

**DETERMINANTS OF INVENTORY MANAGEMENT PERFORMANCE: A STUDY ON  
JIMMA ZONE PUBLIC HEALTH FACILITIES**

**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF JIMMA  
UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE  
AWARD OF THE DEGREE MASTER OF LOGISTIC AND TRANSPORTATION  
MANAGEMENT (MLTM)**

BY

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**Determinants of Pharmaceuticals Inventory Management Performance: A Study on Jimma Zone Public Health Facilities**

**A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Award of the Degree Master of Logistic and Transportation Management (MLTM)**

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## DECLARATION

I the under signed senior LTM student declared that this thesis is my original work in partial fulfillment of the requirements for the degree of master of logistic and transport management (MLTM).

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This research thesis has been submitted for examination with my/our approval for Jimma University.

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## **STATEMENT OF CERTIFICATION**

This is to certify that Biya Abagero Abafogi has carried out his research work on the topic entitled “to find out the determinants of pharmaceuticals inventory management performance in Jimma Zone Public Health facilities” This work is original in nature and is suitable for submission for the award of Msc. in Logistic and Transportation Management (MLTM).

Mesfin Mekonnin (PhD Scholar) \_\_\_\_\_ Date: \_\_\_\_\_

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## **LIST OF ABBREVIATIONS**

<b>APTS</b>	Auditable pharmaceuticals transaction system
<b>ART</b>	Anti-Retroviral Treatment
<b>ARV</b>	Anti-retro viral
<b>DSM</b>	Drug Supply Management
<b>DTC</b>	Drugs and Therapeutic committee
<b>DU</b>	Dispensing Unit
<b>EDL</b>	Essential Drug List
<b>FEFO</b>	First Expiry first out
<b>FMOH</b>	Federal Ministry of Health
<b>HCMIS</b>	Health Commodity Management Information System
<b>ICS</b>	Inventory Control System
<b>IPLS</b>	Integrated Pharmaceuticals Supply System
<b>LMIS</b>	Logistics Management Information System
<b>NPPL</b>	National Pharmaceuticals Procurement List
<b>PFSA</b>	Pharmaceutical Fund and Supply Agency
<b>PLMP</b>	Pharmaceutical Logistics Master Plan
<b>SOP</b>	Standard Operating Procedure

## ABSTRACT

*Inventory management for pharmaceutical supply sounds easy all that must be done is to order, receive, store, issue and reorder limited list of items. This research study aims to find out the determinants of pharmaceuticals inventory management performance in Jimma Zone Public Health facilities. As leading factors management support, documentation, and staff skill with pharmaceuticals inventory management performance were used. The study employed a both quantitative and qualitative research approach and Descriptive and explanatory research design. Descriptive statistics using frequency, percentage, mean &SD and inferential statistics by using Pearson correlation matrix and multiple regression model to investigate the causal relationships between the determinants of inventory management. Data were collected from the sample of Jimma zone 45 health (3, hospitals and 42 health centers) facilities based on simple random sampling and using questionnaire and semi structured Interview. Findings from the study indicated the current pharmaceuticals inventory management performance much more influenced by the management ownership, documentation and the skill of professionals working in the organization. In addition to this, the three independent variables; management support, staff skill and documentation related information significantly explain the variations (66.6%) in pharmaceutical inventory management. Management of the health facilities should have to follow and support the pharmaceuticals sections, through motivating and upgrading the staff skill and also through assigning the right persons for the pharmaceuticals activities in order to improve the facilities inventory management performances.*

**Key words:** *Documentation, Inventory Performance, Management Ownership, Pharmaceuticals inventory Management, and Staff Skill.*

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1 Background of the study

In Ethiopia 90% of the population is dependent on the government to provide for their health care needs, mainly through primary health care facilities. The provision of complete health care necessitates the availability of safe, effective and affordable drugs and related supplies of the required quality. In the health objectives of the National Drug Policy, the government of Ethiopia outlines its commitment to ensuring availability and accessibility of medicines which are effective, affordable, safe and of good quality in all sectors of the health care system to improve the gaps we had in these areas (MoH, 2016). The availability of drugs and medical supplies is critical to the success of any healthcare program. Drugs and medical supplies are part of the final link between patients and health services. They play a key role in prevention, treatment and care programs, and in order to sustain these services, availability of medical commodities is required. A reliable and consistent supply of drugs and medical supplies to health facilities at all levels of the health system determines the success of nationwide health programs (Raja & Mohammad, 2015). Health commodities are expensive and valuable resources in any healthcare program. They must be managed effectively and efficiently in all levels of the supply chain to ensure availability of quality health commodities at all times.

Effective and efficient drug supply management is critical to ensure the cost-effective distribution of health commodities given that the cost of medicines is often high and mismanagement results in wastage, stock out and pilferage. Therefore, there is a need for efficient management of the drug supply cycle to prevent stock out and all types of wastage, including shrinkage and expiries (Nakyanzi, *et al.*, 2010). The principal goal of inventory management involves having to balance the conflicting economics of not wanting to hold too much stock. In fact, inventory management can bring out significant improvement not only on patient care but also in the optimal use of resources (Kagashe, G. & Massawe, T., 2012). So, inventory management is a key measure in ensuring a constant and consistent supply of drugs in a health facility set-up. It is crucial to know the levels of medicines in a pharmaceutical set-up in order to maintain the availability of essential

drugs, to avoid stock outs, overstocking and expiries. Hence, health care organizations need to assess and improve inventory management to attain optimization of the pharmaceutical supply system in terms of its efficiency. This can be supported through linking product selection decisions to patient need; basing financing and procurement decisions on established quantification methodology; and improving information system that provides feedback for tracking stock movements (Kagashe, G. & Massawe, T., 2012). Routine monitoring reports show that IPLS is improving information recording and reporting, storage and distribution systems, as well as the availability of essential commodities at service delivery points. The average availability of essential tracer medicines at health facilities on the day of visit was 89%. The Agency's target was to increase the availability of essential pharmaceuticals from 65% to 100%.

Average availability of the tracer pharmaceuticals during six months prior to the study was 78.1%. This is an indication of the improvement in the availability of essential pharmaceuticals at public health facilities providing primary and secondary level of care (PFSA, 2015). On the other hand, assessment made in 17 Federal and Addis Ababa City Government hospitals, which are supposed to give tertiary level of care, revealed that the availability of key medicines varies significantly among hospitals. The availability of key medicines at the dispensaries of these hospitals at the time of visit ranged from 33.3% to 100%. This shows the need to work hard to ensure the continuous availability of pharmaceuticals at health facilities.

With the aim of improving the continuous availability of health commodities at an affordable price in a sustainable manner, the sector's capacity in procuring and distributing pharmaceuticals, medical supplies, laboratory reagents, and equipment through various programs has increased significantly. Various capacity building activities have been undertaken to enable health facilities to forecast their pharmaceuticals demand. Though this is enabling the Agency to base its procurement on health facilities demand, there are still problems in record-keeping, forecasted data quality, timely requisition and consumption reporting (Federal Democratic Republic of Ethiopia, Ministry of Health, August 2015). So, the study is to examine the factors that determine the pharmaceuticals inventory management performance at Public health facilities found in Jimma zone.

## **1.2. Background of the case area**

The study was conducted on determinants of pharmaceutical inventory management performance at health facilities found in Jimma zone. Jimma zone is one of zones of Oromia regional state in southwestern Ethiopia with its capital, jimma town. It is located 357km southwest Addis Ababa. The zone extends between 7° 13' and 8° 56' north latitudes and between 35° 49' and 38° 38' east longitudes. Jimma zone generally lies between 1000 and 3500m above sea level. The annual rainfall lies between 1300mm and 2100mm and the socio-economic condition of Jimma zone dwellers was mostly based agriculture and trade (Oromia Bureau of finance and economic corporation). There are 134 public health facilities found in the zone, 9 hospitals and 125 health centers. Out of the 134 health facilities, 45 of the health facilities are ART service provider and 89 of the health facilities are not providing ART service (GHSC-PSM Ethiopia, 2017).

## **1.3. Statement of the problem**

In health facilities about 40%-45% of the health budget allocated for procurement of pharmaceuticals to ensure the availability of essential drugs but due to inventory control is a difficult task and challenging in many countries public health facilities facing financial wastage, essential drugs shortage and decrease quality of patient care (Manso & Annan, 2012). A well designed and operated inventory control system due to contribution on generating quality data, helps to prevent shortage, over supply and expiry of pharmaceutical (IPLS, 2007). Taking these benefits in mind in contrast to developed Continents most of Asia and African countries due to poor skills of professionals and inefficient pharmaceutical inventory management practice in their health facilities, frequent stock out of life saving products, unnecessary tie up of budgets as a consequence of overstocking of products than the designed inventory maximum quantity and wastage of pharmaceuticals due to expiry were experienced repeatedly (Godeliveret. al, 2012; Rachmania et al, 2013).

Inefficient Inventory control system of pharmaceuticals resulted poor health outcomes, wastage of scarce resources in most of low and middle income countries (John Snow Inc, 2011). Studies in Indonesia showed the inventory management of pharmaceuticals found non efficient and due to this higher inventory costs, stock out of essential medicines resulted (Ilma, Nurul, Rachmania, 2013). In Africa frequent shortage of drugs which must be available 24 hours in a day and in all 365 days

in a year identified, Cases reported in South Africa in May 2012 shortage of Anti-Retroviral drugs in six of the nations and in July 2012 Western Capes` Groote Schurz hospital experienced major drug shortages for essential medication such as insulin for the treatment of diabetes, steroids to treat inflammatory conditions and certain chemotherapy drugs related to Inventory control system inefficiencies and professionals work load (M.Kachwee,MrD.Hartmann. 2013). Due to the immense effort provided in the infancy implementation age of the new supply chain management system in Ethiopia, availability of drugs in government health facilities were reached 77% from below 50% (PFSA Jimma branch, 2014).

But different supportive supervisions reports indicated that indicators for existence of poor inventory control system like holding drugs for more than four months in their stock, failing to use stock recording formats and generating poor quality supply report data observed in government health facilities with worsen case in far sites from supplying agency. Skill problem, documentation related information and less management support were the major factors reasoned for the problem, (PFSA Jimma branch, 2017). In my literature review most of the studies conducted measuring inventory management performance was on manufacturing, one specific area and only on a single facility only. There is no insight on the performance of pharmaceutical inventory management with respect to management support, documentation related information, staff skill in public health facilities.

Even though unreserved support and reasonable budget allocation have been provided by the government to improve the pharmaceuticals supply chain management, there is complaints on pharmaceuticals shortage and wastage in the office, which might probably be due to poor implementation of the inventory management system and this paper investigates the factors that determine the pharmaceuticals inventory management and identifying these associated factors affecting the performance pharmaceuticals inventory management among the public health facilities of Jimma zone of southwest Ethiopia in 2019.

## **1.4. Research question**

1. What are the Challenges faced the health facilities in using pharmaceuticals inventory management effectively,
2. What are factors affecting inventory management performance in Jimma zone health facilities?
3. What is the effect of management support, documentation, and staff skill on Inventory management performance?

## **1.5. Objectives of the study**

### **1.5.1. General objective**

- ❖ The general objective of the study is to find out the determinants of pharmaceuticals inventory management performance in Jimma Zone Public Health facilities.

### **1.5.2. Specific objectives**

- ❖ To identify the Challenges faced the health facilities in using pharmaceuticals inventory management effectively
- ❖ To examine factors affecting pharmaceuticals inventory management performance in Jimma zone public health facilities
- ❖ To examine the effect of management support, documentation, and staff skill on pharmaceuticals inventory management performance

## **1.6. Significance of the study**

The study has tried to find out the determinants of pharmaceuticals inventory management performance in Jimma Zone Public Health facilities. Proper implementation of pharmaceuticals inventory management system helps to prevent oversupply, under stock and expiry of products and believed taking the lion share to improve the countries pharmaceuticals supply chain management system. On the other way the investigation results will important to the academicians, researchers, policy makers, for business practitioners, and management units in the case company.

- Specifically, the research helps to identify bottlenecks, waste, problems and improvement opportunities in the supply chain practices and its contribution for the operational



performance of the organization.

- The paper will also contribute to narrow the gap in the literature on the generalization of the causal relationship between inventory management practices and its performance. It is self-evident that jimma zone health facilities would benefit from the finding of the research in that they may make necessary reform on the identified area of a problem.
- It may assist different health facilities in the country to make a knowledge-based decision by providing necessary information on the practice and main challenges of an inventory management.
- It may provide necessary information for the authority entitled to make or reform policy on the area.
- It may add little on bulk of knowledge in the area.
- It may help by being a steppingstone for other researchers who might be interested to study farther on the area.

### **1.7.Scope of the study**

The government of Ethiopia has introduced the forced order Max-min inventory management for pharmaceuticals supply chain for improving the service delivery at health facilities. The investigator focuses on analyzing the determinants of factors that affects the performance of pharmaceutical inventory management at public health facilities found in Jimma zone. The research included respondents who have been assigned to carry out pharmaceuticals stock control function in the health facilities. and due to different demographic nature of the area the result of this research may not be generalized to apply to all public health facilities in the rest of Ethiopia, except for those in the same categories of district hospitals and downwards. The hospitals in the study area were not sophisticated like in other areas and the geographical effect may not be same as the study area. The management of medicines and non-medical supplies were also covered by this study. Data were gathered from management and staff of the facilities with specific focus on those officers responsible for acquiring and managing the facility stocks.

