ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE

ASSESSMENT OF WAREHOUSE MANAGEMENT: THE CASE OF PHARMACEUTICAL FUND AND SUPPLY AGENCY HEAD OFFICE

THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ART IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

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Declaration

I, the under signed, declare that this thesis entitled "Assessment of Warehouse Management: The Case of Pharmaceutical Fund and Supply Agency Head Office", is my original work and to the best of my knowledge has not been presented for a degree by any other person and that all the sources of material used for the thesis have been duly acknowledged.

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Statement of Certification

This is to certify that the thesis carried out by Tibebu Hailu Mogessie on the topic entitled: "Assessment of Warehouse Management: The Case of Pharmaceutical Fund and Supply Agency Head Office" is his original work. This research project has been submitted to Addis Ababa University, School of Commerce, Department of Logistics and Supply Chain Management for examination with my approval as a university advisor and is suitable for submission for the award of Masters of Art Degree in Logistics and Supply Chain Management.

Name: Mengistu Bogale (PhD),

Signature: _____

Date: _____

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List of Acronyms and Abbreviations

FEFO: First Expire First Out

FMOH: Federal Ministry of health

HCMIS: Health Management and Information system

IPLS: Integrated pharmaceuticals system

LIFO: Last in first out

LMIS: Logistics Management and Information system

PFSA: Pharmaceuticals Fund and supply Agency

SCM: Supply chain management

SDO: Storage and distribution officer

SOP: Standard Operating Procedures

WHO: World health organization

WMS: Warehouse management system

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Abstract

Many developing countries spend large amount of money on purchasing health commodities; yet an estimated 60–80% of their population particularly in rural areas do not have constant access to even the most essential health commodities. The pharmaceuticals supply management system of Ethiopia has been suffering from several problems including non-availability, un-affordability, poor storage and poor stock management and irrational use of pharmaceuticals. Hence, the purpose of this study was to assess the practices and the major challenges of warehouse management in Pharmaceutical Fund and Supply Agency (PFSA) head office and to indicate the way forward for the improvement in the area. This research study applied descriptive research approach, quantitative and qualitative methods with primary and secondary sources of data so that the objectives of the study need be addressed. A total of 44 professional and technical employees who have warehouse management related works in Pharmaceutical fund and supply agency head office are engaged in the study. Self administered questionnaires with closed ended and open ended questions were used and the collected data were analyzed by SPSS 20. From the findings, the majorities of the employees, average 61.2% have awareness on the principles and procedures of warehouse operations but the sufficient number of trained personnel, safety and personal protective materials, limited number of functional handling materials and equipments are the major problems with an average of 62.3% respondents' agreements. The warehouse managers followed the major procedures of warehouses operations, receiving, putting way and issuing, except that there are limitation on spaces constrictions, limitation on traceability of locations of pharmaceuticals storage areas and lack of handling equipments in the warehouses. Health Management Information System (HCMIS) software is founded to be, 86.3%, an efficient and effective tool on performing the warehouses operations. The major challenges found were HCMIS network connection, safety and security, design and layout of most warehouses and lack of management attention to the warehouse management area. Therefore; the agency needs to work closely with the warehouses related technical and professional workers for the efficiency and effectiveness of warehousing the pharmaceuticals in the health system.

Key words: pharmaceutical, warehouse, management, HCMIS and PFSA.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Warehouse management is the key component of the broader Supply chain management (SCM) which encompasses the planning and management of all activities involving in the sourcing, procurement and other activities and all the logistics management activities and which also includes the coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers (USAID/DELIVER PROJECT, 2011). SCM is the integration of key business processes from end user through original suppliers and a set of approaches utilized to efficiently integrate suppliers, manufactures, warehouses, and stores. SCM Systems are relied on logistics activities to manage warehouses, transportation, trade logistics and various other issues concerning the coordinated movement of products and services from suppliers to customers along the supply chain (Scavarda et al., 2012).

Warehouse is a place used for receiving, storing, picking, packing and shipping goods (Anteneh, 2017) or is a facility in the supply chain to consolidate products to reduce transportation cost, achieve economies of scale in manufacturing or in purchasing, provide value added processes and shorten response time for the customers (Ramaa, Subramanya & Rangaswamy, 2012) where as warehousing is a systematic and an orderly manner activities of storage of goods that will be held from the purchasing to their need by the users (Belayhun, 2017). Warehousing has also been recognized as one of the main operations where companies can provide tailored services for their customers and gain competitive advantage. In a supply chain, warehousing function is very critical as it acts as a node in linking the material flows between the supplier and customer (Ramaa et al., 2012).Warehouse integrates and coordinates the supply chain processes (Paul & Lestari, 2015) and is an important aspect in the supply chain for health commodities especially true in resource poor environments where they act as buffers against uncertainties and breakdowns within the supply chain (USAID | DELIVER PROJECT, 2014).

Generally the primary functions of a warehouse are receiving goods from a source, storing them until they are required, picking them when they are required, and shipping them to the appropriate user (Faber, 2015). The Two broader patterns operations of physical processes for the reorganization of product are: Inbound processes: receiving and put-away and

Outbound processes: order-picking, checking, accumulation/sortation, value-adding and cross-docking packing and shipping (Bartholdi & Hackman, 2011).

Warehouse Management is the planning, controlling, and optimizing the material flows and the use of the resources in a warehouse in an everyday context, with the objective of delivering goods in accordance with customer demands while minimizing operational costs (Faber, 2015). Warehouse management today is part of SCM and demand management. Warehouse management does not just start with receipt of material but it actually starts with actual initial planning when warehouse design and process design within the warehouse. Warehouse Management monitors the progress of products through the warehouse. It involves the physical warehouse infrastructure, tracking systems, and communication between products stations (Anteneh, 2017).

Warehouse management system (WMS) is a database driven computer application, to improve the efficiency of the warehouse by directing put-aways and to maintain accurate inventory by recording warehouse transactions. A WMS primarily aims to control the movement and storage of materials within a warehouse and process the associated transactions, including shipping, receiving, put-away and picking (Ramaa et al., 2012). A WMS focuses on coordinating the processes within the warehouse and it supports the day-to-day operations in a warehouse (Faber, 2015). WMS will reduce inventory, reduce labor costs, increase storage capacity, increase customer service and increase inventory accuracy (Apparel Logistics Group, Inc., 2014).

1.2 Background of the organization

Pharmaceutical Fund and Supply Agency (PFSA) initiated by the Federal Ministry of Health (FMOH) that ensures an efficient and high-performing healthcare supply chain that ensures equitable access to affordable medicines for all Ethiopians. PFSA has responsibility of the strengthening of the pharmaceutical supply system including the procurement, and distribution of health commodities throughout Ethiopian regions through its branches and is established in 2007 by the proclamation number 553/2007. PFSA is mandated to avail affordable and quality pharmaceuticals sustainably to all public health facilities and ensure their rational use (Pharmaceutical Fund and Supply Agency, 2015).

Currently, the agency has 19 branches and sub- branches which are found in all regions of Ethiopia. It has more than 2000 employees overall, and more than 1100 employees in the central head offices. The agency has Forecasting and Capacity Building, Procurement, Storage and Distribution and 13 other supporting directorates and offices.

