software technology for keeping records instead of manual methods can help in improving inventory management and using stock cards and updated bin cards should be 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 ZMH.

5.5 Suggestions for Further Research

A similar study should be conducted in the other hospitals 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 hospitals implement inventory management practices and what public hospitals 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

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE INVENTORY MANAGEMENT SURVEY QUESTIONNAIRE

This questionnaire is part of a project work required by Addis Ababa University School of commerce as a partial requirement for the award of a Master of Logistics & Supply chain management degree. The questionnaire is designed to solicit your independent views on "Health commodities Inventory Management Practices & Challenges at Zewditu Memorial Hospital, Ethiopia, Addis Ababa". All information provided shall be treated as confidential and used strictly for Academic purpose. Please answer the following questions freely without indicating your name.

PART 1: Background Data

1.Your Gender?

Male ☐ Female ☐

2. What is your age?

Less than 20 years ☐ 21 -30 years ☐ 31-40 years ☐ 41-50 years ☐ 51years& above ☐

3. Marital Status: Never married ☐ Married ☐ Divorced ☐ Separated ☐ Widowed ☐

4. What is your level of education?

Certificate ☐ Diploma ☐ 1st Degree ☐ Master's degree ☐

Other, please specify……..

5. Profession:

Pharmacy profession ☐ Laboratory profession ☐ Nurse /Health officer ☐ Other ☐

6 Position of staff are you?

Management ☐ Senior staff ☐ Junior staff ☐

7. Which department of the hospital do you work?

OPD [ ] Stores [ ] Pharmacy [ ] Laboratory [ ] Ward [ ] anagement [ ]

8. How long have you worked for the hospital?

Less than 1 years [ ] 1 – 3 years [ ] 4 – 6 years [ ] 7 – 9 years [ ] 10 years and above [ ]

PART II : 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 practised at Zewditu Memorial Hospital							
	Inventory control technique			1	2	3	4	5
1	The hospital maintain Maximum, Minimum, and Re-order levels for health commodities			[ ]	[ ]	[ ]	[ ]	[ ]
2	The hospital established procedures for placing emergency orders			[ ]	[ ]	[ ]	[ ]	[ ]
3	The hospital uses of periodical replenishment of stocks			[ ]	[ ]	[ ]	[ ]	[ ]
4	The hospital practices vender managed inventory systems			[ ]	[ ]	[ ]	[ ]	[ ]
5	Long – term agreements between the hospital and its suppliers			[ ]	[ ]	[ ]	[ ]	[ ]
6	Use of suppliers to manage inventory on behalf of the hospital (Vendor managed Inventory)			[ ]	[ ]	[ ]	[ ]	[ ]
7	The hospital uses Enterprise Resource Planning system			[ ]	[ ]	[ ]	[ ]	[ ]
8	The hospital has an integrated information sharing system			[ ]	[ ]	[ ]	[ ]	[ ]

9	The hospital maintains a data base for all suppliers	[ ]	[ ]	[ ]	[ ]	[ ]
10	The hospital uses Just In Time stock control system (where no safety stocks are kept)	[ ]	[ ]	[ ]	[ ]	[ ]
11	The hospital uses ABC/VEN(Vital, Essential& Non essential) analysis to classify items according to their stock value	[ ]	[ ]	[ ]	[ ]	[ ]
12	Use of ABC/VEN(Vital, Essential& 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	Separate location for quarantine commodities	[ ]	[ ]	[ ]	[ ]	[ ]
6	LMIS Formats and Job Aides are available at the ZMH	[ ]	[ ]	[ ]	[ ]	[ ]
7	Head of department have determines the quantity of commodities to be ordered	[ ]	[ ]	[ ]	[ ]	[ ]
8	Head of department of pharmacy have responsible for procurement	[ ]	[ ]	[ ]	[ ]	[ ]

9	The hospital have standard guide line for health commodities storage and management	[ ]	[ ]	[ ]	[ ]	[ ]
10	Products are stored and organized in a manner accessible for first-to-expire, first-out counting and general management	[ ]	[ ]	[ ]	[ ]	[ ]
	Physical Inventory management					
1	Management monitor and approve the write-offs of obsolete and inactive inventories	[ ]	[ ]	[ ]	[ ]	[ ]
2	The hospital uses automatic stock tracking	[ ]	[ ]	[ ]	[ ]	[ ]
3	Adequate detailed written inventory instructions and procedures exist	[ ]	[ ]	[ ]	[ ]	[ ]
4	Obsolete, expired, or damaged inventories properly identified and segregated	[ ]	[ ]	[ ]	[ ]	[ ]
5	The hospital uses Electronic Data Interchange Technology (EDI)	[ ]	[ ]	[ ]	[ ]	[ ]
6	Inventory procedures give appropriate consideration to the location and arrangement of inventories	[ ]	[ ]	[ ]	[ ]	[ ]
7	Adequate procedures in place to identify inventory counted, ensure that all items have been counted, and prevent double counting	[ ]	[ ]	[ ]	[ ]	[ ]
8	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.)	[ ]	[ ]	[ ]	[ ]	[ ]
9	Management have review the reconciliation of physical	[ ]	[ ]	[ ]	[ ]	[ ]

	inventory counts to the inventory records					
10	Keep one location in the same health commodity item	[ ]	[ ]	[ ]	[ ]	[ ]
	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 hospital 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 stock out 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	[ ]	[ ]	[ ]	[ ]	[ ]

Thank you very much for your time and support

Annex III observation check list and results

Observation of ZMH 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) Yes □ b) 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) Yes □ b) 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 stock outs 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) Yes□ b) 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 hospital uses automatic stock tracking . a) Yes □ b) No□

Annex IV Interview questions

Q1. Does this facility applied any methods for periodic replenishment of stock?

Q2. Are there long – term agreements between the hospital and its suppliers? If yes who is the supplier

Q3. Who is responsible for procurement & is that proper person? Why?

Q4. Are there stocks out of health commodities at ZMH? If yes what are the reasons of stock out &which type of commodities are stock out?

Q5. Are there count physical inventory at regular basis?

Annex V Reference for questionnaire

Questionnaire of the study content	Title	Authors	Year of published
Inventory control techniques	The effect of inventory management practices on service at St Martin's hospital, Agroyesum, A Mansie	Osiei msei M, Esther,	2015
	Inventory management practices and performance of public hospital in Kenya	Margaret W,Njoroge	2015
Flow and stock management	Assessment of the health commodity supply chain and role of KEMSA	Aronovich D, Gelfeld	2001
Physical inventory management	Assessment of the health commodity supply chain and role of KEMSA	Aronovich D, Gelfeld	2001
	Inventory management practices and performance of public hospital in Kenya	Margaret W,Njoroge	2015
Challenges of inventory management	Inventory management practices and performance of public hospital in Kenya	Margaret W,Njoroge	2015
	The effect of inventory management practices on service at St Martin's hospital, Agroyesum, A Mansie	Osiei msei M, Esther,	2015