### **1.8. Definition of Terms**

The following definitions are provided to ensure uniformity and understanding of these terms

throughout the study. **Stock out:** Depicts a situation in which the demand or requirement for an item cannot be fulfilled from the current inventory. It is unavailability of usable stocks in the store or a balance of zero on the bin cards at store (Raja & Mohammad, 2005).

**Essential drugs:** Those drugs which the nation must have in sufficient quantities at all times for the management of the most common health problems that affects the greater number of its population(MoH,2016).

**Tracer drugs:** These are drugs selected by the federal ministry health of Ethiopia to be available in all government health institutions in all the time, 24 hours a day and 365 days in a year (USAID, 2006).

**Pharmaceuticals:** This term is used in this document to mean medicines and other medical supplies (USAID, 2006.).

**Staff skill:** Are technical and behavioral capabilities of staffs to accomplish tasks effectively.

**Management Support:** Statements relating to the influence of higher management on implementing Inventory Management Systems. This is support and follow-up from the higher management in devising the appropriate infrastructure, procedures, personnel and performance management for the efficient inventory management practice.

**Program drugs:** those drugs that are necessary for the treatment of program specific disease such as anti-malarial drugs, antiretroviral drugs, family planning drugs, and TB-drugs, etc. those drugs are not for sell (MoH,2016).

## **1.9.Organization of the Study**

The study is organized into five Chapters. The first chapter include: Background of the study, Statement of the problem, Research questions, Research objectives, Significance of the study, Scope of the study, Limitation of the study, and Definition of terms and Organization of the study. Chapter two include: a review of related literature (theoretical and empirical). chapter three includes research methodology(research design, population of the study, sampling techniques, sample size, data collection instruments, the data collection procedures and ends with data analysis approach).next chapter is chapter four results of the research and the discussion upon the findings. The last chapter is chapter five presents a summary of the major findings of the research and recommendations based on the findings. Also this chapter contains the conclusion and section of the study.

**Inventory System:** A set of policies and controls that monitors levels of inventory and determines what levels should be maintained, when stock should be replenished, and how large orders should be placed (WHO, 2003).

# **CHAPTER TWO**

## **2. REVIEW OF RELATED LITERATURE**

The literature review part of this study has theoretical literature review and empirical literature review parts. The theoretical part presents the summary of theories forwarded by different scholars pertaining to the subject under study at different times. Whereas the empirical part contains summary of similar or related research findings obtained from other earlier researches.

### **2.1. Theoretical Review**

#### **2.1.1 Definition of Inventory**

Matiwos Ensermu (2013), explained that inventory is a physical resource that a firm holds in stock with the intent of selling it or transforming it into a more valuable state. Inventory is defined as a stock or store of goods for fulfilling customers demand. These goods are maintained on hand at or near a business's location so that the firm may meet demand and fulfill its reason for existence. If the firm is a retail establishment, a customer may look elsewhere to have his or her need satisfied if the firm does not have the required item in stock when the customer arrives. If the firm is a manufacturer, it must maintain some inventory of raw materials and work-in- process in order to keep the factory running. In addition, it must maintain some supply of finished goods in order to meet demand (Stock and Lambert, 2001). Coyle, et al., (2003) defines Inventory as raw materials, work-in-progress, finished goods and supplies required for creation of a company's goods and services. The number of units and/or value of the stock of goods a company hold.

#### **2.1. Stock Diffusion Theory**

Braglia, Gabbrielli & Zammori (2013) was pioneered a stock diffusion theory with an intention to derive the probability distribution of the stock consumption and that of the reorder time. These authors further explained that the importance of stock diffusion theory is to assess and evaluate the required inventory levels in theory and practice. There are three considerations of the stock diffusion theory: (1) storage space required; (2) how quickly inventory is sold or used; and (3) how to avoid inventory from becoming outdated before it is used. These considerations can prevent shortages and wasteful spending. In addition, the stock diffusion theory has been confirmed to

lower inventory level and has a direct impact on cost savings emanating from storage costs including stock insurance premiums (Unegbu & Mohammed, 2011: 304).

### **2.1.1. Adaptive Structuration Theory (AST)**

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

### **2.1.2. Transaction Cost Economics (TCE)**

The study of inventory management calls for an organization to ensure all costs are kept at a minimum hence the need to apply the theory of transactional Economics (TCE). According to Halldorson, et al., (2007), TCE is a theory that ensures that costs across the supply chain are kept at a minimal. In the early 1970s, the mathematical economist, Williamson, incorporated TCE into the general equilibrium model in the new theory of a firm. Organizations can reduce their transaction costs by vertical integration and increasing the level of trust at the same time. This kind of integration can reduce the costs of inventory management while increasing the service level of both internal and external customers and releasing capital to be used in other areas of the organization. Organizational supply chain can however reduce transaction not only through vertical integration and increasing the level of trust among supply chain participants, but also through horizontal integration and economy of scale gained from the aggregation of supply and/or demand (Williamson, 2008). One might expect the seemingly infinite stream of inventory theory related research to be a key resource for managers seeking to gain a competitive advantage through inventory control. However, some have suggested that managers who turn to inventory theory

research may find it to be of little significance or that it has little to offer in terms of enhancing inventory practices.

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

The first is to enable the firm achieve economies of scale. Inventory is required if a firm is to realize economies of scale in purchasing, transportation, and manufacturing. Secondly, it balances supply and demand. Seasonal supply and/or demand may make it necessary for a firm to hold inventory. Thirdly, inventory enables specialization in manufacturing. Inventory makes it possible for each of a firm's plants to specialize in the products that it manufactures. Stock & Lambert (2001), outlined five reasons for holding inventory. The first is to enable the firm achieve economies of scale. Inventory is required if a firm is to realize economies of scale in purchasing, transportation, and manufacturing. Secondly, it balances supply and demand. Seasonal supply and/or demand may make it necessary for a firm to hold inventory.

Thirdly, inventory enables specialization in manufacturing. Inventory makes it possible for each of a firm's plants to specialize in the products that it manufactures. Fourthly, it provides protection from uncertainties in demand and order cycle. 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. Finally, inventory acts as a buffer between critically interfaces within the supply chain. Since members of the supply chain are separated geographically, it is necessary for inventory to beheld throughout the supply chain in order to successfully achieve time and place utility. Though these reasons for holding inventory are very good and important for organizations, holding of inventory still draws some skepticism

## **2.2. Inventory cost**

### **2.2.1. *Costs of Holding Stock***

Costs of Holding Stock, also known as carrying cost, is the variable cost of keeping inventory on hand, and is a combination of the costs associated with opportunity costs, interest on capital invested on the stock, storage charges (rent, lighting etc.), taxes, equipment maintenance and running cost, insurance and security, shrinkage, and other variables. It represents one of the highest costs of logistics.

### **2.2.2. *Costs of Obtaining Stock***

This cost is the expense of placing an order for additional inventory and does not include the cost or expense of the product itself. It includes the clerical and administrative costs associated with the purchasing, accounting and goods received departments; transport cost; and set up and tooling costs associated with each production run where goods are manufactured internally (Coyle, et al., 2003).

### **2.2.3. *Stock-out Costs***

It is the cost of not having product available when a customer demands or need it. When an item is unavailable for sale, a customer may accept a back order for future availability of the needed product, or perhaps purchase (or substitute) a competitor's product, directly taking profit from the firm experiencing the stock out. According to Coyle, et al., (2003), stock out costs include lost contribution through the lost sale caused by the stock out, loss of future sales because customers may go elsewhere, cost of production stoppages caused by stock out of work-in- progress and raw materials, and extra costs associated with urgent, often small quantity, replenishment orders.

### **2.2.4. *Cost of the Stock***

Cost of the stock also called purchasing cost is the cost of the purchased item itself. These costs are buying in prices or the direct cost of production. These costs are needed to be considered when discount is available for bulk purchases, and when savings in production cost are possible with longer batch runs.

### **2.2.5. Importance of Inventory**

According to Stock and Lambert, (2001), Inventory management is concerned with every aspect of the movement or flow of commodities in an organization. This is to be done by:

- Eliminating handling wherever possible.
- Minimizing travel distance.
- Providing uniform flow free of bottlenecks.
- Minimizing losses from waste, breakage, spoilage, and theft.
- An organization incurs costs every time an item is handled. Since handling generally adds no value to a product or service, it should be kept to a lowest minimum. By carefully analyzing material flows, inventory management can save an organization significant amount of money. Inventory is a major use of capital and for this reason; efficient inventory management is to increase organizational profitability, to predict the impact of organizational policies on inventory levels, and to minimize the total cost of logistics activities. Stock and Lambert, (2001), explained that, corporate profitability can be improved by increasing sales volume or cutting inventory costs. Increased sales are often possible if high levels of inventory lead to better in-stock availability and more consistent service levels. Low inventory levels can reduce fill rates on customer orders and result in lost sales. Chopra &Meindl, (2003), explained that inventory exists in an organizational operation because of the mismatch between supply and demand. Therefore, inventory's role is to increase the amount of demand that can be satisfied by having the product or service ready and available when the customer wants it. Another important role inventory plays is to reduce cost by exploiting economies of scale that may exist during production and distribution, but managers should use actions that lower the amount of inventory needed without increasing cost. Stock and Lambert, (2001), further explained that, better inventory management can increase the ability to control and predict the reaction of inventory investment to changes in management policy.

Therefore, inventory managers must determine how much inventory to order and when to place the order. Chopra &Meindl, (2003), suggests that since inventory plays a significant role in a supply chain's ability to support a firm's competitive strategy and that the firm's competitive strategy requires very high level of responsiveness; a company can achieve this responsiveness by locating large amounts of inventory close to the customer. Another very important role that inventory plays in an organization is to avoid stock-out costs (the costs of being out of inventory). This is very important to all organizations, especially in the healthcare delivery where delay by a few seconds can cost a life.



### **2.2.6. Inventory Management**

Inventory management is the set of policies and controls that monitor levels of inventory and determine what levels should be maintained, when stock should be replenished, and how large orders should be. Inventory management involves ordering, receiving, storing, issuing, and reordering limited items. Firms keep a supply of inventory to maintain independence of operations, meet variation in product demand, and allow flexibility in production scheduling, provide a safeguard for variation in raw material delivery time, take advantage of economic purchase order size and anticipation of price changes.

In making any decision that affects inventory size, one must consider inventory holding costs which includes the costs for storage facilities, handling, insurance, pilferage, breakage, obsolescence, depreciation, taxes, and the opportunity cost of capital; Setup (or production change) costs; Ordering costs and Shortage costs (Odinga, 2007). An inventory management system aims to assist in determining when and how much stock to order or issue. Orders that are placed timely allow drugs to be available at the right time. Successful inventory management is based on good record keeping. Paper-based record keeping is found in most drug supply systems, where stock cards or bin cards are used for that purpose. Maintaining enough stock to avoid shortages, to confront fluctuation and to avoid oversupply also constitutes the aim of successful inventory management (Odinga, 2007).

Poor inventory management can be inferred from inaccurate stock records, inadequate and unsystematic monitoring of medical stock, and indefinite procedures in terms of frequency and quantity. These incidences can be traced to inadequate know-how of inventory management and its actual management (MSH., 2012). Inventory control is one of the elements underpinning inventory management; a failure to monitor stock levels regularly could have fatal consequences; disruption of or delay in a course of treatment which may worsen a patient's condition and lead to death if a lifesaving medicine is out of stock. The lack of a standardized inventory control system with procedures for monitoring and managing stock levels of drugs is a challenge to emerging logistic systems; as is the case in Lesotho where stock levels were not monitored, resulting in stock out and over-stocking of certain medicines (Clark & Barraclough, 2010). Inventory control deals with the physical control

of product quantities in the store to ensure a balance on hand. It helps to decide what, when and how much to keep in the store to avoid shortages and pilferages and to minimize ineffective stock. Matching the stock on hand with stock-keeping records by physically counting the number of each type of product in the store at a given time is required for functioning inventory management (Odinga, 2007). In inventory management, records serve as the basis of the information needed in ordering new stocks of medicines and other supplies, and provide an audit trail. Records are crucial in inventory management as they help in ensuring balanced levels of stock and are the basis for decision-making. They also constitute an important source of data used to compile various reports. Documenting all activities in inventory management is critical. Creating accurate records reduces the likelihood of discrepancies that may occur in many activities that take place in the store room (MSH., 2012).

#### **2.2.7. Pharmaceutical Inventory Control System**

The purpose of an inventory control system is to inform personnel when and how much of a pharmaceuticals to order and to maintain an appropriate stock level to meet the needs of patients. A well designed and well operated inventory control system helps to prevent shortages, oversupply, and expiry of pharmaceuticals. To help maintain adequate stock levels, the maximum months of stock, minimum months of stock and an emergency order point have been established for each health facility in the system. The maximum months of stock is the largest amount of each pharmaceutical a facility should hold at any one time. If a facility has more than the maximum, it is overstocked and risks having stocks expire before they are used. The minimum months of stock is the level of stock at which actions to replenish inventory should occur under normal conditions. The emergency order point is the level where the risk of stocking out is likely, and an emergency order should be placed immediately. The inventory control system for the IPLS is a Forced Ordering Maximum/Minimum inventory control system. This means that all facilities are required to report on a fixed schedule (monthly at health posts, every other month at health centers and hospitals) for all products. In addition, all products are re-supplied each time a report is completed. In emergencies, an emergency order can be placed. In practice, this means that: Health centers and hospitals are required to report and order every two months. Health centers and hospitals calculate their own order quantities, ordering sufficient quantities of all pharmaceuticals to bring stock levels up to the maximum level. Health posts report data monthly to their affiliated Health Centre. The

Health center calculates the re-supply quantities that are needed to bring health post stocks up to the maximum level. If the stock on hand for any product at a facility falls below a set emergency order point before the end of the reporting period, an emergency order should be placed. (See the Job Aid on Placing Emergency Orders.)