1.3 Statement of problem

Many developing countries spend sizeable sums on the purchase of health commodities yet an estimated 60–80% of their populations; particularly in rural areas do not have constant access to even the most essential health commodities. The regular provision of adequate amounts of appropriate health commodities is crucial if health services are to be effective and credible. Most leading causes of death and disability in developing countries can be prevented, treated or at least alleviated with cost-effective essential drugs (Adzimah et al., 2014). The Government of Ethiopia has developed various programs and strategies to achieve goals set in the Millennium Development Goals. However, the evaluation of the Health Sector Development Program (HSDP) I and II indicated that the pharmaceuticals supply management system of the country has been suffering from several problems including non-availability, un-affordability, poor storage and stock management and irrational use of pharmaceuticals (Pharmaceutical Fund and Supply Agency, 2014).

Warehouses are facing ever-increasing demands with respect to cost, productivity, and customer service as they become vital for the success of many companies and simultaneously, warehouse processes are becoming more complex due to developments such as value added services, e-commerces, and up-scaling warehouses. Consequently, planning and controlling warehouse processes have become a challenging task (Faber, 2015).

Managing health commodities has a lot of challenges as it involves human lives. Today, warehouse managers are responsible for all aspects of materials management, including a total systems approach to plan, acquire, store, move, and control materials. Warehouse managers are also facing with challenges and potential problems related to products including warehouse design, making it necessary to anticipate change and to be prepared to adapt today's systems at a reasonable cost (UDP, 2014).

Understanding the types of warehousing operations and how Warehouse Management System is being used to effectively solve typical business problems helps to understand the critical role that affect warehouse management in the distribution industry. Materials must be handled in a well-organized and effective manner to complete the essential warehouse operations. Appropriate warehouse equipments such as racking systems and material handling tools are needed to comply with these responsibilities and to complete both the information and material cycle (UDP, 2014)**.**

Health commodities warehouse management is not given attention even if the products are sensitive, different in nature, deal with human life and are expensive in cost. Therefore, this study was attempted to examine the assessment of the current warehouse management practices and challenges in Pharmaceutical fund and supply agency in the head office.

1.4 Research Questions

The following research questions have been addressed in this study:

1. How are the human and material recourses managed in the warehouses?
2. How are the receiving, putting away and issuing activities carried out in the Pharmaceutical Fund and Supply Agency warehouses?
3. What are the activities performed by warehouse management system in the warehousing?
4. What are the challenges faced in the warehouse management?

1.5 Research Objectives

1.5.1 General Objective:

The general objective of this study is to assess warehousing management practices of pharmaceutical fund and supply agency main warehouses.

1.5.2 Specific Objectives:

The specific objectives of this study are**:-**

1. To assess the human and material resources management in the warehouses.
2. To examine the practices of the receiving, putting away and issuing activities in the warehouses.

3. To examine the warehouse management system activities.
4. To identify the challenges in the warehouses operations.

1.6 Significance of the Study

Pharmaceuticals are sensitive products in nature and need attention to maintain their quality and their intended uses when stored in warehouses and they play an important role in the healthcare system but warehousing pharmaceuticals is not given attention. Therefore, researching on the warehousing of these products has an important implication in the health products supply chain systems. The study notifies the Pharmaceutical Fund and Supply Agency about the current practices of the warehouse operations, the human and material managements in the warehouses, the convenience of the design and locations of the warehouses, the activities of the warehouse management system and the main challenges in the warehouse managements. So, that the management can take the corrective actions in the areas and make informed decisions for the effective and efficient warehouse management in the agency as per the findings of the study, the conclusions and the recommendations forwarded. The study also gives a baseline data for the further in depth researching on similar topic and gives a light for the other related studies intended to be done and also will have academic contribution.

1.7 Scope of the study

The study focused on the warehouse management practices among the supply chain supply management activities and components in the Pharmaceutical Fund and Supply Agency. The study was done only in the head office's warehouses because of the inability to cover and access the 19 branches throughout Ethiopia in all the regions due to the geographical locations, time and budget hence the study concentrated on the 12 warehouses confined in the head office two owned by PFSA and 10 rental located in Addis Ababa in different areas, which are in: Akaki, Gulelle, Kaliti, Lebu, Saris and Shegolle.

1.8 Limitation of the study

The study dealt with an assessment of warehouse management practices, very detailed discussions on the efficiency and effectiveness the current warehouse management may not be

achieved. Sufficient second hand researched data were not available in the topic on the warehouses in the branch and central offices. The difficulty of the accesses of respondents and participants in the study because, the employees in the study areas had high workload, tight schedules and offsite works. Because of the limitation of budget, experience, time, distance and manageability, the study is confined to only in the head office of the organization.

1.9 Definition of operational terms

Pharmaceuticals - any substance or mixture of substances used in the diagnosis, treatment, mitigation or prevention of a disease, and includes medical instruments and medical supplies(PFSA, 2015).

Warehouse is a facility in the supply chain to consolidate products to reduce transportation cost, achieve economies of scale in manufacturing or in purchasing, provide value added processes and shorten response time for the customers (Ramaa, et al., 2012)

Warehouse Management is the planning, controlling, and optimizing the material flows and the use of the resources in a warehouse in an everyday context, with the objective of delivering goods in accordance with customer demands while minimizing operational costs (Faber, 2015).

Receiving the process of carrier processing, item identification, recording the goods receipt, quantity and quality inspection, un-packing, and sorting activities (Bodnar, 2013)

Put-away is the process that moves materials from the receiving area to the storage, replenishment, or pick areas in SKU(Smart turn Inc., 2014) and a product kept in stock is also called a stock keeping unit (SKU) (Faber, 2015).

Order picking is the processes of obtaining the products requested by a customer order from the storage area in pallet/case/broken case(Faber, 2015).

Shipping is the processes of preparing usable commodities for shipment to customers and the placement of those commodities on vehicles for transport to the customers(USAID, 2014).

Value-adding services, such as labeling, sampling, kitting, (assembling sets of different products into kits), testing, and repacking may be offered to customize products to customer requirements(Faber, 2015).

1.10 Organization of the study

The organization of this research study was divided in to five chapters:

The first chapter contains the introduction which covers the background of the study and the organization, the statement of the problem, the research questions, the research objectives, the significance of the study, the scope of the study, the limitations of the study, the definitions of terms and organization of the study. The second chapter contains the literature review which includes on the theoretical literature review, empirical literature review, conceptual framework and concepts of warehouse management related issues. The third chapter contains research methodology which focuses on the description of the study area, the research approach, the research design, the populations and samples, the data sources and types, the data collection procedures, ethical considerations and data analysis. The fourth chapter contains data analysis which includes the data presentation, data interpretation and discussion. The fifth chapter contains the summary, conclusion, recommendation and further study areas of the study.

CHAPTER TWO: RELATED LITERATURE REVIEW

2.1 Introduction

This chapter has a purpose of discussing the concepts, the theoretical and empirical studies on the warehouse management in the supply chain system.

2.1.1 Warehouses

In supply chain management, modern warehousing firms and distribution centers are overwhelmed with information related to the flows and storage of goods and services (More, 2016). A pharmaceutical supply chain is truly unlike any other supply chain for any other type of product, in complexity, cost, and regulation. No other product has such a high risk associated with potential contamination or instability of ingredient, sterilization and stability of packaging, as well as overall transport from factory to consumer, which needs to be strictly monitored and maintained (Charles et al., 2012).

A warehouse is a planned space for the storage and handling of goods and material. In general, warehouses are focal points for product and information flow between sources of supply and beneficiaries (Anteneh, 2017). A warehouse is a commercial building for buffering and storage of goods for consumption or an intermediate area for storage of raw materials for production until they are needed (Belayhun, 2017).

The reasons for warehousing of products are: to achieve transportation and production economies of scales, to take advantage of quantity purchase discounts and forward buys, maintaining a source of supply, supporting the firm's customer service policies, supporting the just-in-time programs of suppliers and customers, providing customers with a mix of products instead of a single product on each order, providing temporary storage of materials to be disposed or recycled with reverse logistics (Faber, 2015).

2.1.2 Types of warehouses

Types of warehouse in order to meet their requirement various types of warehouses came into existence based on the ownership which may be classified as follows:

Private Warehouses: The warehouses which are owned and managed by the manufacturers or traders to store, exclusively, their own stock of goods are known as private warehouses. Generally these warehouses are constructed by the farmers near their fields, by wholesalers and retailers near their business centers and by manufacturers near their factories.

Public Warehouses: The warehouses which are run to store goods of the general public. Anyone can store his goods in these warehouses on payment of rent. An individual, a partnership firm or a company may own these warehouses. .

Government Warehouses: These warehouses are owned, managed and controlled by central or state governments or public corporations or local authorities. Both government and private enterprises may use these warehouses to store their goods. .

Bonded Warehouses: These warehouses are owned, managed and controlled by government as well as private agencies. Private bonded warehouses have to obtain license from the government. Bonded warehouses are used to store imported goods for which import duty is yet to be paid. .

Co-operative Warehouses: These warehouses are owned, managed and controlled by co-operative societies. They provide warehousing facilities at the most economical rates to the members of their society (Chavan, 2010).

Warehouses may be categorized by type which is primarily defined by the customers they serve. Here are some of the more important distinctions:

A retail distribution center: typically supplies products to retail stores.

A service parts distribution center: holds spare parts for expensive capital equipment, such as automobiles, airplanes, computer systems, or medical equipment.

A catalog fulfillment or e-commerce distribution center: typically receives small orders from individuals by phone, fax, or the Internet.

A 3PL warehouse is one to which a company might outsource its warehousing operations.

A perishables warehouse may handle food, fresh flowers, vaccines, or other product requiring refrigeration to protect its very short shelf life (Bartholdi & Hackman, 2011).

Warehouses can also be classified generally into distribution centers and production warehouses (Ramaa et al., 2012). Distribution centers: warehouse in which products from one or more suppliers are collected for delivery to a number of customers and production warehouses: hold raw materials, semi-finished products, and finished products. Raw materials and semi-finished goods are delivered to a nearby production plant and finished goods are received from this plant and can be directly delivered from the warehouse to customers or to other warehouses (Faber, 2015). And by their roles in the supply chain they can be classified as raw materials warehouses, work-in-process warehouses, finished good warehouses, distribution warehouses, fulfillment warehouses, local warehouses direct to customer demand and value-added service warehouses (Ramaa et al., 2012).

2.1.3 The roles of warehouses in supply chain system

A warehouse reorganizes and repackages products. Products typically arrive packaged on a larger scale and leave packaged on a smaller scale. In other words, an important function of this warehouse is to break down large chunks of products and redistribute them in smaller quantities. For example, some stock keeping units(SKUs) may arrive from the vendor or manufacturer in pallet quantities but be shipped out to customers in case quantities; other SKUs may arrive as cases but be shipped out as each; and some very fast-moving SKU may arrive as pallets and be shipped out as each (Bartholdi & Hackman, 2011).

Warehouses are often a part of a larger supply chain or network and as a member of the supply chain or network, the number of shipments demanded from a warehouse and the number of replenishments received at a warehouse are often affected or even controlled by supply chain coordination. Warehousing plays a vital role in the supply chain in providing a desired level of customer service at the lowest possible total cost. Warehouses are expected to be more responsive to customer demands than ever before by providing value-added services such as customization, small-scale assembly, labeling, kitting, and special packaging. With the growing success of e-commerce, warehouses increasingly have to process large numbers of small orders which have to be picked within tight time windows which further complicates warehouse

processes. In response to these developments in particular to supply chain management initiatives, companies have either concentrated their warehouse operations in one or a few large centralized warehouse(s) with high throughputs, or have decided to outsource their warehouse activities to emergent specialized logistics companies (Faber, 2015).

Since inventory holding and the customer serving are key warehouse functions which implies warehouse has an important role to play in supply chain. Some of the important roles of warehouse are to make or break bulk. Consolidation centers, cross docking centers, transshipment, product fulfillment centers, returned goods depots. Some other roles like customer support, installation and repair services. The roles mentioned here are associated with some concepts like agility, production postponements and time compression which are recognized as increasing trends in warehousing. Thus inventory has important role on warehouse in modern supply chains (Asmelash, 2017).

Warehousing facilities play a vital role in the overall supply chain process. It is evident that continuing globalization and changes/challenges occurring in such areas as reverse logistics, environmental sustainability, information technology and overall supply chain integration are further evolving the strategies, roles, and responsibilities for warehouses. Warehousing is costly in terms of human resources and of the facilities and equipment's required and its performance will affect directly on overall supply chain performance (More, 2016).

2.2 Theoretical literature review

The theoretical framework for warehouse management is to discuss the important factors and concepts related to warehouses.

2.2.1 Human and Material resources managements

2.2.1.1 Human resources management

Human Resources Management(HRM) includes the activities, organizational procedures and plans that affect the behavior, attitudes, organizational culture and achievements of staff in the business system in a way that increases the productivity of workers, their flexibility and capacity for creating competitive advantages that are difficult to copy in the short term. HRM as a business function encompasses the duties and tasks related to the people, their acquisition,

selection, training and other activities that ensure the development of employees. The goal of human resources management is to help the company reach its strategic goals. The basic assumption of human resources management is that people are not machines and therefore we need an interdisciplinary approach for observed people in their work environment (Jurčević , Ivaković and Babić, 2009).

In every storage site like that of a manufacturer, distributor, wholesaler, community or hospital pharmacy, there should be an adequate number of qualified personnel to achieve goods quality assurance objectives with proper training in relation to: good storage practice, regulations, procedures and safety: personal hygiene and sanitation and wearing suitable protective or working garments appropriate for the activities they perform (WHO Technical Report Series, No. 908, 2003). Most warehouses jobs are nontechnical and in-service training and supervision of staff are likely to be the most effective approach. A written manual of standard operating procedures should cover the following:- general managements policy, managements structure, reporting procedures, stocks control and other record-keeping procedures, operational procedures, health and safety procedures and security (Geraldes, Carvalho & Pereira, 2008).

Managers are bond between employee and company and exercise their functions in order to achieve the integrity of the system and achieve the satisfaction of the people and the aim of the company (Jurčević et al., 2009). Managers are Responsible for all human resource activity in an organization – recruitment and selection, performance management, payroll and remuneration, and policy and strategy development and must be well organized, able to embrace enabling technology and systems, interpret information and manage a multitude of subtle variances along with the volume of work. They must also be open to identifying opportunities to improve systems. Every organization of any size needs to include employees who oversee the human resources, employment relations, health and safety and learning and development of their staff (AUT, 2015).

There are strong interdependencies between supply chain management and Human Resource (HR) management and thus it is difficult to identify precise boundaries. Furthermore, these boundaries are continuously moving to accommodate an integration of supply chain and HR activities. Responsive product flow is essential to strategic success in most companies; focused HRM must become a core element in the logistics professional's portfolio (Jurčević et al., 2009).