## **2.2.8. Empirical Review**

### **2.2.9. Importance pharmaceutical Inventory management in Health facilities**

Inventory management plays a crucial role in providing efficient healthcare in relation to three vital aspects of medical supplies used in the health facilities; availability, safety, and affordability. Quality care cannot be provided on time unless required pharmaceutical is available in adequate quality. The availability of pharmaceutical is the most important quality indicator of healthcare as medicines play a key role as a final link between patients and health services. Sustained supply contributes to improving the therapeutic outcomes of patients. In the current scenario of increasing health care costs, systems inventory must be optimized without sacrificing the level of service provided (Clark & Barraclough, 2010).

Although the amounts and dollar values of the inventories carried by different types of health care providers vary widely, in a typical hospital's budget 25 to 30 percent goes for medical supplies and their handling. On the national scene, health care supplies constitute 8 to 9 percent of health care expenditures. Clearly, medical supplies require significant attention in health care budgeting. Health care managers must be able to manage the inventory of medical supplies effectively (Clark & Barraclough, 2010). Inventory management systems obtain and move supplies and equipment to places where they are needed in a timely manner and at an optimum cost. Supplies and equipment usually cannot go directly from their source to the end user. They must be held in the warehouse at different level along the way. In view of this warehouse of supplies maintained and inventory of supplies and equipment are held at all levels in the Ethiopian pharmaceutical supply chain (John snow Inc., 2010). Drugs have a special importance and need to be available for the following reasons:

- I. Save lives and improve health outcomes,
- II. Promote trust and participation of the people in health services,
- III. provide a direct low-cost response for many diseases

Considering these brief reasons for the importance of the availability of drugs, it is imperative that the pharmaceutical supply management follows a stringent process and implementing efficient pharmaceuticals supply management is indispensable, because it improves the pharmaceuticals logistics activities which in turn have quantifiable benefits. Well-functioning supply chain benefits public health programs by increasing program impact, enhancing quality of care and improving cost effectiveness and efficiency (John snow Inc., 2010). The ultimate purpose of effective pharmaceuticals logistics activities is to ensure that patients always get pharmaceuticals they need, and to be successful, the system must fulfill the six rights of supply chain management by ensuring the right products, in the right quantity, of the right quality, at the right place, at the right time and for the right cost (PFSA., 2007).

#### **2.2.10. Pharmaceutical Inventory Management performance**

Inventory management is the heart of pharmaceutical supply system. Inventory management for pharmaceutical supply sounds easy all that must be done is to order, receive, store, issue and reorder limited list of items. But in reality, the task is difficult and in many countries poor inventory management in public drug supply system lead to financial wastage, shortage of essential drugs, decreased in quality of patient care and increased the inventory cost. Lack of accurate stock cards, and systematic performance procedures and rules to guide staff, lack of understanding of basic issue of proper inventory management system are directly related to ineffective management (WHO, 2003). Medicines play an important role in public health care programs, saving lives and drawing people to health facilities, where they can also receive preventive treatment. Medicines can also help keep health care costs down. Despite this important role of medicines in the health care delivery system, access to essential medicines has remained a big challenge to many populations around the world. Survey by WHO/HAI estimates that in about 40 developing countries, availability of medicines in the public sector is only one third (Report, MDG Gap Task Force, 2008).

A well-organized pharmaceutical logistics system ensures the continuous availability of all pharmaceuticals that are required for patient care. At the same time, an effective pharmaceutical logistics system should be able to respond to sudden increases in drug demand, ensuring that adequate supplies are available to deal with any emergencies that arise. Stock availability is the ultimate measure of the other components of the logistics system and it also gives an idea of the overall effectiveness and efficiency of the system, from forecasting and procurement to distribution, storage and inventory management (John snow Inc., 2010). Measuring the availability of EDs at health facilities is one of the core components of the assessment of readiness of facilities to deliver quality services. The health facility assessments, however, employ a wide variety of tools and approaches to measure availability of EDs.

For example, rapid assessments employ the reported availability by respondents without verification as a measurement of availability of EDs, while in-depth facility assessment methods validate the reported response by observing the medicines, verifying the expiration dates and collecting further data on stock-out over an extended period. An assessment that was done in Afghanistan to REACH grantee NGOs found that for the surveyed warehouses, on average 81% of the tracer medicines were in stock on the day of the visit and in surveyed HFs, on average 86% of the tracer medicines were in stock on the day of visit (USAID, 2006).

Study conducted in Indonesia on Pharmaceuticals Inventory management issues found that there is inefficient inventory management of pharmaceuticals in hospital due to less management awareness and this leads to increased inventory cost (IlmaNurulRachmania, 2013). A study done to assess pharmacy and inventory control in ministry of health hospitals in Jordan showed that medication quantification requirements are not estimated according to actual hospital need and standard procedures related to poor inventory system. In addition, there were improper stock recording practices in some hospitals due to poor skills (Godeliver A.B, et al., 2012). Study in Tanzania on Medicine stock out and inventory management in hospitals showed logistics skills levels of professionals who involved in supply chain was poor and pharmaceuticals inventories management was not effective and in turn it affects the availability of essential medicine (Godeliver A.B, et al., 2012). Studies in South Africa and Kenya showed due to the inventory management system is by inappropriate professionals and lack of management ownership, difficulties in getting accurate records of information and product flow, low availability of

essential drugs were resulted and challenges to implement FEFO with expiration of huge stocks resulted. Poor inventory management greatly interrelated with poor skill level of professionals, lack of management follow up, allocation of inappropriate type of professionals (MSH, 2006). Other literatures also evidenced that due to lack of appropriate skill, training gaps on the system and failed to deploy the required quantity of pharmacy professionals, appropriate data on drug consumption and stock position had not been collected regularly from the service center, which resulted serious consequence on the rational use of medicine, quantification and availability of medicine at health facilities of developing countries. Essential medicine programs place a high priority on improving inventory control to ensure the reliable supply of essential medicines and other item at health facility. To achieve this aim, staffs need to be trained in inventory control, storage and ordering procedure, system monitoring should be in place, management ownership on the system should be improved; appropriate staff should be recruited (MSH, 2006).

The purpose of inventory management system at health facility level is to inform when to order or issue, how much to order or issue, and how to maintain appropriate stock level of all product to avoid shortage and over supply (WHO, 2003). In other way, the purpose help to prepare orders, maintain sufficient safety stock, maintain records accurately, adjust inventory level to new health problems and changes, provide appropriate, safe and secure storage, prevent expiry of medicine which demands management follow up, trained and committed pharmacy professional for the system implementation (MSH, 2006).

The management of inventory depends on information systems that provide feedback for tracking the storage and movement of goods at every level within the supply system and storage of medication ready for use in health facilities, ensuring proper stock rotation and medicine with dates so that items of earliest expiry dates are used first, as well as enabling managers to know the total amounts of drugs that are within the supply and where they are located thus allowing the possibility of redistribution and inventory records should be regularly updated to confirm that items are being used correctly and not diverted and misused (FMHO., 2003).

For these reasons, it is very important to control and manage the building up of inventory, Pharmaceuticals should be controlled by inventory management systems, items on shelves should be tagged with bin cards, the necessary information's on the bin cards should be filled and update, the stock record cards should also show an up-to-date stock balance for received and issue items, there by resulting good inventory control which makes pharmaceutical supply management effective and efficient. Researches done in Sub-Saharan countries showed that availability of Essential Drugs has been improved, but still far from the WHO recommended target of 100% (WHO, 1993). In Ghana, the availability of key Essential Drugs selected for the country in public health facilities was 80%; and length of stock out duration 29.9 days (Ministry of Health of Ghana, 2009).

In Tanzania, Uganda and Kenya, all of them East African countries, the availability of key Essential Drugs was 88.9%, 45.7% and 82.6%, respectively ( (MOHSW, 2008); (Ministry of Health of Uganda, 2008); (WHO, 2009). Though the availability of Essential Drugs seems high in the health facilities of Tanzania, the same facilities also presented a considerable number of stock out days. Some medicines were out of stock for 4 months with the median number of stock-out 135.6 (MOHSW, 2008). In Uganda, the length of stock-out duration in public health facility pharmacy was 72.9 days (Ministry of Health of Uganda, 2008). A cross-sectional study conducted in health centers of Western Ethiopia showed that only 55.6% of the assessed drugs were available (Abiye. Z, et al., 2013).

Accuracy of stock records is very critical for proper inventory management. The study that was done in Afghanistan found that 20% to 25% of the warehouses did not have up to date stock cards, did not mark dates of stock outs and did not keep the stock card with the items (USAID, 2006.). A study done in Tanah Papua to assess HIV/AIDS commodities showed that in general inventory management was poor, stock record keeping and subsequent data quality was poor and management of expiry dates was weak (SCMS, 2008). In Kenya, an assessment that was done in 2006 to assess stock status and logistics system for various vertical programs found that, in general there was inadequate availability of recording and LMIS tools and poor quality of records and reporting (Bunde, et al., 2007). Essential Drugs

require specific procedures and conditions for safe storage that protect their integrity and effectiveness, maximize their shelf life, and make them readily available for distribution. The procedures should include about the dimensions and design of the storage space, appropriate conditions for storage of drugs, and the importance of stock rotation and systematic arrangement of stock, as well as attention to cleanliness, fire prevention measures, and security within the store. A drug product must retain its properties within specified limits in order to be useful. When Essential Drugs are stored appropriately, clients can be assured that they receive a high- quality product. The stability of a drug product depends on the active ingredient, which can be affected by its formulation and packaging. Inadequate storage and distribution can lead to physical deterioration and chemical decomposition, and reduced potency (MSH, 2011). The availability of quality medicines and medical supplies at health units contributes significantly to health service utilization and to the overall public health outcomes.

Given the limited resources, especially in developing countries it is important to minimize resource wastage by ensuring that procured medicines and medical supplies are appropriately received, stored and distributed while maintaining their quality. This contributes to the timely access to health services by those in need (Kagashe&Massawe, 2012). It is vital that the storage of medicines is managed efficiently and effectively to ensure that medicines are kept properly, as the shelf life of medicines depends on their storage conditions. The storage area must be dry and well-ventilated, out of direct sunlight and maintained within acceptable temperature limits. The presence of an air conditioner is necessary to allow the correct temperature.

The inventory must be protected from excessive humidity according to product specifications, and the presence of sufficient lighting is necessary. Fire safety equipment must be available and the staff should be trained to use it. Furthermore, the storage must meet physical dimension standards (MSH., 2012). The inventory must be well labeled and arranged in an accessible manner for counting and general management (Raja & Mohammad, 2005). A good store management system is built in a way that allows the tracking of medicine movement in the store and ensures proper stock rotation so as to allow medicines with the earliest date to be used first (Clark & Barraclough, 2010. ....



The use of the FEFO (first expiry, first out) system is one of the techniques of inventory management, where the products with the closest date of expiry are the first to be issued, despite the order in which they were received. This helps in preventing loss through expiries. The manufacturer labels products with an expiry date to indicate the date until which the quality and efficacy of the medicine is still guaranteed (WHO, 2003). Records are produced and maintained in the context of professional responsibilities that are necessary to the running of business activities. Records are documents that arise from the activities, process and transactions of an organization and that constitute facts upon which to base future decisions. In inventory management they serve as the basis of the needed in ordering new stocks of medicines and other supplies, and provide an audit trail. They are crucial in inventory management as they help in ensuring balanced levels of stock and are the basis for decision making.

They also constitute an important source of data used to compile various reports (MSH., 2012). Difficulties of complying with record-keeping practices have been identified in many PHC facilities in Lesotho; challenges pinpointed in ART scale up included scarce reliable records, characterized by poor record-keeping practices and late reporting of consumption data. The staff were not sufficiently trained and motivated at every level to use the LMIS (Logistic Management Information System), a tool used in order to prevent stock-outs (Raja & Mohammad, 2005). Documenting all activities in inventory management is critical. Creating accurate records reduces the likelihood of discrepancies that may occur in many activities that take place in the store room. In this way, the pharmacy staff and the administration have information necessary for decision making. Access to quality data is also necessary for the forecasting and quantification process, the outcome of which is used by the facility and the provincial health information system. A proper information system allows for the identification of bottlenecks in the facility system (Kagashe&Massawe, 2012). Kagashe&Massawe, (2012) identified discrepancies in records during a study carried out in Tanzanian public hospitals: at one hospital (Temeke), records showed that recorded balances were greater than physical count, indicating that the recording of issuing of supplies was very poor. One of the contributing factors was that there were many record books to be filled out, in such a way that a person issuing the medicines does not record directly on the bin card. Some tracer items at the aforementioned hospital had no bin cards (Kagashe&Massawe, 2012). In Sub- Saharan

countries like Uganda, and South Sudan, only 63.6% and 35% of the surveyed health facilities had adequate storage practices respectively (Ministry of Health of Uganda, 2008); (GhTech, 2011). In Kenya, adequacy of storage space and condition in public health facilities was only 60% (WHO, 2009).