2.2.1.2 Material resources management

Materials management is a coordinating function responsible for planning and controlling materials in the warehouse and all the activities. Such activities include physical supply, operations planning and control, and physical distribution. Its objectives are as follows:

• Maximize the use of the firm's resources.
• Provide the required level of customer service **(**Arnold, Chapman & Clive, 1991**).**

Materials and pharmaceutical products should be handled and stored in such a manner as to prevent contamination, mix-ups and cross-contamination. Materials and pharmaceutical products should be stored in conditions which assure that their quality is maintained, and stock should be appropriately rotated. Storage areas in the warehouse should be of sufficient capacity to allow the orderly storage of the various categories of materials and products, namely starting and packaging materials, intermediates, bulk and finished products, products in quarantine, and released, rejected, returned or recalled products. Highly active and radioactive materials, narcotics and other hazardous, sensitive and/or dangerous materials and pharmaceutical products, as well as substances presenting special risks of abuse, fire or explosion, (e.g. combustible liquids and solids and pressurized gases) should be stored in a dedicated area that is subject to appropriate additional safety and security measures(WHO TRS, 2003).

Rejected materials and pharmaceutical products should be identified and controlled under a quarantine system designed to prevent their use until a final decision is taken on their fate. Quarantine status is ensured by storage in separate areas, these areas must be clearly marked and their access restricted to authorized personnel (WHO TRS, 2003).

2.2.2 Warehouse activities

Warehouses are essential components of any supply chain and items are handled in order to balance the variability and uneven material flow caused by factors such as seasonality in demand, production scheduling, transportation, and consolidation of items. Inventories in warehouses are capital intensive assets that require storage areas, handling equipment, and information systems. The capital and operating costs of warehouses represent about 20-25% of

the logistics costs. Therefore, improvements in the planning and control of warehousing systems can contribute to the success of any supply chain (Bartholdi & Hackman, 2011).

A warehouse has traditionally been viewed as a place to hold or store inventory. However, in contemporary logistical systems, warehouse functionality is more properly viewed as mixing and modifying inventory to meet customer requirements, where storage of products is ideally held to a minimum (More, 2016).

Warehouses are the points in the supply chain where product pauses briefly. This consumes both space and time (person-hours) which are an expense. There are four basic warehouse functions that add value to the supply chain. The break-bulk function allows for products to arrive in large quantities and then to be shipped in small quantities tailored to the needs of many customers. This adds value as it reduces production costs, purchasing costs, and transport costs upstream in the supply chain. The storage function adds value since it allows larger quantities to be produced and transported which is more efficient. It also enables orders to be quickly delivered to customers, which provides a better service level and prevents lost sales. The consolidation function implies that the warehouse holds products from various sources, so that customers can order a large product range from a single source. The customization function adds value by postponing customized services (i.e., value added services) until the end of the supply chain, reducing upstream inventories (Faber, 2015).

A warehouse is typically divided into functional areas that are designed to facilitate the material flow. The main warehouse areas are outlined in the following: receiving area, storage area (reserve and forward areas) and shipping area. Where Operations in the receiving area include the processing (i.e., unloading) of carriers, item identification, and quantity and quality inspection. Received items are then moved to a storage area or directly to the shipping area. In the shipping area, items are sorted, consolidated and loaded on the carriers. While this is a general material flow in a warehouse, the actual material flow depends mainly on the role of the particular warehouse in the supply chain (Bartholdi & Hackman, 2011).
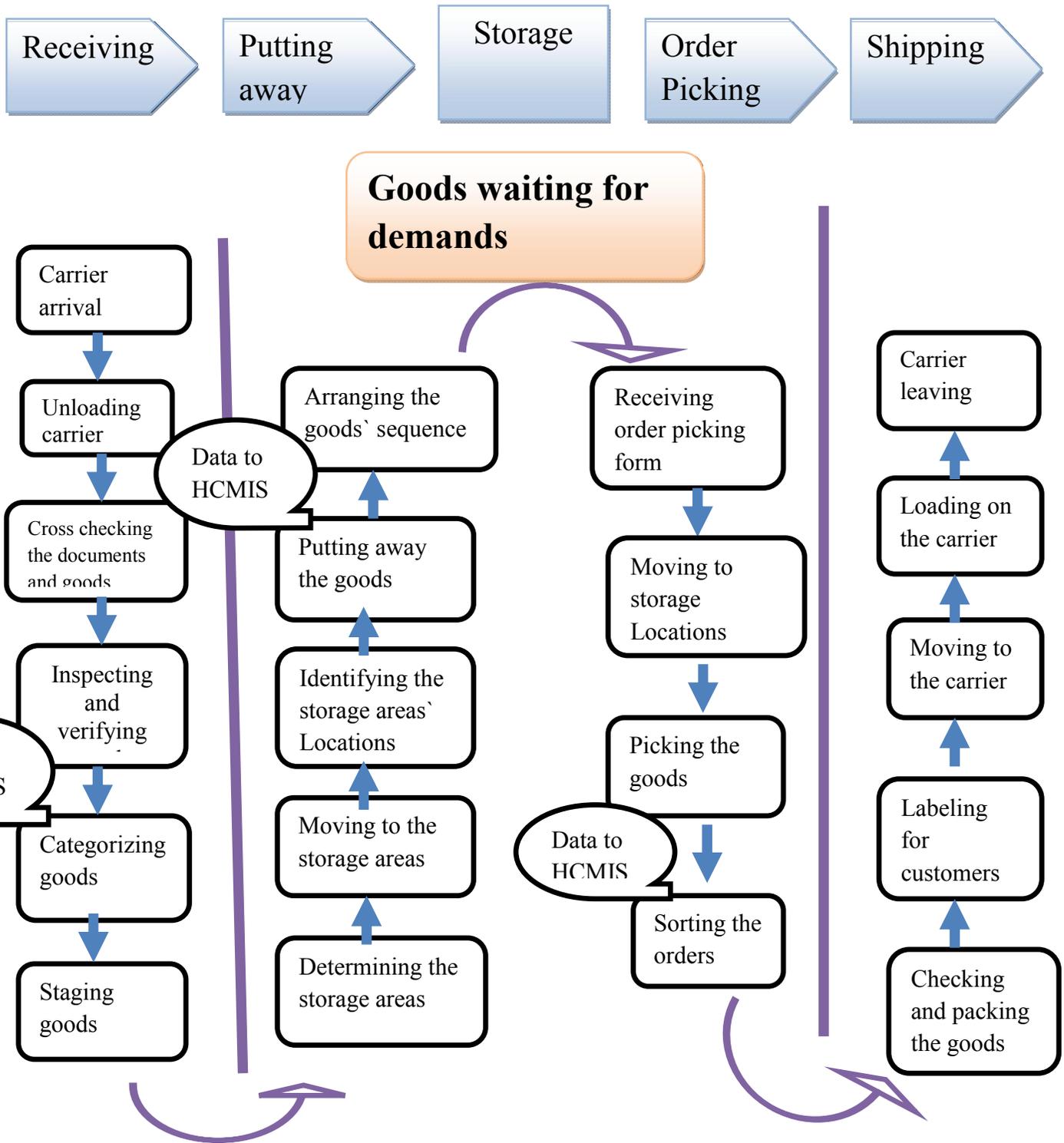
Figure 2.1: The flow of goods in the warehouse (Bartholdi & Hackman, 2011) and Activities adopted from Asmelash, 2017.

The main stages in warehouse operations process are: receiving, storage, order picking, and shipping:

2.2.2.1 Receiving

Receiving includes typically carrier processing (i.e., unloading), item identification, recording the goods receipt, quantity and quality inspection, un-packing, and sorting activities (Bodnar, 2013). Receiving may begin with advance notification of the arrival of goods. This allows the warehouse to schedule receipt and unloading to coordinate efficiently with other activities within the warehouse. (Bartholdi & Hackman, 2011).

Once the product has arrived, it is unloaded and possibly staged for put away. It is likely to be scanned to register its arrival so that ownership is assumed, payments dispatched, and so that it is known to be available to fulfill customer demand. Product will be inspected for any exceptions noted, such as damage, incorrect counts, wrong descriptions, and so on. Generally, receiving accounts for only about 10% of operating costs in a typical distribution center (Bartholdi & Hackman, 2011).

At its most fundamental level, receiving is the process of confirming that is received with what is ordered. Does the material received match the purchase order? the average warehouse receives, counts, and inspects thousands of items of varying shapes and sizes from hundreds of vendors whose picking, packing, and shipping practices are all different, it is not surprising that receiving can be one of the most complicated functions and warehouse processes (Smart turn inc, 2014).

Receiving should be allowed only on a scheduled basis, with every trucker making an appointment and then assigned an unloading time. Many warehouse operators believe that they are unable to operate a scheduled receiving dock. Yet most carriers appreciate the precision of a scheduled dock and will cooperate with any warehouse operator who insists upon establishing unloading appointments. While scheduling has obvious advantages for the warehouse operator, it also represents an obligation. With today's electronic capabilities, it is relatively easy to obtain a detailed manifest with every receipt of material. A growing number of warehouses have established a policy that no receipt will be unloaded without the ASN. This document represents the best way to be sure that the correct product has been delivered to the correct place (Acherman, 1997).

2.2.2.2 Putting away

Before product can be put away, an appropriate storage location must be determined. This is very important because where the warehouse operator store the product determines to a large extent how quickly and at what cost the operator later retrieve it for a customer. This requires managing a second inventory, not of product, but of storage locations. The operator must know at all times what storage locations are available, how large they are, how much weight they can bear, and so on. When product is put away, the storage location should also be scanned to record where the product has been placed. This information will subsequently be used to construct efficient pick-lists to guide the order-pickers in retrieving the product for customers. Put-away can require a fair amount of labor because product may need to be moved considerable distance to its storage location. Put-away typically accounts for about 15% of warehouse operating expenses (Bartholdi & Hackman, 2011).

Put-away is the process that moves material from the receiving area to the storage, replenishment, or pick areas. Ideally, the warehouse operator managing the put-away space requirements by calculating resource and space requirements based on the estimated or expected receipts, as well as current backlogs. In a perfect world, product is put away the same day it's received. If the operators are unable to reach this daily objective, they are going to generate space and congestion problems. They will increase the chances of creating transaction errors. Product will become more susceptible to damage—both from remaining on the ground, as well as being moved multiple times (Smart turn Inc., 2014).

Since warehouse storage locations and pickers are generally scarce resources, therefore high allocation efficiency is required in terms of utilization of both picker effort and storage capacity. Storage includes the following interrelated activities: sequencing and consolidation, storage location assignment, and shuffling. Item sequencing determines the order, according to which items are sorted to be processed, e.g., allocated or shuffled. The sequence of storage Location where different access methods can be chosen like: LIFO (last in first out, FIFO (first in first out), FEFO (first expire first out) or Random Access. However, items can be consolidated (or clustered) according to decisions and restrictions determining whether different items can be placed in the same compartment. A dedicated compartment accommodates only one item. While in a mixed compartment, more items can be allocated. e.g., a stored pallet may consist of several

different products, or a rack location may cover several slots and a product can be assigned to each slot. Item consolidation may yield both improved storage utilization and increased complexity (Bodnar, 2013).

The direct put-away activity involves transferring of (if applicable repacked, i.e., from pallets to cases) incoming products to a location within the storage area. A product kept in stock is also called a stock keeping unit (SKU). Each product or SKU has an identification code that allows it to be tracked for inventory purposes. During the course of a year, the entire inventory of a product or SKU can be replenished multiple times. A wide range of systems can be used to store products, varying from shelf racks to automated storage systems (Faber, 2015).

The storage location assignment influences essentially the expected total storage and order picking time, which consists of travel time, stowing and retrieving time, and administration related time. The travel time may take up to 50 % of the total time spent on storing and picking an item. Therefore, several studies have addressed storage location assignment problem with the objective to minimize the travel time. The storage location assignment policies frequently considered in the literature are: random, closest-open-location, popularity based, turnover based, class based, and duration-of-stay based rule (Bodnar, 2013).

2.2.2.3 Order picking

On receipt of a customer order the warehouse must perform checks such as verifying that inventory is available to ship. Then the warehouse must produce pick lists to guide the order-picking. Finally, it must produce any necessary shipping documentation and schedule the order-picking and shipping. These activities are typically accomplished by a warehouse management system. This is all part of the support to expedite the sending of the product to the customer. Notice that traveling comprises the greatest part of the expense of order-picking, which is itself the most expensive part of warehouse operating expenses. Much of the design of the order-picking process is directed to reducing this unproductive time. The outbound processes of the warehouse are initiated by receipt of a customer order, which may be thought of as a shopping list. Each entry on the list is referred to as an order-line and typically consists of the item and quantity requested. The warehouse management system (WMS) then checks the order against available inventory and identifies any shortages. In addition, the WMS may reorganize the list to

match the layout and operations of the warehouse for greater efficiency (Bartholdi & Hackman, 2011).

Order picking (pallet/case/broken case) involves obtaining the products requested by a customer order from the storage area. Customer orders consist of order lines, each line for a unique SKU in a certain quantity. Pallet picking involves retrieving full pallet loads for customers requesting full pallet quantities. Picking can either be manually or (partly) automated, and it is generally recognized as the most expensive warehouse operation, because it tends to be very labor intensive or very capital. Many different order-picking system types can be found in warehouses. In the picking process, the requested number of units of a product can be less than the number of units contained within a case (broken case picking), equal to or a multiple of the number of units within a case (full case picking), or as many units as on a pallet (pallet or bulk picking). When picking the products, an order picker may pick one customer order at a time (single order picking), several customer orders at once (batch picking), or parts of several customer orders (zone-batch picking) (Faber, 2015).

When multiple orders request the same product, the items can be picked in batches. In this case sorting is required before delivering the items, i.e., the picked products are divided into smaller quantities corresponding to the orders. Sorting can pursue a sequential or a simultaneous approach. The former is called *pick-and-sort*, i.e., sorting is done after items have been accumulated during picking. The latter is called *sort-while-pick*, i.e., sorting is done during picking. Order picking can be manual, mechanical or automatic (Bodnar, 2013).

The sortation of picked products into customer orders is a necessary activity if the orders are picked in batches or come from different storage areas. Value adding services, such as labeling, sampling, kitting, (assembling sets of different products into kits), testing, and repacking may be offered to customize products to customer requirements. The packing activity includes checking, packing, and preparing a customer order for shipping. The cross-docking activity bypasses the storage and picking activities by transferring incoming products directly from the receiving docks to the shipping docks (Faber, 2015).