A study done in Tanzania showed the situation of storage practice of pharmaceuticals in detail. The study revealed that most health facilities (71%) had a main storage place, but the storage space for forecasted quantities of medicines and medical supplies was inadequate and this was affirmed by 56% of facilities surveyed. The study reported that expired stocks did have a separate storage space in only 41% of the health facility pharmacies. With regard to products requiring cold storage, only 52% of the health facilities had fulfilled the requirement and had the equipment (MOHSW, 2008). Knowledge on pharmaceutical inventory management is one of the key factors for ensuring proper inventory management of pharmaceutical.

Knowledge of those managing the “last mile” of the supply chain, that is, from district or zonal warehouse to the health facility to the patients is critical for the essential pharmaceuticals to the patients (MSH, 2010). However, some studies have shown the knowledge of some of individuals involved in the pharmaceutical supply logistics is low. A survey that was done in Dar es salaam hospitals on medicine stock out and inventory management problems in public hospitals found that, sixty five percent (65%) of the interviewed pharmaceutical health workers were unable to mention the methods used in inventory control/ Sixty five percent (65%) were unable to mention the method they were using to estimate the quantities of pharmaceuticals required annually, and about twenty two percent (22%) mentioned the consumption method while twenty seven percent (27%) said they quantified the amounts of medicines depending on the funds available (Kagashe&Massawe, 2012). In the last five years, the inventory management across the Ethiopia pharmaceutical supply chain has showed significant improvement. As part of major interventions to improve pharmaceutical inventory management in the country, the Integrated Pharmaceuticals Logistics System (IPLS) has been implemented in more than 2500 health facilities. Since August 2011, it has been started to directly deliver program commodities to many health facilities all hospitals and accessible health centers which creates a three level distribution levels i.e. PFSA center, PFSA Hubs and Health facilities (PFSA, 2016).

The national IPLS survey indicated that wastage of pharmaceuticals due to expiry, theft, damage, etc, is known to be decreasing from time to time as a result of the implementation of IPLS at health facilities. But, it was not possible to get clear evidence on the current status of wastage rate at health facilities due to lack of proper recording and documentation of unfit for use pharmaceuticals at health facilities. The average annual wastage rate in value for pharmaceuticals at the Agency level (both at central and branch warehouses) was 1.60% and 1.19% in 2006 and 2007 budget years respectively. The rapid assessment conducted on 17 federal and Addis Ababa administration hospitals in 2006 revealed that the estimated average wastage rate of 8 hospitals was about 4.8% (PFSA, 2015).

Even though there are astonishing achievements in the last five years, there are challenges which still remain to be addressed to create well established inventory management system at all levels of the country supply chain. On/off implementation of IPLS particularly at referral hospitals and smaller health centers hampered the inventory control system (PFSA, 2015). According to the national IPLS survey, sustainable availability of formats and the quality of record keeping is a challenge so as to use data for decision making.

Only 49 percent of hospitals have an accurate balance on their bin cards. The exact accuracy of RRF data was found to be between 40 and 50 percent for most of the products; with the average of 46 percent. The survey results also showed that the storage condition for significant proportion of health facilities did not meet the standard criteria. On average, slightly more than half (55 percent) of the facilities met 80% of the acceptable storage conditions. The aforementioned challenges overtly signify the pressing need to intensify efforts to coordinate activities, scale up best practices to strengthen inventory management at all levels (PFSA, 2015).

The above cited studies provide evidence that pharmaceutical logistics systems in many countries globally and specifically in the developing world are facing some problems in their operations. Problems of unavailability of pharmaceuticals, poor record keeping practices and therefore poor quality of data and reports are some of the problems that were evident in the cited studies. Ethiopia, therefore, being in the developing country, is no wonder that its pharmaceutical logistics system might be facing similar challenges as those in other developing countries.

## Summary and Gap in literature

Summarizing the literatures inventory serve as an insurance policy against the unexpected break through, delay and other disturbances that could disrupt ongoing activities. According to the review less management ownerships on system ownership, documentation related information and gap on professional's skills are some of the factors that limit effective inventory management and generally it is important to have a good stock record system as it helps in preventing stock out, overstocking, deterioration, obsolescence and high currying cost. A sound stores record system is therefore vital for procurement decision making. Effective stock records are important to an organization which expects to operate profitably or offer quality service. Late posting and poor data quality supply reports have undesirable effects.

### **2.3. Conceptual Framework**

Bradley (2008) defines conceptual framework as a visual or written product that explain either graphically or in a narrative, the key factors and the presumed relationship among them. It is therefore a model used in research to outline possible courses of action or to present a preferred approach to an idea or thought. A conceptual framework is very important in any research study being undertaken. The conceptual framework includes independent variables identified as management support, staff competency, documentation related information & pharmaceutical inventory management performance as dependent variable. The problem under investigation is performance of pharmaceutical inventory management as it is affected by the identified independent variables. Pharmaceutical Inventory management performance is shown on the right side while the independent variables are shown on the left hand side in figure 2.8.

**Independent Variables**

**Dependent Variables**

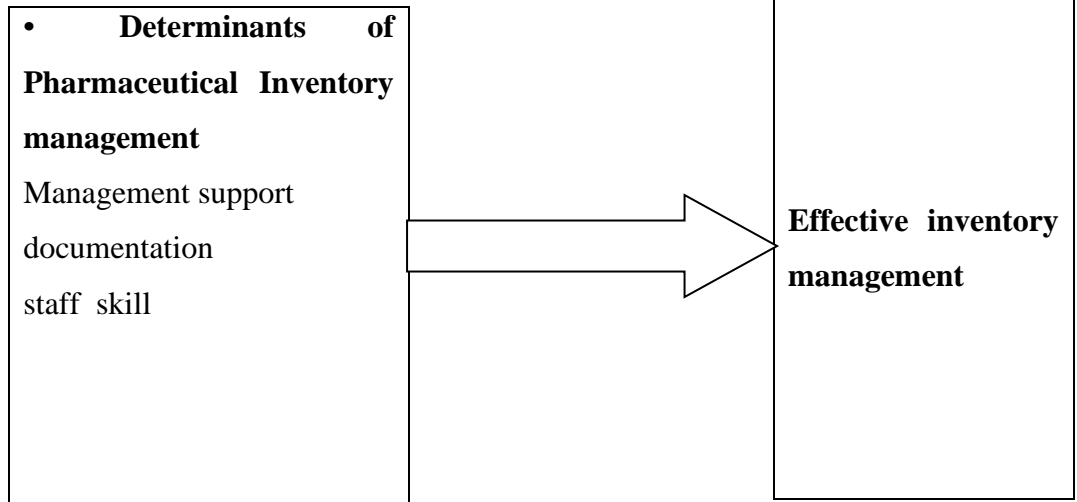


Figure 2.8; factors affecting pharmaceutical inventory management performance adapted from Masakhalia O. 2012

## **CHAPTER THREE**

### **3. INTRODUCTION**

Research methodology provides a means to systematically solve a research problem. This chapter explains the methodological approach adopted when conducting the research. This includes the research design; population and sampling technique, tool of data collection and method of data analysis were briefly explained.

#### **3.1. Research Design**

The design of this study was employee descriptive and explanatory research design. Descriptive research design is considered best for observing, describing recording, analyzing and reporting conditions that exist without alterations, Whereas explanatory study to examine the relationships between variables. According to Donald and Pamela (2006), a descriptive study deals with what, how and who of a phenomenon; these are also the concerns of this study. Hence, this research is aims to identify factors affecting the performance of pharmaceutical inventory management at health facilities. This research design is appropriate for this study because the data required to meet the stated objectives can easily be obtained from questionnaire based sampling.

#### **3.2. Source and Type of Data**

The study used both primary and secondary sources of data. Primary data collected through questioners, from the sample respondents of the organization. The secondary source of data included documents, data and information from previous studies such as existing official reports and documents from the named entities, journals, other empirical researches in the area and any other relevant document from the libraries and internet. The sources of data for the study were health facility records and staff (store managers and pharmacy head) working at health facilities in the inventory management. The primary data was collected by observation, physical inventory for tracer product, and structured interviews with relevant staffs at hospitals and health centers.

This study was primarily quantitative and cross-sectional in nature and aimed at assessing effect of staff competency, management support, documentation related on performance of pharmaceutical inventory management at health facilities found in Jimma zone. Qualitative approach is also used to support the findings of the quantitative findings.

### 3.3. Target Population & Sampling Methods

The study sample were included all hospitals and health centers serving the people of the zone which are 9 hospitals and 125 health centers with total of 134 health facilities. The respondents are pharmacist, manager and store man of the selected health facilities. The main factor considers in determining the sample size is to keep it manageable enough and also to enable the researcher to derive detail data at an affordable cost in terms of time, finances and human resource (Mugenda, 2003) The sampling technique used was probability sampling because was not biased and more representative for the population. To generate representative sample for LIAT survey, an assumption that 50% of the public health facilities would poorly pharmaceutical supply chain performance was considered as similar studies in Ethiopia were not available. In addition, a confidence level of 90% with a margin of error of 10% was used. The sample size was then calculated using formula for calculating sample sizes in finite population bases. With this formula, sample size of 45 was obtained.

The general formula for calculating a sample size is:

$$n = \frac{z^2 * p(1-p)}{m^2}$$

$$n = \frac{(1.64)^2 * 0.5(1-0.5)}{(0.1)^2}$$

$$n=67$$

Where: n = required sample size

Z = Z value (e.g. 1.64. for 90% confidence level) p = estimated prevalence of the indicator.

Unknown performance was used, 0.5) m = margin of error you wish to allow in estimating the prevalence, at 10 percent m = 0.1) However, there is a predetermined population (e.g., total number of public health facilities in Jimma Zone 134), the sample size generated from the above equation

needs to be multiplied by the Finite Population Correction (FPC) factor. For our purposes, the formula can be expressed as:

$$\text{New } n = \frac{n}{1 + [(n-1)/N]}$$

Where: New n = the adjusted new sample size N = the population size n = the sample size obtained from the general formula

$$\text{New } n = \frac{67}{1 + \{(67-1)/134\}} = 44.9 = 45$$

### 3.4. Sampling Techniques and Procedure

A total of 134 public health facilities that are providing health care service were used as a study population from which 45 selected facilities were drawn. For selection of the sample population, first the health facilities were categorized into two different strata as per their type. The strata include 9 hospitals and 125 health centers. The number of facilities to be included into the calculated sample of 45 facilities from each of the stratum was determined by using proportionate sampling respective sizes. Once the sample size per stratum was determined, individual facilities were identified using lottery method. A total of 3 hospitals and 42 health center were included in the study. From each health facilities 3 personnel that were perform inventory management activities. In addition (jimma PFSA) head office corresponding woreda health officer purposively included. Since PFSA is the sole supplier of pharmaceuticals to public health facilities.

S. No	Types of Facility	Total population	Sample size	sample respondents
1	Hospital	9	3	3*3=9
2	Health centers	125	42	42*3=126
3	Total	134	45	135



A criterion sampling technique was applied for the qualitative part. Employees or experts who were supposed to be knowledgeable about the study topic were selected as key informant. The in depth interview was continued until the point of saturation whereby no new information becomes available with further interview. Based on this, a total of 7 in-depth interviews were conducted with key informants. In addition jimma PFSA branch officer and corresponding 6 woreda health officer purposively included. Since PFSA is the sole supplier of pharmaceuticals to public health facilities. These respondents were selected purposely interviewed.

### **3.5. Method of Data collection, Design and Administration**

In this study, primary data used for collecting quantitative data was standardized questionnaires with some revision, containing semi-structure questionnaire set in five liker scale questions was used to collect primary data from the respondents of the study while secondary data was` obtained from annual reports of the organization and technical reports on the pharmaceuticals inventory management performance. The interview data collection was collected by using semi structured questions.

#### **3.5.1. Questionnaire Design**

A questionnaire was chosen as the main data collection instrument. A questionnaire was a printed self-report form designed to elicit information that could be obtained through the written responses of the respondent. The questionnaires were designed in a self-administered format to enable the respondents to fill the answers by their own (Dawson, 2002). In this study, unstructured interviewers, questionnaires were used to develop seek ideas related to the research objective from respondents. A pre-test using the questionnaire was conducted. The questionnaires could be detailed and help to cover many subjects or issues can be easily and quickly analyzed once the field data gathering work is completed. Open-ended questionnaires will be used for respondents to explain their feeling and understanding freely as much as possible.

### **3.6. Validity of Research**

In the context of quantitative research, the validity of the research refers to the „appropriateness of the measures used, accuracy of the analysis of the result and generalization of the finding (Saunders et al, 2015). According to Maxwell (1992), descriptive, interpretive, and theoretical validities are the most important way to measure the validity of the study.

### 3.7. Reliability of Research

The research instrument concerns the extent to which the instrument yields the same results on repeated trials. The most significant tool preferred to the reliability and internal consistency of the findings is Chronbach Alpha Statistics. Chronbach Alpha result should be above 0.70 to obtain a reliable scale and any scale with Chronbach Alpha which is less than 0.70 has to be excluded (Sekaran & Bougie, 2013). Therefore, the study will be yield the consistency result and considered to be highly reliable. The Chronbach alpha result found from the pilot survey made on 20 respondents presented below.

Table 1: Reliability test

<b>Reliability Statistics</b>			
<b>Variables</b>	<b>Cronbach's Cronbach's</b>	<b>Alpha</b>	<b>N of</b>
<b>Alpha Based on Standardized Items</b>			
Management support	.823	.825 <sup>^</sup>	10
Documentation Related information	.789	.785	10
Staff skill	.762	.764	9
Inventory management performance	.737	.743	8

### **3.8. Data processing and analysis**

Data from the questionnaire was summarized, edited, coded, tabulated and analyzed. Editing was done to see whether respondents, respond to questions, or trace if there were black responses and to improve the quality of data for coding. The study utilized mainly quantitative data analysis techniques. Descriptive statistics such as mean, percentage and frequency tables were used to describe the data and inferential statistics by using Pearson correlation matrix and multiple regression model to investigate the causal relationships between the determinants of inventory management. The study incorporate four independent variables in which all of them was measured on a 5-point Likert-Scale, with “1” stands for “Strongly Disagree” and “5” stands for “Strongly Agree”. Apparently, mean was used as a measure of central tendency. Furthermore, the data were encoded, processed and analyzed using SPSS. V20 interview questions were analyzed qualitatively..

### **3.2. Ethical Consideration**

Permission to carry out the study was granted from ethical clearness string committee from College of Business and Economics, in Jimma University. Informed consents were also obtained from the store managers after the purpose of the study was explained to them. They are also informed that the information obtained from them will not be disclosed to the third person. Name and other identifying information didn't used in the study. During the consent process, they were provided with information regarding the purpose of the study, why and how they were selected to be involved in the study, and what was expected of them and that they could withdraw from the study at any time. Participants were also assured about confidentiality of the information obtained in the course of the study by not used personal identifiers. The name for whom a questionnaire was administered and the public facility in which they work will not appear in data analysis.

## **CHAPTER FOUR:**

### **4.1. RESULT, DISCUSSIONS AND INTERPRETATION**

This chapter contains the presentation, analysis and interpretations of data. The statistical techniques that were outlined in chapter three were applied to the data, and the results obtained are presented in this chapter. The first part describes the demographic characteristics of respondents in terms of sex, age group, and education level and service years. In the second part the analysis and interpretation of data gathered through questionnaire were discussed descriptions of the variables with different assumption tests, result of goodness of fit test and result of independent variables effect tests.

#### **4.1. DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS**

The data analysis, presentation and discussion focused on presenting the finding from the observation and answers to the research questions. The result of observation is presented in descriptive statistics. The questionnaire was analyzed using SPSS version 20 and the result found from the interview was used to triangulate with the finding from the respondents. Emphasis was given to answer the research questions and finally summary of the analysis was presented. Before going to the main part of the study it is logical to present the background information of the study. Therefore, here under the result regarding respondents' background information like: - age, sex, marital status, educational back ground and work experience has been presented with tables as shown below.

**Table 2: Demographic characteristics of respondents**

<b>Characteristics</b>	<b>Frequency</b>	<b>Valid percentage</b>	<b>Cumulative percentage</b>
<b>Sex:</b>			
Male	84	62.2	62.2
Female	51	37.8	100.0
<b>Total</b>	135	100.0	
<b>Age group (in years):</b>			
<25	12	8.9	8.9
25-30	20	14.8	23.7
31-35	48	35.6	59.3
36-40	42	31.1	90.4
>40	13	9.6	100.0
<b>Total</b>	135	100.0	8.9
<b>Marital Status:</b>			
Married	46	34.1	34.1
Single	54	40.0	74.1
Divorced	27	20.0	94.1
Widowed	8	5.9	100.0
<b>Total</b>	135	100.0	
<b>Educational level:</b>			
College diploma	49	36.3	36.3
BSc	46	34.1	70.4
MSc/MA	23	17.0	87.4
Others	17	12.6	100.0
<b>Total</b>	135	100.0	
<b>Work Experience:</b>			
<1 year	14	10.4	10.4
1-3 years	32	23.7	34.1
3-5 years	35	25.9	60.0
5-10 years	40	29.6	89.6
>10 years	14	10.4	100.0
<b>Total</b>	135	100.0	
<b>Professional</b>			
0 + Nurse	26	19.3	19.3
Druggist	20	14.8	34.1
Pharmacist	80	59.3	93.3
Other	9	6.7	100.0
<b>Total</b>	135	100.0	

Table 4.1 indicates that the majority respondents (62.2%) were Male while 37.8% were female. It was observed that in every department, although the male were many compared to females, this tells as the majority respondents are males. This shows that males dominantly handle inventory management activities in the organization. In terms of age, the information observed on table above showed that 35.6 percent of respondents were within the age category of 31 to 35 years: 31.1 percent were within the age range of 36 to 40 years while 14.8 percent were within 25-30 years, 9.6% were above 40 years old and the remaining least group 8.9% percent were less than 25 years old age. The analysis of the respondent's marital status showed the larger proportion of respondents, 40% was single followed by, 34.1 % of them were married, and 20% and 5.9% of them were divorced and widowed respectively. The study requested the respondent to indicate their highest level of education. From the findings, 36.3% of the respondent indicated their highest education level as college diploma, 34.1% of the respondent indicated their highest education level as degree, and 17% of the respondents indicated their highest education level as masters, whereas 12.6% of the respondents indicated their education level as others, who were certificate and others level holders.

The above identified findings were implies as majority of the study participants were found on degree level. This is an indication that the majority of the respondents were middle level professionals which are BSC/BA holders. Therefore the respondents provide relevant and reliable information on inventory management of health facilities needed for the study and they are fitted in line with the response to the questionnaire. The analysis of organizational work experience of respondents showed that, based on the figure indicated above, least group 14 respondents (10. percent) had worked for less than 1 year and above 10 years with equal proportions; 32 respondents (23.7 percent) worked for 1 to 3 years, 35 (25.9 percent) had worked for 3-5 years, and larger group 40(29.6 percent) had worked for 5-10 years. This implies that majority of the respondents engaged in this study had worked for a considerable time and thus they had vast knowledge which could be relied upon in the study. The

more experienced one is, is attributed to performance, hence directly having an impact on the consistency at which pharmaceutical inventory management were a valid The findings indicated above could imply as the study participants experienced enough. Therefore, they could able to provide valuable data as an input for the study. Therefore, the demographic analyses indicate that there is a higher male ratio, force, high work experience and very good educational level. On the table 4.1 above indicates that the contribution different health professionals for managing pharmaceutical activities and health service in health facility. 59.3.9%, 19.3%, 14.8 and 6.7 of respondents were pharmacist, Nurse, druggist and others respectively those have more contact with pharmaceutical distribution management. Therefore, the demographic analyses indicate that there is a higher male ratio, force, high work experience and very good educational level.

## **4.2 DESCRIPTIVE ANALYSIS**

The descriptive statistics utilized are based on frequency tables to provide information on the demographic variables. Through tables, summary statistics such as means, standard deviations, minimum and maximum are computed for each factor and Inventory management this study. The findings which identified on this study presented as follows

### **4.2.1. DESCRIPTIVE ANALYSIS OF THE MANAGEMENT SUPPORT**

As indicated on table 3 the analysis of management /support showed that, larger proportion (53.3%) of respondents were reported that as they were disagree or strongly disagree for the statement management should try to make pharmaceutical procurement processes less bureaucratic, through procurement reforms. This might imply as the management could not able to try the best for ensuring the availability of pharmaceuticals for the facility and they had been also not pay a concern for the transactional flow. As a result a customer satisfaction on pharmaceuticals service provision is so poor. Regarding the available pharmacy professionals are sufficient for the current inventory management activities most of 63.3% of respondents were state as they were disagree or strongly disagree as there were sufficient pharmacy professionals. This implies the management could not able to arrange the right personnel for effective pharmaceuticals inventory management practice at the study area.

This might be hindering the performance of the pharmaceuticals inventory management practices because of the task given for other health professionals as additional activities. Additionally, 63.4% of the study participants were disagree or strongly disagree for the management used reliable Information to an effective and efficient inventory management process. Thus, the management decision making process was based on unreliable information. As a result they have no got better outcome the objectives what they had been attempted regarding pharmaceuticals inventory management practices. Regarding the management follow-up of the pharmaceuticals inventory records, most of 56.7% of respondents were state as they were disagree or strongly disagree on the management follow Accuracy of inventory records as necessary to determine replenishment of individual items. This could suggest, as the management could not able to maintain steady pharmaceuticals supply to the facility with their right decisions. In other way, larger proportion 63.4% respondents were disagree or strongly disagree on the management make a decision for inventory management function to achieve a superior performance.



Table 3: Descriptive analysis of the management support

Items	SD	Dis	Neut ral	Agre e SA	M ea n	SD	
management should try to make pharmaceutical procurement processes less bureaucratic, through procurement reforms	10%	43.3 %	20%	10 %	16.7%	2.30	0.952
The available pharmacy professionals are sufficient for the current inventory management activities	20%	46.3 %	13.3 %	10 %	13.3%	2.33	0.959
The management used reliable Information to an effective and efficient inventory management Process	21.7 %	41.7 %	10%	20%	6.7 %	2.27	0.980
The management follow Accuracy of inventory records as necessary to determine replenishment of individual items	35 %	21.7 %	15%	21.7 %	6.7 %	2.23	1.006
The management make a decision for inventory management function to achieve a superior performance, it's necessary to recruit, train and develop personnel with the capacity and motivation to do better job	16.7%	46.7 %	10 %	16.7 %	10 %	2.20	0.997
The management follow to eliminate duplicate or obsolete pharmacy inventory and reduce drug waste	20%	30%	33.3 %	10%	16.7%	2.27	0.980
The management regularly receive a report on stock status from pharmacy store for the last 6 months	10%	40%	6.7%	26.7 %	16.7%	2.20	1.006
The management provides feedback on supply report regularly	16.7 %	33.3 %	10%	20%	20 %	2.23	0.997
The management allocate enough funds the organization can run its activities efficiently in pharmaceuticals availability	10%	40%	23.3 %	13.3 %	13.3%	2.23	1.006
Grand mean of management support	2.17	.950	20%	20%	13.3%	2.33	0.959

*Source: Own survey SPSS result, 2019*

This could suggest as a management failed to make an effective decision on better performance achievement of the inventory management practice on the study area. Having a belief on necessary to recruit, train and develop personnel with the capacity and motivation to do better job while larger group 50 % of respondents were also disagree or strongly disagree from response to the statements. This imply as a significant proportion of respondents indicated for the poor management involvements on for a superior performance of pharmaceuticals inventory management practice. Additionally, 50% of respondents report were indicated as they were disagree or strongly disagree for the management follow to eliminate duplicate or obsolete pharmacy inventory and reduce drug waste. This implies as the management had poor follow up of pharmaceuticals supply to had economic value. Therefore, there were great probabilities of pharmaceuticals wastage on the facilities at the study area.

Concerning the reporting path of the management and the pharmaceuticals section larger proportion 46.6% of the respondents were reported as the management not regularly receive a report on stock status from pharmacy store for the last 6 months. This could ensure as the management currently had not a report of the pharmaceutical stock status which had received from the pharmaceuticals section. And also 50% of the participants were state they disagree or strongly disagree for the management provides feedback on supply report regularly. This imply as the management not pay a concern to the report and it go through with the report and could not prepare and provide feedback for the improvements of the activities.

The analysis for the management allocation enough funds for pharmaceuticals, the management concerned the inventory activities of the facility. and the management could able to establish and functioning of DTC as a support for the facility inventory management practice larger proportion 50%, 46.6% & 50% of the respondents were state they disagree and strongly disagree respectively for the above indicated statements. From the above findings we can conclude as the management not playing its role on allocating fund for pharmaceuticals, taking an action with paying a concern for the inventory activities and could establish a multidisciplinary team as to share the role of the pharmaceuticals activities of the facility.

Additionally, larger proportions 56.6% & 50% of respondents were reported with agree or strongly agree for the existence of joint supportive supervision in quarter base with WHO, ZOHO, and other partners and disagree and strongly disagree on the pharmaceuticals activities and for the management accepting the need for training for the staff as a vital means of building skills for the staff. This could imply facilities on the study areas had a chance of supports/mentors with different joint parties to improve the pharmaceuticals activities. However, the management had not a concern of the need of training for the staff. Thus, the chance of training for the pharmaceutical personnel had not got a primary target by the management to improve the pharmaceuticals service provision by the facilities of jimma zones.

#### **4.2.2 : EFFECTS OF DOCUMENTATION ON INVENTORY MANAGEMENT PERFORMANCE**

According to the information showed above on 4., the descriptive analysis of documentation concern and activities on the study area showed that, larger proportion 46.6 % of respondents. were disagree or strongly disagree on Information is critical to an efficient inventory 74 management process of the facilities on the study areas. This could suggest information could not take as a means to make right decisions. However, larger proportions 36.3% & 33.3% respondents were disagree/strongly disagree and neutral for accuracy of inventory records is necessary to provide satisfactory customer service respectively. This could imply the role accuracy inventory record on the study area not satisfactory and failed to get an agreement with the study participants. Regarding Accuracy of inventory records is necessary to determine replenishment of individual pharmaceutical items the analysis showed that it got disagree or strongly disagree with larger proportion 53.4% of respondents. This could be not supported by theoretically an accurate inventory record could forecast the right demand and hence accurately determine the replenishment of individual items. About half 50% of the respondents were disagree or strongly disagree on Proper documentation ensures that pharmaceuticals availability meets disposal or pharmaceuticals demand on the facilities of study areas. This imply as most of the respondents could disapproved the functions of proper documentations on the study area.