2.2.2.4 Checking and packing

Packing can be labor-intensive because each piece of a customer order must be handled; but there is little walking. And because each piece will be handled, this is a convenient time to check that the customer order is complete and accurate. Order accuracy is a key measure of service to the customer, which is, in turn, that on which most businesses compete. Inaccurate orders not only annoy customers by disrupting their operations, they also generate returns; and returns are expensive to handle (up to ten times the cost of shipping the product out). One complication of packing is that customers generally prefer to receive all the parts of their order in as few containers as possible because this reduces shipping and handling charges. This means that care must be taken to try to get all the parts of an order to arrive at packing together. Otherwise partial shipments must be staged, waiting completion before packing, or else partial orders must be packaged and sent (Bartholdi & Hackman, 2011).

2.2.2.5 Shipping

Shipping generally handles larger units than picking, because packing has consolidated the items into fewer containers (cases, pallets). Consequently, there is still less labor here. There may be some walking if product is staged before being loaded into freight carriers. Product is likely to be staged if it must be loaded in reverse order of delivery or if shipping long distances, when one must work hard to completely fill each trailer. Staging freight creates more work because staged freight must be double-handled. The trailer is likely to be scanned here to register its departure from the warehouse (Bartholdi & Hackman, 2011).

Shipping includes the tasks that help prepare usable commodities for shipment to customers and the placement of those commodities on vehicles for transport to the customers. The shipping activities like other warehouse activities need a dispatching area for processing information and for dispatching personnel to fulfill various tasks like checking packing, labeling or loading items. Sometimes, the dispatching area is located in a walled office, although more often it is located in an open area within the receiving/shipping section of the warehouse. The dispatching section of the receiving/shipping area should require a minimum area. If cross docking is likely to become part of the requirements, you may need to estimate its space requirements and establish a separate area in the store for these purposes (USAID, 2014).

2.2.3 Warehouse Management System (WMS) Activities

The main function of a warehouse management system is the management of a warehouse. The system keep record of the storage capacity, i.e., the specification of the existing storage bins (location management) and record of the stored units (inventory management) (Hompe & Schmidt, 2007). A WMS focuses on coordinating the processes within the warehouse. It supports the day-to-day operations in a warehouse (Faber, 2015). It is generally built around an industrial strength relational database. At a minimum, the database tracks all product arriving and all product shipped out and the most fundamental capability of a WMS is to record receipt of inventory into the warehouse and to register its shipment out (Bartholdi & Hackman, 2011).

A warehouse management system primarily aims to control the movement and storage of materials within a warehouse and process the associated transactions, including shipping, receiving, put-away and picking and to improve the efficiency of the warehouse (Faber, 2015). Warehouses usually managed their inventory manually which was quite difficult and the rate of error was high in the manual work. With the implementation of Warehouse Management system all that paper work has ended and the inventory is managed in a computerized way and the error in the inventory management has decreased (Naseed et al., 2013).

Warehousing takes up to between 2% and 5% of the cost of sales of a corporation and with today's highly competitive global business environment organizations are emphasizing on return on assets and hence minimizing warehousing costs has become an important business issue. Many firms are automating their basic warehousing functions to achieve the increase in throughput rates or inventory turns required for their warehousing operations to be cost effective. It is necessary to allocate warehouse resources efficiently and effectively to enhance the productivity and reduce the operation costs of the warehouse. One vital area determining the efficiency of warehouse is the determination of the proper storage locations for potentially thousands of products in a warehouse (More, 2015).

WMS tend to be more often associated with the need to do something to service your customers that your current system does not support such as first-in-first-out, cross-docking, automated pick replenishment, wave picking, lot tracking, yard management, automated data collection and automated material handling equipment (Apparel, 2014). WMS enables real-time tracking of

receiving, storage and immediate access to information on combined statistics of weight and lines for a specified customer (Hui Nee, 2009). WMS will reduce labor costs, inventory, increase storage capacity, increase customer service and increase inventory accuracy (Apparel, 2014).

By integrating advanced radio frequency and bar coding technologies with core warehousing functionality, WMS provides comprehensive fulfillment centre and warehouse management, including receiving, stocking, picking and related warehouse tasks. WMS also provides detailed audit trail that measures performance levels objectively, ensures employee accountability and allows material flow to be easily traced (Hui Nee, 2009).

Warehouse accuracy is paramount for the software to operate and to do this, data will need to be entered accurately and in a timely fashion. Although most WMS implementations will reduce labor costs in the placement and removal of materials, there is often an added warehouse management function required just to operate the software. Despite the complexity, WMS implementations do offer businesses significant benefits. Not only will placement and removal cycle times be reduced, but inventory accuracy should be improved as well as increased storage capacity, more organized storage of materials and greater flexibility of warehouse operations(Karimi & Namusonge, 2014).

Basic features of most WMS's include tools to support: Appointment scheduling, receiving, quality assurance, put-away, location tracking work-order management, picking, packing and consolidation and shipping (Bartholdi & Hackman, 2011).

Health Commodity Management Information System (HCMIS) is a WMS, and it is a warehouse and a facility health commodities management system developed to implement and support the country's pharmaceutical logistics management system at both PFSA and Ethiopian Ministry of Health (MOH). HCMIS has two versions namely HCMIS Hub Edition and HCMIS Facility Edition. Its development was started in 2008 and implementation was started at hospitals and high traffic health centers. The HCMIS Hub Edition is designed to be a record-keeping system, which can help efficiently manage daily transactions at warehouses and facilities. Moreover, HCMIS provides a mechanism that allows for essential and standard working procedures to be enforced in the pharmaceutical settings. Some of the standards that are better supported by the system include: First to Expire First out (FEFO), Batch and Expiry Tracking. At the same time,

HCMIS is a crucial tool in aiding managers of warehouses and facilities to generate appropriate and timely stock reports while enhancing their decision making skills (PFSA, 2015).

Benefits of the HCMIS: *Enhanced efficiency and effectiveness*- Through the consolidation of data, there is a great reduction in losses due to overstock, waste, expiry, damage, pilferage, etc. therefore increasing efficiency and effectiveness. The enhancement of communication among the different layers within the group also contributes for increased in efficiency. *Consistency & accuracy*- With centralized record-keeping system that holds accurate information, all users will have access to corresponding information among the different levels within warehouses and hubs, thus, ensuring consistent performance and procedures across the organizations (PFSA, 2015).

2.2.4 Challenges in the warehouse management

Despite all of the integration initiatives, supply chains will never be so well coordinated that warehousing can be completely eliminated. Warehouses are important for a supply chain because they provide storage for raw materials, components, work-in-process, and finished goods; operate as distribution and order fulfillment centers; and perform localized and value added warehousing(Sayeed, 2013).

Warehouse management was considered to be very simple to handle in earlier days when everything was performed manually. The biggest problems then were the bar codes and space utilization in the warehouse. There has been drastic change in today's Internet world, after the outbreak of this internet technology everything was looking even simpler than the earlier days with more efficiency and consumption of less time and gaining a competitive advantage with potential economical savings. The evolving technology changed the warehousing methods a lot with logistics being carried out a quicker pace and with very little scope for error. Although there are many technologies evolving every day, many problems are also arising making warehousing more complex. This in turn is affecting the whole supply chain management. The following are some of the problems being faced by today's warehouses:

i) Automate all the mechanized or manual operations
ii) Satisfy the requirements of the customer without much customization

iii) Integration of the warehouse data with supply chain applications

iv) Compatible to the cost- effective global supply chain (Sayeed, 2013).