On the other way, larger proportions disagree or strongly disagree for Accuracy records provide the management with the information which issued to ensure accountability. This implies the

inaccuracy of the records which gives to the management on the study area had a bias. So, improper information could be transferred to the management which misleads inappropriate decision to be made by the management. Thus, great concern should have to pay for the accuracy of the records as to get quality information and right decisions by the management. As indicated table, the analysis for the documentation system used by the facility showed that Larger proportion 56.6 % respondents were disagree or strongly disagree for the health facility uses both manual & Computerized type of inventory control record posting system for documenting valuable information. This implies as the facility had been used either manual or some of them used computerized types of record systems. Most 60% of respondents were state with their agree or strongly agree for the health facility avails all LMIS tools (Bin card, stock card, RRF, IFRR, HPMRR) for effective documentation of inventory data. This ensured recordkeeping access tool readiness but the utilization determined by staff commitment and skills.

Regarding the facility has been used and updated stock control records (bin card and stock record card) for its pharmaceutical inventory control. The analysis showed that larger proportion 50% of respondents were disagreed or strongly disagree on the statement. This imply as LMIS tool utilization is poor on the study area. The reason for this might be the work burden at the facility, poor commitment by the staff, negligence and also turnover over retained personnel. However, larger proportion of respondents 43.3 % were response of disagree or strongly disagree on the information on the documentation had been used for effective and efficient procurement process of the facility. Grand Mean value of documentation related information is 2.00. This result implies that the agency has great job in using of accurate information for decision making. This result contradicted study done by (gulilat 2018) that the information management practices of health facilities is very poor. This could suggest as the information on the documentation not utilized might poor or un logical for the decision has been made. This imply as most of the facilities on the study areas were used simple estimation to forecast their demands without concerning their consumption data.

Table 4: Descriptive analysis of the documentation related activities

Items	SD	Dis	Ne utAgr	SA	Mean	SD	
Information is critical to an effective and efficient inventory management process	13.3%	33.3%	20%	20%	13.3	2.03	0.964
Accuracy of inventory records is necessary to provide satisfactory customer service	33.3%	33.3%	33.3%	13.3%	20%	2.00	0.983
Accuracy of inventory records is necessary to determine replenishment of individual pharmaceutical items	16.7%	36.7%	13.3%	23.3%	20%	2.07	1.081
Proper documentation ensures that pharmaceuticals availability meets disposal or pharmaceuticals demand	26.7%	23.3%	20%	16.7%	13.3	1.90	0.960
Accuracy records provide the management with the information which is used to ensure accountability	26.3%	16.7%	23.3%	10%	3%	2.07	1.048
The health facility uses both manual & Computerized type of inventory control record posting system for documenting valuable information	23.3%	33.3%	13.3%	20%	3.3	2.10	0.960
The health facility avails all LMIS tools (Bin card stock card, RRF,IFRR,HPMRR..) for effective documentation of inventory data.	3.3%	13.3%	23.3%	43.3%	16.7	1.97	0.964
The facility has been used stock control records (bin card and stock record card) for its pharmaceutical inventory control.	23.3%	26.7%	23.3%	13.3%	13.3	1.90	0.960
The information on the documentation had been used for effective and efficient procurement process of the facility.	10%	33.3%	20%	26.7%	10	1.97	0.928
The heath facility store manager resupply to the dispensing units as per specified schedule based on the information of their consumption found at their documentation.	33.3%	43.3%	20%	20%	13.3	2.00	0.910
<b>Grand mean of Documentation related information</b>						<b>2.07</b>	<b>.907</b>

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Source: Own survey SPSS result, 2019

### 4.2.3 : Effects of staff skill on inventory management performance

**Table 5: Descriptive Analysis of the Staff Skill Status**

Items	SD	Dis	Neutr al	Agre e	SA	Mea n	SD
There are qualified staff that is competent and skilled helps the organization to achieve its goals and objectives by being efficient and effective when Carrying out their various functions on the pharmaceuticals inventory control system.	23.3	33.3 %	16.7 %	16.7 %	10 %	2.37	0.999
For inventory management function to achieve a superior performance, staff at the facility had been and develops personnel with the capacity and motivation to do better job.	13.3	33.3 %	23.3 %	20%	10 %	2.20	1.031
Staff at the pharmaceuticals sections of the facility had been trained IPLS/DTC	13.3	16.7 %	16.7 %	30%	23.3 %	2.33	1.061
Health facility employees are well trained to effectively execute the inventory management activities and they perform as per trained	13.3 %	36.7 %	20%	23.3 %	6.7 %	2.43	1.073
Health facility Staffs qualification matches with Job requirement which enhance the inventory management practice.	23.3 %	40 %	13.3 %	20%	3.3 %	2.30	1.119
Staffs knowledge and skills affects the performance of the inventory management system	20%	30 %	26.7 %	13.3 %	10 %	2.27	1.048
Team development and leadership competencies are vital for the effectiveness of inventory management of the facility	20%	36.7 %	6.7%	26.7 %	10 %	2.40	1.037
The health facility staffs follow organization processes, instructions, rules, and parameters for warehouse and inventory management and related activities	20%	36.7 %	20%	20%	3.3 %	2.37	1.033
The health facility deploys the right type and mix of professional for the effective implementation of inventory management system	20%	36.7 %	13.3 %	20%	10 %	2.33	0.994
Grand mean of the staff skill	-	-	-	-	-	<b>2.23</b>	.858

Source: Own survey SPSS result, 2019

Health facility employees are well trained to effectively execute the inventory management activities (which approved by 50% of respondents). Health facility Staffs qualification matches with Job requirement which enhance the inventory management practice (which approved by 63.3% of respondents). Staffs knowledge and skills affects the performance of the inventory management system (which approved by 50% of respondents). Team development and leadership competencies are vital for the effectiveness of inventory management (which approved by 50% of respondents). The health facility staffs follow organization processes, instructions, rules, and parameters for warehouse and inventory management and related activities (which approved by 56.7 % of respondents). The health facility deploys the right type and mix of professional for the effective implementation of inventory management system (which approved by 56.7 % of respondents). The above findings imply the staff skill/competency is not better in all regards. They have been failed to secure the inventory management performance of the facilities in skill wise. However, 60% of the respondents were reported as the staff had gotten IPLS and DTC training but they had been showed a gap with level of commitment, negligence and so on.

As indicated above on table 4. the descriptive analysis staff skill showed larger proportion of respondents were disagree or strongly disagree for all item of staff skills which showed that; The facility having qualified staff that is competent and skilled helps the organization to achieve its goals and objectives by being efficient and effective when Carrying out their various functions on the pharmaceuticals inventory control system (which approved by 56.6% of respondents).For inventory management function to achieve a superior performance, it's necessary to recruit, train and develop personnel with the capacity and motivation to do better job (which approved by 46.6% of respondents).

#### 4.2.4 : PERFORMANCE OF INVENTORY MANAGEMENT AT THE STUDY AREA

**Table 6: Descriptive analysis of the inventory management performance**

<i>Items</i>	<i>SD</i>	<i>Dis</i>	<i>Neut</i>	<i>Agree</i>	<i>SA</i>	<i>Mean</i>	<i>SD</i>
The facility could be used important and developed purchasing process	13.3 %	36.7 %	23.3 %	20%	6.7%	2.27	0.785
Inventory management systems are developed with the aim of reducing costs associated with inventory management at the facility	16.7 %	30%	16.7 %	26.7 %	10%	2.27	0.868
Inventory Management plays a decisive role in the enhancement of efficiency and competitiveness of the facility.	20%	46.7 %	6.7%	13.3 %	13.3 %	2.27	0.907
There is an inventory process involves finding systems to track orders, shipping cost, stock and sales at the facility.	13.3 %	33.3 %	20%	23.3 %	10%	2.20	0.925
There is an inventory management is subject to lowering Costs at the facility	16.7 %	30%	23.3 %	20%	10%	2.13	0.819
Too much inventory consumes physical space, creates a financial burden, and increases the possibility of damage, spoilage and loss at the Facility	10%	13.3 %	30%	20%	26.7 %	2.57	1.165
The inventory management practiced supported by themanagement feedback and partners supervision.	23.3 %	40%	20%	13.3 %	3.3%	2.20	1.126
The documentation at the facility creates valid inventory data for decision making in inventory management.	23.3 %	40%	13.3 %	10%	13.3 %	2.40	1.003
Grand mean of the effective inventory management performance						2.23	.774

*Source: Own survey SPSS result, 2019*

As indicated above on table 5. the descriptive analysis inventory management performance on the study area showed larger proportion of respondents were disagree or strongly disagree for all inventory management performance items. However, according to the majority 66.7%, 63.3% &



63.3 % of the study participants negative report indicated that Inventory management plays a decisive role in the enhancement of efficiency and competitiveness of the facility, the inventory management practiced supported by the management feedback and partners supervision and the documentation at the facility creates valid inventory data for decision making in inventory management respectively. Grand mean of the effective inventory management performance was 2.28. This imply as inventory management performance of the facilities on the study area could not function enough as enhancing the facility efficiency and competitiveness, the practice not supported by the management feedback and also the documentation at the facilities were poor to create valid information for decision makings. From the response it can be understood that the inventory performance of the health were not performing in the best interest of their customer.

**Table 7: Summary of descriptive statistics**

	Mean	Std. Deviation	N
Inventory Management performance	2.23	.774	135
Management` ownership/support	2.17	.950	135
Documentation Related information	2.07	.907	135
Staff skill	2.23	.858	135

#### 4.2.5. Results of Key Informant Interview

##### **Major challenges for the inventory management practice**

The in-depth interview aimed on getting opinions of key informants regarding the problems and possible suggestions on the inventory management implementation of the facility. Based on this, a number of insights reflected by the key informants during the in-depth interviews are summarized below. The results generated in this study are organized in line with the research objectives.

**From the Perspective of Management Support:** Participants of the in-depth interview reflected that public health facility management did not invest enough to enhance the inventory management performance. They noticed serious gaps in standardizing and enforcing procedures for better management of inventory at health facility. Lack of practicing cyclic inventory counts, lack of strict application of FEFO principles and inconsistencies in batch tracking were considered as

major problems that hampered the efficiency of existing inventory management practice. Participants of the in depth interview emphasized lack of strong support by senior management towards modernizing the overall inventory management system at all levels of the supply chain. Respondents stressed also that standard inventory practices such as vendor managed inventory, Lean and JIT are not properly practiced at the facility. Key informants also added that there is limited support and follow-up from the higher level in a regular manner. Some of the participants stated presence of scattered nonstandard warehouses as major limitation that hindered efficiency of the inventory management practice.

**From the Perspective of Documentation Related Information:** Participants of the in-depth interview criticized that the existing information system did not get the full support of senior management. Lack of strict use of system, inadequate use of the existing data for logical decision making, absence of standardized directory service and lack of ownership were some of the points raised by key informants as major challenges for the existing documentation at the study area which in turn affects the inventory management efficiency.

**From the Perspective of Staff Competency:** Key informants were asked about the major problems on the existing inventory management performance in terms of human resource capacity. Based on this, they indicated that there were no clear roles and responsibilities given for each employee to build commitment and accountability at facility. They also witnessed even though there are huge efforts to build the capacity of the staffs, the outcomes from the training in terms of building the skills of the staffs are limited. Key informants added that there is lack of capacity in terms of efficient management of inventories. Some of the participants explained that incompetent and demotivated staffs are source of wastage and inefficiencies.

### **Suggested Solutions to Improve the Inventory Management at the Facility**

Participants of the in depth interviews were asked to provide possible solutions to improve inventory management practice across the pharmaceutical supply chain. Based on this, a number of suggestions forwarded are summarized as follows:

**Enough investment on the inventory management:** Participants stressed deployment of standard inventory management techniques such as vendor managed inventory cross docking, cyclic count, and strict enforcement of FEFO principles as important milestone for the efficient management of inventory management which needs strong management support and investment

as well. “Currently, PFSA is under business process reengineering, hence proper implementation of the newly redesigned processes should be a priority agenda for the management”, said a key informant from PFSA.

**Enhance data quality for inventory management:** Key informants stressed standardizing the pharmaceutical master list, strict use of the existing information technology, real time data sharing and use of data for decision making and improving ownership as important steps to improve inventory management practice. Key informants pinpointed that use of quality and real time data for decision making are instrumental for minimizing wastage and reducing the inventory holding costs.

**Enhancing Staff Competency:** Skill based capacity building for the inventory management workforce, development of clear job specification and job description for all staffs, aligning staffs quality with job requirement, devising strong monitoring and evaluation mechanisms, instituting rewarding and incentive mechanisms were suggested by key informants as milestones to improve staff competency at health facility.

#### **4.2.6. RESULTS OF INFERENTIAL STATISTICS**

##### **4.2.6.1 Validity and Reliability Testing**

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Validity and reliability testing of management ownership/responsibility was measured based on 10 items (Item I1 -I10) of the sub scale, for documentation 10 items (Item II 1-II 10), for staff skill/competency is 9 (Items III1-III9), and inventory management practice on the basis of submitting 8 items (Items IV1-IV8) to the analysis. Based on the Significance value obtained by the sig. (2-tailed) of  $0.000 < 0.05$  (for management ownership/support),  $0.002 < 0.05$  (for documentation),  $0.000 < .05$  (for staff skill), and  $.000 < .05$  (for inventory management performance), it can be concluded that the items were valid.

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The result of reliability testing as measured by Cronbach's alpha for all the 37 items of the main questionnaire part is .823. Management support scored Cronbach's alpha of 0.992, documentation 0.980, staff skill 0.981, and Inventory management practice 0.969. It means that all values of Cronbach's alpha are more than 0.6. Thus all data are reliable. See table on reliability below (Table 6

Table 4.7. Table of Reliability

S/No	Variables	Cronbach alpha	Cronbach alpha based on standardized items
1	Management ownership/support	0.992	0.992
2	Documentation	0.980	0.981
3	Staff skill/competency	0.981	0.982
4	Inventory management practice	0.969	0.970

*Source: 2019 survey*

According to George and Mallery (2003) a Cronbach's alpha coefficient greater than 0.9 implies excellent, greater than 0.8 is good, greater than 0.7 is acceptable, greater than 0.6 is questionable, greater than 0.5 is poor, and less than 0.5 is unacceptable". Thus, it is excellent for this study since it is greater than 0.9.

#### ***4.2.6.1 Classical Assumption Testing***

##### **A. Sample characteristics of normality test**

According to normal Q-Q plots and box plot showed that the data factors effect, management support, documentation, staff skill and inventory management performance were normally distributed with the value of asymptotic significance (p-value) 0.871 which is higher than alpha ( $\alpha = 0.05$ ). The value of asymptotic significance for management support was 0.938, for documentation is 0.865, for staff skill is 0.860, and for inventory management performance

0.821

**Table 8: TESTS OF NORMALITY**

Tests of Normality						Observed
Dependent Variable	Variables	Kolmogorov-Smirnov Statistic	Sig.	Shapiro-Wilk Statistic	Sig.	Correlations coefficient
Inventory Management practice	Management Support	.473	.001	.552	.000	.938
	Documentation	.256	.012	.833	.006	.865
	Staff skill	.417	.000	.608	.000	.860
	Inventory management performance	.407	.002	.640	.001	.821

a. Lilliefors Significance Correction

*Source: Own survey SPSS result, 2019*

## B. Checking for multicollinearity

Multicollinearity is produced when any single predictor variable is highly correlated with a set of other predictor variables. Ways of detecting multicollinearity is using tolerance values (1/VIF) and variance inflator factor (VIF) value. The cutting value for 1/VIF is greater than 0.1 and the VIF less than 10. As it shown table below the 1/VIF of all independent variables are greater than 0.1 and the VIF value of all the independent variables are also less than 10. Therefore, there is no multicollinearity problem among each independent variable. Output of variance inflation factor (VIF), column in the coefficients table of the regression output shows that VIF for management support (4.730), documentation (1.636), and staff skill (3.617), all are smaller than 10. It means that there is no problem of multicollinearity between independent variables. This can be further ascertained from the Tolerance column of the same table in which the tolerance for the three independent variables is 0.211, 0.611, and 0.276 respectively all > 0.1 indicating that there is no multi co linearity problems among each independent variable(see table 8).

**Table 9: CO-LINEARITY STATISTICS**

Variables	Co-linearity statistics	
	Tolerance	VIF
Management Support	.211	4.730
Documentation	.611	1.636
Staff skill	.276	3.617

*Source: Own survey SPSS result, 2019*

Table 10: Dependent variable: Inventory management performance

Variables	VIF	1/VIF
<i>management support</i>	4.730	<i>0.2114</i>
<i>Documentation</i>	1.636	<i>0.6112</i>
<i>staff skill</i>	3.617	<i>0.2765</i>
<i>Mean</i>	<b>3.328</b>	

*Source: Own survey SPSS result, 2019*

**Table 11: result of goodness of fit test**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	11.569	3	3.856	37.222	.000 <sup>b</sup>
Residual	5.798	56	.103		
Total	17.367	59			

a. Dependent Variable: Inventory Management performance

Predictors: (Constant), Staff skill/competency, Documentation Related information, Management` support Significance of the model

The last column in the above table (ANOVA-table) shows the goodness of fit of the model. It is p-value or observed significance of the F. The lowers this number, the better the fit. Typically, if “Sig” is greater than 0.05, we conclude that our model could not fit the data.

The F is comparing the two models below:

1.  $IMP = \beta_0 + \beta_1 * C + \beta_2 * CB + \beta_3 * CB + et$ ,

2.  $IMP = \beta_0$  (In formal terms, the F is testing the hypothesis:  $\beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ ) If the F is not significant, then we cannot say that model 1 is any better than model 2. The implication is obvious- the use of the independent variables has not assisted in predicting the dependent variable. If Sig < .01, then the model is significant at 99%, if Sig < .05, then the model is significant at 95%, and if Sig < .1, the model is significant at 90%. Significance implies that we can accept the model. If Sig > .1 then the model was not significant (a relationship could not be found) or "R-square is not significantly different from zero", the model does not work at all Note that p-value is the Sig. column value. Test of the goodness of fit of the model in this research showed negative results. From the result of F-test, it is known that the F-statistic **37.222** is higher than the critical value 2.390 (from t- table) and the probability (p-value or the Sig. value) 0.000 is smaller than alpha (0.05). Therefore, the model is fit. The third confirmatory test is looking at the  $R^2$  value of the model summary which is .666 > 0. As this value gets approach to +1, the better the model will be.

**Table 12: Modelsummary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square	F Change	df1	df2	Sig. Change	Durbin-Watson
1	a .816	.666	.628	.472	.666	37.222	3	56	.000	1.940

**Source: Own survey SPSS result, 2019**

- a. Predictors: (Constant), Staff skill, Documentation Related information, Management` support
- b. Dependent Variable: Inventory Management performance

If we had to compute it by hand the F value, it would be  $F = \frac{\dots}{\dots}$

Where: F=F-value that is resulted from the calculation;  $R^2$  =coefficient of determination;

k=number of variables (# of dependent and independent variables);

N=number of observations (# of sample respondents). (K-1) = degree of freedom

$R^2=0.666$  .....from regression summary table

$K-1 = 4 - 1 = 3$ ,  $1 - R^2 = 1-0.666 = 0.334$  and  $N-k = 60 - 4 = 56=df2$

Therefore,  $F = 0.666/3 \div 0.334/56$

$= 0.666/3 * 56/0.334 = .222*56 \div 0.334 = 12.432/.334 = 37.221$

$$= 0.222 * 167.66 = 37.221$$

The value is similar, **37.221=37.222**; the difference could be the effect of rounding.

The results from the regression model summary and analysis of variance above indicate that affecting factors, management support, documentation and staff skill could significantly contribute towards the R<sup>2</sup>-value, which is a statistical measure of how close the data are to the fitted regression line. Based on the R<sup>2</sup>-value of 0.666, these three variables could explain 66.6 % variation in the pharmaceuticals inventory management performance on public health facilities of jimma zones.

**Table 13: Table of coefficientsa**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.546	.279		5.541	.000		
	Management support	.477	.201	.373	2.373	.012	.211	4.730
	Documentation Related information	.359	.124	.420	2.901	.007	.611	1.636

Source: Own survey SPSS result, 2019

The regression coefficients are shown in the above table. The intercept, 1.546, is representing the estimated average value of inventory management practice when management support; documentation, and staff skill/competency are zero. Thus an inventory management practice with no management support; documentation and staff skill will have severe impact on the success of pharmaceuticals inventory management practices of public health facilities at Jimma zones. The slope of independent variables also exhibits useful predictive information about the implication. The slope of management support, documentation and staff skill, which are 0.477, 0.359 and 0.879 means that the pharmaceuticals inventory management practices increased by 0.477, 0.359 and 0.879 when, management support, documentation and staff skill respectively increases by 1. An examination of these three independent variables indicated that staff skill presented the strongest positive interference on the pharmaceuticals inventory management practice with the standard beta of 0.879 followed by management support with beta of 0.477 and documentation with  $\beta$  0.359. Thus the statistical results prove that positive and linear relationship exists between pharmaceuticals inventory management performance and management support,



documentation and staff skill at public health facilities of the study area.

**Table 14: Summary of the regression output**

Variables	F-test and T-test					R <sup>2</sup>	K	N	Conclusion	
	F-statistic	Critical value	Regression coefficient	Critical Value	p-value					Significant
Goodness of fit testing	37.222	2.390			0.000					
(Constant)			1.546	5.541	2.390	.000				
Management` Support			.477	2.373	2.390	.012	0.666	4	135	Significant
Documentation Related information			.359	2.901	2.390	.007	0.666	4	135	Significant
Staff skill			.879	4.523	2.390	.000	0.666	4	135	Significant

*Source: Own survey SPSS result, 2019*

Based on the above tables, the regression model will be filled in as follows:

$$Y = 1.546 + 0.477X_1 + 0.359X_2 + 0.879X_3 + \varepsilon$$

## CHAPTER FIVE:

# SUMMARY, CONCLUSIONS& RECOMMENDATIONS

### 5.1. Summary of Major findings

According to the collected data from the study population, after the study was processed and analyzed this raw data in order to present relevant result of the study with full of interpretation and discussion. The findings on the result part of the study were sorted with descriptive and inferential statistics presentation. Therefore, based on the identified result the study sought to analyze the relationship of the management support to effectiveness of the pharmaceuticals inventory control system, to determine the effect of poor documentation on the effectiveness of pharmaceuticals inventory control system and to investigate the relationship of skills of professionals working in managing the store to the effectiveness of pharmaceuticals inventory control system. The three variables were found to have an effect on effectiveness of pharmaceuticals inventory control system.

Therefore, based on the identified result of the study, the researcher could able to summarize the major findings of the study and present as shown below.

- The majority respondents (62.2%) were Male while 37.8% were female. It was observed that in every department.
- The study showed that 35.6 percent of respondents were within the age category of 31 to 35 years: 31.1 percent were within the age range of 36 to 40 years while 14.8 percent were within 25-30 years, 9.6% were above 40 years old and the remaining least group 8.9% percent were less than 25 years old age.
- The analysis of the respondent's marital status showed the larger proportion of respondents, 40% was single followed by, 34.1 % of them were married, and 20% and 5.9% of them were divorced and widowed respectively.
- From the findings, 36.3% of the respondent indicated their highest education level as college diploma, 34.1% of the respondent indicated their highest education level as degree, and 17% of the respondents indicated their highest education level as masters, whereas 12.6% of the respondents indicated their education level as others, who were certificate and others level

holders.

- Therefore, the demographic analyses indicate that there is a higher male ratio, force, high work experience and very good educational level.
- Regarding the available pharmacy professionals are sufficient for the current inventory management activities most of 63.3% of respondents were state as they were disagree or strongly disagree as there were sufficient pharmacy professionals. This implies the management could not able to arrange the right personnel for effective pharmaceuticals inventory management practice at the study area.
- They have been failed to secure the inventory management performance of the facilities in skill wise. However, 60% of the respondents were reported as the staff had gotten IPLS and DTC training but they had been showed a gap with level of commitment, negligence and so on.
- The value is similar,  $37.221=37.222$ ; the difference could be the effect of rounding.
- The results from the regression model summary and analysis of variance above indicate that affecting factors, management support, documentation and staff skill could significantly contribute towards the R<sup>2</sup>value, which is a statistical measure of how close the data are to the fitted regression line Based on the R<sup>2</sup>-value of 0.666, these three variables could explain 66.6 % variation in the pharmaceuticals inventory management performance on public health facilities of jimma zones.

## 5.1. CONCLUSIONS

The study found out that the management support on the system, documentation, and the skill of the staff on the system implementation were poor which resulted the performance of the effectiveness of pharmaceuticals inventory control system in the study area be poor. The key findings from the study revealed that: poor document qualities, which create unreliable information and which could be misled the information on the procurement process. According to the study, management support, documentation and staff skill showed positive significant interferences with the pharmaceuticals inventory management performance .Thus an inventory management practice with no management support; documentation and staff skill/competency will have severe impact on the success of pharmaceuticals inventory management practices of public health facilities at the study area. According to the above findings, the study was accepting the hypothesis of; management support, documentation and staff skill has positive interference with pharmaceuticals inventory management.

The other inventory management challenge identified in this study were associated with the process of updating stock recorded LMIS data tools and documentation processing in general, poor management ownership/support and poor staff skill. From this study which showed that as the correlation between staff skill/competency and pharmaceuticals inventory management performance ( $r=0.746$ ) higher than that of between management support and pharmaceuticals inventory management practices ( $0.602$ ) and the correlation between documentation and pharmaceuticals inventory management performance ( $r=0.517$ ).

This implies r-value of staff skill is  $>0.7$ , which means staff skill had strong positive relationship with pharmaceuticals inventory management performance of public health facilities at the study area. Also the results from the regression model summary and analysis of variance indicate that affecting factors, management ownership/support, documentation and staff skill could significantly contribute towards the  $R^2$ value, which is a statistical measure of how close the data are to the fitted regression line Based on the  $R^2$ -value of  $0.666$ , these three variables could explain  $66.6\%$  variation in the pharmaceuticals inventory management performance on public health facilities of the study area.