2.3 Empirical literature review

Studies conducted on the warehouse management by different researchers showed different findings on the parameters that affect the warehouse management. The study conducted by Faber (2015) entitled with `Structuring Warehouse Management: Exploring the Fit between Warehouse Characteristics and Warehouse Planning and Control Structure, and its Effect on Warehouse Performance` concluded that warehouse management is affected by the warehouse type (i.e., production warehouse or distribution center), the task complexity and the market dynamics in a lesser extent.. The findings in the study are:

1. It is recognized that a WMS plays a crucial role in the planning and control structure to achieve the desired high warehouse performance.

2. Warehouse Management structure is largely driven by Task Complexity and to a much lesser extent by Market Dynamics. The results show that the more complex the warehouse task is, the more extensive is the planning and the more complex are the decision rules. Furthermore, a complex warehouse task leads to a more sophisticated control system.

3. Demand unpredictability and task complexity can effectively be managed by choosing the appropriate level of planning and level of decision rules complexity. The contribution to warehousing practice is that the research demonstrated that fit between warehouse Management structure and warehouse context has a positive impact on performance. The study concluded that it is important to align the level of planning extensiveness and decision rules complexity with the level of demand unpredictability and task complexity, respectively, to achieve high warehouse performance.

A study researched by More(2016) in India under the title of ` The study of Efficiency and Effectiveness of Warehouse Management in the context of Supply Chain Management` indicated that warehousing has become a critical activity in the supply chain to out-perform competitors on customer service, lead-times, and costs. It showed that for the effective and efficient achievement of the high performance of warehouse operations in today's marketplace, timely and accurate

information about products, resources and processes are essential and the information is used to make work of the planning and controlling structure.

The complexity of warehouses affects the planning and control structure through the comprehensiveness of the work to be done. Feeding the right type of information and knowledge at the right time is difficult in a highly complex warehouse. Nonetheless, a complex warehousing operation requires a control structure that has a great deal of information, data, and knowledge about products, processes, customers, and resources readily available. But the study, did not show the importance of the human resources and workers` culture in the efficiency and effectiveness of a warehousing system especially when the goods are health commodities which are different in nature and characteristics.

Belayhun (2017) in his study with the title ` Assessment Of Ware House Management The Case Of Ethiopian National Defense Main Department Of Logistics In Adama` discussed that warehouse management can only be productive if there is effective and efficient management of human and material resources in the system and computerized data base communication between warehouse managers and warehouse data workers.

In the study in his study area, the finding showed that there is no data base technological administration in the warehouse activities, there are no well-organized shelves and allocations of store materials system were not identified to improve their warehouse planning requirements, most of the warehouse spare parts have been managed by non-professionals and without relevant qualification and experience, attention that is given to training opportunities and staff development programs by the Ethiopian national warehouse spare parts have been found to be unsatisfactory and facilities such as computers, workshops and safety materials have been realized to be very scarce. In the study, specific variables like the layout of the warehouse, the human management, material management and WMS are not studied in depth and separately and the study is on non-health commodities.

In a research study by Ramaa et al.(2012) with title `Impact of Warehouse Management System in a Supply Chain` explained that there are many challenges that restrict the capacity of warehouses. The implementation of warehouse management system is one of the enabling factors for the performance and improvements of warehouses.

The value stream mappings of the current systems showed many bottlenecks that prevail in the system and these bottlenecks restricted the capacity the warehouses could handle. Performance and productivity of the warehouse suffered as the operations were manually carried when it could be more easily and more effectively done using machines. With WMS implementation the cycle time of the process also decreases. The cycle time reduces from 773 minutes to 236 minutes. The cost benefit analysis for WMS implementation in warehouse shows a savings of Rs. 19,60,000 per month. The study proves WMS is an enabling factor for the performance and productivity improvement. The productivity of a WMS in a warehouse is way higher than when the operations are manually performed.

As the study by Admasu (2017) with the title of `Assessment Of Pharmaceuticals Distribution System: The Case Of Pharmaceuticals Fund And Supply Agency (PFSA)`, warehousing and storage activities are perceived to be practiced moderately and there is a lack of full implementation of computerized system. Moreover; mechanical machines that facilitate the warehousing activities are also not in placed. In his research, he conclude that even if PFSA built two new standardized warehouses, some warehouses specially the rental ones are not convenient to load and unload pharmaceuticals because of their location. He also found that the Majority of employees of the agency perceived that warehousing and storage activities are moderately practiced. However; they perceived that warehouses lack fully implementation of computerized system. Mechanical machines speed up the warehousing activities, but adequate mechanical machines are not in placed.

2.4 Conceptual framework of the study

The conceptual framework of the study consists of the components of a good warehouse management. The purpose of the warehouse management is generally the management of the receiving, storing and shipping goods and exchange of information and these will be ensured through the coordination of the main components illustrated in the figure 1. The framework contains four (4) components which determine whether a warehouse management is effective or not.

Figure 2.2 Conceptual framework elements of warehouse management practice in PFSA (Source: Survey 2018).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Descriptions of the study area

This study was conducted from April to May 2018 in Pharmaceuticals Fund and Supply Agency (PFSA) which is organized into sixteen (16) core- and supportive- processes at Head Office level. The study focused on the areas of assessment the warehouse management practices of PFSA in the head office level in the sub process Storage & Distribution Directorate which in turn is responsible for effective, efficient and safe handling, storage and distribution of such pharmaceutical products to the lower branches, regions and service delivery points (health facilities).

3.2 Research Approach

The research used both qualitative and quantitative approaches. Procedurally, primary data collected through questionnaire and secondary data from the previously studied researches and the qualitative and quantitative data mixed and analyzed to meet the objectives of the study.

3.3 Research Design

To achieve the research objectives and to answer the research questions, descriptive research design was used to describe the nature, condition and the present situation of the system in the warehouse management practices of the PFSA head office warehouses.

3.4 Population and samples

In the study, to get right respondents with right knowledge, exposure and experience about the research area the study population selected from the storage and distribution Directorate with a total number of forty eight (48) professional and technical employees who are working on the warehouse management including the director, coordinators, supervisors, officers and store managers who are . The sample size selected is the total population of the employees in the directorate but only 44 employees are engaged in the study 4 are not available during the data collection period.

3.5 Data sources and types

The sources of the data for the purpose of conducting this research were collected from the primary and secondary sources of data. The primary data was gathered through questionnaires and the secondary sources of the data were from the related researches conducted previously and from journals, procedures, policies, standard operating procedures and guidelines produced from concerned bodies which are used to collect essential data to enrich the study.

3.6 Data collection procedures

In the data collection procedure, respondents were contacted physically to explain the purpose and nature of the study in order to have desired and actual data collection and oriented to respond the information responsibly. Then the questionnaires were distributed to the respondents and collected physically from the respondents at their working place by the researcher and supporters of the researcher. The questionnaires were organized and arranged in a very simple and meaningful way to encourage participation of the respondents and the questions were also kept as concise and easily understandable as possible and care were taken for using the regular wording and phrasing of the questions. The arrangement and the flow of the questions were designed to make it as meaningful as possible because in the study, it was important for the respondent to complete the study up to the last response with interest.