## 5.2. RECOMMENDATIONS

Findings from this study indicates that the practice of the current pharmaceuticals inventory control system much more influenced by the management ownership, documentation and the skill of professionals working in the system, there for:

- The key management bodies in health facility, wereda health office and zonal health departments should be oriented or trained on the system implementation and follow up.
- The regional government should work on improving the challenge on availability of pharmacy technicians and managements of the health facilities should employ adequate qualified personnel involved in stock control activity.
- Establishment and strengthening of technical committee (DTC) to support the system implementation in facility level should be commenced.
- There is need for organizations to ensure accuracy of records provide the management with the information which is used to ensure accountability thus the study established that proper documentation ensures that pharmaceuticals availability meets the facility demand and the accuracy of inventory records is necessary to provide satisfactory customers.
- Management of the health facilities should have to follow and support the pharmaceuticals sections, through motivating and upgrading the staff skill and also through assigning the right persons for the pharmaceuticals warehouse tasks in order to improve the facilities inventory management performances.

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## 7. Appendixes

### APPENDIX 1: SPSS OUTCOME TABLES AND FIGURES

		Inventory Management performance	Management support	Documentation Related information	Staff skill
	Inventory Management performance	1.000	.602	.517	.746
Pearson Correlation	Management support	.602	1.000	.587	.839
	Documentation Related information	.517	.587	1.000	.378
	Staff skill	.746	.839	.378	1.000
	Inventory Management performance	.000	.000	.002	.000
	Management support	.000	.000	.000	.000
Sig. (1-tailed)	Documentation Related information	.002	.000	.000	.020
	Staff skill	.000	.000	.020	.000
	Inventory Management performance	135	135	135	135
N	Management support	135	135	135	135
	Documentation Related information	135	135	135	135
	Staff skill	135	135	135	135

#### Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.546	.279		5.541	.000		
Management support	.477	.201	.373	2.373	.012	.211	4.730

1	Documentation Related information	.359	.124	.420	2.901	.007	.611	1.636
	Staff skill	.879	.194	.975	4.523	.000	.276	3.617

a. Dependent Variable: Inventory Management performance

**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	.816 <sup>a</sup>	.666	.628	.472	.666	37.222	3	56	.000	1.940

a. Predictors: (Constant), Staff skill, Documentation Related information, Management support

b. Dependent Variable: Inventory Management performance

**ANOVA<sup>a</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	11.569	3	3.856	37.222	.000 <sup>b</sup>
1	Residual	5.798	56	.103		
	Total	17.367	59			

a. Dependent Variable: Inventory Management performance

Predictors: (Constant), Staff skill, Documentation Related information, Management support

S/No	Variables	Cronbach alpha	Cronbach alpha based on standardized items
1	Management support	0.992	0.992
2	Documentation	0.980	0.981
3	Staff skill	0.981	0.982
4	Inventory management performance	0.969	0.970

Tests of Normality							Observed Correlation coefficient
Dependent Variable	Variables	Kolmogorov-Smirnov <sup>a</sup>		Shapiro-Wilk			
		Statistic	Sig.	Statistic	Sig.		
Inventory Management	Management support	.473	.001	.552	.000	.938	
	Documentation	.256	.012	.833	.006	.865	

practice	Staff skill	.417	.000	.608	.000	.860
	Inventory management performance	.407	.002	.640	.001	.821
a. Lilliefors Significance Correction						

### Summary of the Regression output

Variables	F-test and T-test						R <sup>2</sup>	K	N	Conclusion
	F-statistic	Critical value	Regression coefficient	t	Critical value	p-value				
Goodness of fit testing	37.222	2.390				0.000				Significant
(Constant)			1.546	5.541	2.390	.000				Significant
Management support			.477	2.373	2.390	.012	0.666	4	135	Significant
Documentation Related information			.359	2.901	2.390	.007	0.666	4	135	Significant
Staff skill			.879	4.523	2.390	.000	0.666	4	135	Significant

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.773
Approx. Chi-Square		70.201
Bartlett's Test of Sphericity	Df	6
Sig.		.000

### Communalities

	Initial	Extraction
Management support	1.000	.772
Documentation Related information	1.000	.631
Staff skill	1.000	.805

Inventory Management performance	1.000	.825
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Extraction Method: Principal Component Analysis.

### Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.035	75.868	75.868	3.035	75.868	75.868
2	.511	12.786	88.655			
3	.293	7.331	95.986			
4	.161	4.014	100.000			

Extraction Method: Principal Component Analysis.

### Descriptive Statistics

	Mean	Std. Deviation	N
Inventory Management performance	2.23	.774	135
Management` ownership/support	2.17	.950	135
Documentation Related information	2.07	.907	135
Staff skill	2.23	.858	135

## APPENDIX 2: Questionnaire Jimma University

### Dear respondents:

I'm a graduate student at Jimma University College of Business and Economics in the Department of Logistics and Transportation Management. Currently, I'm conducting a research entitled '*Studying pharmaceutical inventory management performance of public health facilities*' as a partial requirement for the award of Masters of Art Degree in Logistics and Transportation Management. The purpose of this questionnaire is to gather data for the proposed study, and hence you are kindly requested to assist the successful completion of the study by providing the necessary information.

Your participation is entirely voluntary and the questionnaire is completely anonymous. I confirm you that the information you share will stay confidential and only used for the aforementioned

academic purpose, thus not affects you in any way rather it will be help you in improving the performance of your health facility. So, your genuine, frank and timely response is vital for the success of the study. I want to thank you in advance for your kind cooperation and dedication of your precious time to fill this questionnaire.

Thank you in Advance!

**Part I. Information about Demographic Data**

Please put a tick (  ) mark in the box ~~for you~~ Please put a tick (answer and for the number of

your choice for the alternatives given.

Sex A. Male  B. Female

2. Age groups

A. 25 years  B. 25-30  C. 31-35  D. 36-40  E. >40

3. Marital status

A. married  B. single  C. Divorced  D. Widowed

4. Educational back ground. A. College diploma  B.  C.  D.

5. Work experience

A. less than one year  B. 1- 3 years

C. 3-5 years  D.

**College of Business and Economics Department of Management**

**Dear respondents:**

I'm a graduate student at Jimma University College of Business and Economics in the Department of Logistics and Transportation Management. Currently, I'm conducting a research entitled '*Studying pharmaceutical inventory management performance of public health facilities*' as a partial requirement for the award of Masters of Art Degree in Logistics and Transportation

Management. The purpose of this questionnaire is to gather data for the proposed study, and hence you are kindly requested to assist the successful completion of the study by providing the necessary information.

Your participation is entirely voluntary and the questionnaire is completely anonymous. I confirm you that the information you share will stay confidential and only used for the aforementioned academic purpose, thus not affects you in any way rather it will be help you in improving the performance of your health facility. So, your genuine, frank and timely response is vital for the success of the study. I want to thank you in advance for your kind cooperation and dedication of your precious time to fill this questionnaire.

Thank you in Advance!

**Part I. Information about Demographic Data**

Please put a tick (  ) mark in the box for your answer and for the number of

your choice for the alternatives given.

Sex A. Male  B. Female

4. Age groups

A. 25 years  B. 25-30  C. 31-35  D. 36-40  E. >40

3. Marital status

E. married  F. single  G. Divorced  H. Widowed

4. Educational back ground. A. College diploma

5. Work experience

A. less than one year  B. 1- 3 years   
 C. 3-5 years  D. 5- 10 years  E. More than 10 years

5. Personnel professional category

1. Nurse  2. Druggist

3. Pharmacist  4. Other  specify

**Part II:** Factors affecting inventory Management performance: Management Support, Documentation Related information and Staff Competency.

Based on the current practice you know, choose only one level of agreement for each statement related to factors affecting pharmaceuticals inventory management performance at facility. Key =1-Strongly Disagree (SD), 2- Disagree (D), 3-Neutral (N), 4-Agree (A), 5- Strongly Agree (SA)

S/N		SD [1]	D [2]	N [3]	A [4]	SA [5]
	<b>I Management support</b>					
I1	Management should try to make pharmaceutical procurement processes less bureaucratic, through procurement reforms					
I2	The available pharmacy professionals are sufficient for the current inventory management activities					
I3	The management used reliable Information to an effective and efficient inventory management process					
I4	The management follow Accuracy of inventory records as necessary to determine replenishment of individual items					
I5	The management make a decision for inventory management function to achieve a superior performance, it's necessary to recruit, train and develop personnel with the capacity and motivation to do better job					
I6	The management follow to eliminate duplicate or obsolete pharmacy inventory and reduce drug waste					
I7	The management regularly receive a report on stock status from pharmacy store for the last 6 months					
I8	The management provides feedback on supply report regularly					
I9	The management allocate enough funds the organization can run its activities efficiently in pharmaceuticals availability					
I10	There exist a regular (at least quarterly) supportive supervision visit by Wereda health office/(WHO)/Zonal health department(ZHD) on mentoring the pharmaceuticals inventory control system of the facilities.					
	<b>II Documentation Related information</b>					
II 1	Information is critical to an effective and efficient inventory management process					
II 2	Accuracy of inventory records is necessary to provide satisfactory customer service					
II 3	Accuracy of inventory records is necessary to determine replenishment of individual pharmaceutical items					
II 4	Proper documentation ensures that pharmaceuticals availability meets disposal or pharmaceuticals demand					
II 5	Accuracy records provide the management with the information which is used to ensure accountability					



II 6	The health facility uses both manual & Computerized type of inventory control record posting system for documenting valuable information					
II 7	The health facility avails all LMIS tools (Bin card ,stock card, RRF,IFRR,HPMRR..) for effective documentation of inventory data.					
II 8	The facility has been used stock control records (bin card and stock record card) for its pharmaceutical inventory control.					
II 9	The information on the documentation had been used for effective and efficient procurement process of the facility.					
II 10	The heath facility store manager resupply to the dispensing units as per specified schedule based on the information of their consumption found at their documentation					
<b>III Staff skill</b>						
III 1	Qualified staff that is competent and skilled helps the organization to achieve its goals and objectives by being efficient and effective when Carrying out their various functions on the pharmaceuticals inventory control system.					
III 2	For inventory management function to achieve a superior performance, it's necessary to recruit, train and develop personnel with the capacity and motivation to do better job.					
III 3	Staff at the pharmaceuticals sections of the facility had been trained IPLS/DTC					
III 4	Health facility employees are well trained to effectively execute the inventory management activities					
III 5	Health facility Staffs qualification matches with Job requirement which enhance the inventory management performance.					
III 6	Staffs knowledge and skills affects the performance of the inventory management system					
III 7	Team development and leadership competencies are vital for the effectiveness of inventory management of the facility.					
III 8	The health facility staffs follow organization processes, instructions, rules, and parameters for warehouse and inventory management and related activities.					
III 9	The health facility deploys the right type and mix of professional for the effective implementation of inventory management system.					
II	<b>Inventory management performance</b>					
IV 1	The facility could be used important and developed purchasing process.					
IV 2	Inventory management systems are developed with the aim of reducing costs associated with inventory management at the facility					
IV 3	Inventory Management plays a decisive role in the enhancement of efficiency and competitiveness of the facility.					
IV 4	There is an inventory process involves finding systems to track orders, shipping cost, stock and sales at the facility.					

IV 5	There is an inventory management is subject to lowering Costs at the facility					
IV 6	Too much inventory consumes physical space, creates financial burden, and increases the possibility of damage, spoilage and loss at the facility					
IV 7	The inventory management practiced supported by the management feedback and partners supervision.					
IV 8	The documentation at the facility creates valid inventory data for decision making in inventory management.					

### **APPENDIX 3: Questionnaire format**

#### **QUESTIONNAIRE JIMMA UNIVERSITY SCHOOL OF BUSINESS & ECONOMICS GRADUATE STUDIES DEPARTMENT OF LOGISTICS AND TRANSPORT MANAGEMENT**

Dear respondents:

I'm a graduate student at Jimma University College of Business and Economics in the Department of Logistics and Transportation Management. Currently, I'm conducting a research entitled *'Studying pharmaceutical inventory management performance of public health facilities'* as a partial requirement for the award of Masters of Art Degree in Logistics and Transportation Management. The purpose of this questionnaire is to gather data for the proposed study, and hence you are kindly requested to assist the successful completion of the study by providing the necessary information. Your participation is entirely voluntary and the questionnaire is completely anonymous. I confirm you that the information you share will stay confidential and only used for the aforementioned academic purpose, thus not affects you in any way rather it will be help you in improving the performance of your health facility. So, your genuine, frank and timely response is vital for the success of the study. I want to thank you in advance for your kind cooperation and dedication of your precious time to fill this questionnaire.

### **APPENDIX 4: In-depth interview guiding questions**

1. How do you describe the current inventory management performance of your health facility as compared to standard inventory practice?
2. What are the current challenges of inventory management at your health facility in terms of:
  - Organizational structure
  - Management support
  - Staff competency
  - Coordination
  - Documentation Related Information technology and

3. What do you think are the possible interventions to resolve the current problems in terms of:

- Management support
- Staff competency
- Documentation related Information and

What other additional factors affect the inventory management performance of your facility