3.7 Data analysis

In the study, quantitative and qualitative data were used from the primary and secondary data sources. The quantitative data that were collected by the questionnaires were computed by using Statistical Packages for Social Science (SPSS 20) statistical analysis tool that was employed for doing the analysis and the data were coded, entered and analyzed using this tool. Descriptive statistics in the form of the analysis of frequencies and percentages distributions of the socio-demographic characteristics of the respondents whom the questionnaires were administered was computed by tables to show the capability of respondents to give right technical and quality data for reliability and validity purpose. The statistical inferences of the quantitative data were also analyzed with same tool and the qualitative data that were collected from primary and secondary

data sources were mixed with quantitative data and based on the findings, conclusions were addressed and recommendations and future areas for study were forwarded.

3.8 Validity and Reliability of the study

Validity is concerned with the accuracy and truthfulness of scientific findings. A valid study should demonstrate what actually exists and a valid instrument or measure should actually measure what it is supposed to measure (Brink, 1993). To achieve the validity of the study, the instrument applied (questionnaires) were derived from related subject matter literatures, standards of the warehouse management's measurements, the previously studied researches from Admasu, 2017; Anteneh, 2017; Asmelash, 2017; Belayhun, 2017 and WHO, 2003.

Reliability is concerned with the consistency, stability and repeatability of the informant's accounts as well as the investigators' ability to collect and record information accurately. It refers to the ability of a research method to yield consistently the same results over repeated testing periods. It requires that a researcher using the same or comparable methods obtained the same or comparable results every time he uses the methods on the same or comparable subjects (Brink, 1993). To test the reliability of the questions in the questionnaire, four pre-test questionnaires were distributed and data collected then redundant, unnecessary and outlier questions were removed, corrected and reversed and most of the questions in use were used by other studies.

3.9 Ethical considerations

The approval and clearance letter were obtained from Addis Ababa University School of Commerce and then permission were obtained from the PFSA higher officials and given to the respective lower level, Storage and distribution directorate office. The participants in the study were given the right to ask and understand the questions and their role in the data collection activity and were addressed by explaining the essence of the study. Everyone was given the right to determine whether or not to participate in the research and gave up at any time in the processes of the data collections. The confidentiality of the data from respondents was kept, and the data were only be used for the fulfillment of this research study and were not given for other bodies. The responses collected from the participants were analyzed directly without any change by the researcher and supporter.

CHAPTER FOUR: DATA PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter focuses on the data presentation, analysis, interpretation and discussion of the information obtained from the self administered questionnaires and the findings are presented and analyzed by descriptive statistics frequency, valid percentage and mean using tables using SPSS 20. The findings are presented with respect to the relevant variables in the objectives of the study and research questions. The objectives from which the research questions are drawn include:

1. To assess the human and material resources management in the warehouses.
2. To examine the practices of the receiving, putting away and issuing activities in the warehouses.
3. To examine the warehouse management system activities.
4. To identify the challenges in the warehouses operations.

From the total of 48 employee selected, questionnaires are distributed to 44 employees the other four (04) are not available on their place temporary with different reasons. From the 44 questionnaires distributed, all the 44 were returned and the data from the respondents were analyzed.

4.2 Demographic information of the respondents

This part of the questionnaire contains of the general demographic information of respondents related to the personal and professional data of the respondents and summarized in the Table 4.1. These variables from the respondents include: Age, sex, educational qualification, job position and years of experience in PFSA.

Table 4.1: Summary of demographic information

Variables	Categories	Frequency	Percent	Valid Percent	Cumulative Percent
Age	20-30	17	38.6	38.6	38.6
	31-40	26	59.1	59.1	97.7
	41-50	1	2.3	2.3	100.0
	Total	**44**	**100.0**	**100.0**	
Sex	female	11	25.0	25.0	25.0
	male	33	75.0	75.0	100.0
	Total	**44**	**100.0**	**100.0**	
Educational qualification	diploma	11	25.0	25.0	25.0
	first agree and above	33	75.0	75.0	100.0
	Total	**44**	**100.0**	**100.0**	
Job descriptions	warehouse manager	26	59.1	59.1	59.1
	SDO officer	15	34.1	34.1	93.2
	supervisor	2	4.5	4.5	97.7
	director	1	2.3	2.3	100.0
	Total	**44**	**100.0**	**100.0**	
Years of service in PFSA	<3.0	16	36.4	36.4	36.4
	3.0-6.0	12	27.3	27.3	63.6
	6.1-9.0	16	36.4	36.4	100.0
	Total	**44**	**100.0**	**100.0**	

(Data source: Survey questionnaire 2018)

From the survey study of 44 respondents, 17(38.6%) are between the Age of 20-30 years, 26(59.1%) are between 31-40 years and only 1(2.3%) is between 41-50 years. The gender distribution, 11(25%) are females and 33(75%) are males. The educational qualification of the respondents are 11(25%) diploma and 33(75%) are first degree and above. Concerning the job description, 26(59.1%) are warehouse managers, 15(34.10%) are storage and distribution officers, 2(4.5%) are supervisors and the remaining 1(2.3%) is a director where 6.8% of the respondents are on a lower and meddle level of management the rest are on non-management levels. The service years the respondents has been working in PFSA are: 16(36.4%) have work experience below 3 years, 12(27.3%) have work experience between 3.0 -6.0 years and the rest 16(36.4%) have work experience between 6.1-9.0 years where most of the respondents have above 3 years of experiences in PFSA, with these they can harvest lots of skill and knowledge on their duties.

4.3 Warehouse management related issues

Using Likert`s scale, the responses of the respondents rated from Strongly Disagree to Strongly Agree on the warehouse management related issues of PFSA central warehouse as 1=**Strongly Disagree(SD), 2=Disagree(D), 3=Neutral(N), 4=Agree(A), & 5=Strongly Agree(SA)**, hence as stated as follows:

4.3.1 The Human and Material Resources Management

Table 4.2 summary of Human and Material Resources Management

A	Sub Part 2-1- The Human and Material Resource Managements	SD (n(%))	D (n(%))	N (n(%))	A (n(%))	SA (n(%))	Mean	SD	Total (n(%))
1	There are sufficient number of staff to run the warehouses	4(9.1)	22(50)	15(34.1)	3(6.8)	0	2.39	0.754	44(100)
2	The staff members are not aware of warehouse management principles	3(6.8)	21(47.7)	12(27.3)	8(18.2)	0	2.55	0.901	44(100)
3	The warehouse personnel have job description for their respected duties	5(11.4)	19(43.2)	18(40.9)	2(4.5)	0	2.39	0.754	44(100)
4	There are no standard operating procedures (SOP) for the warehouse management activities	4(9.1)	26(59.1)	13(29.5)	1(2.3)	0	2.25	0.651	44(100)
5	There are sufficient personal protective materials like gowns, masks, gloves, etc for the staff in the warehouses	3(6.8)	29(65.9)	12(27.3)	0	0	2.20	0.553	44(100)
6	There are safety materials like fire extinguishers and alarms for unexpected incidents	4(9.1)	25(56.8)	15(34.1)	0	0	2.25	0.615	44(100)
7	There are on the job(on site) trainings on warehouse management issues	3(6.8)	23(52.3)	17(38.6)	1(2.3)	0	2.36	0.650	44(100)
8	There are sufficient materials and equipments to facilitate the warehouse activities	4(9.1)	20(45.5)	19(43.2)	1(2.3)	0	2.39	0.689	44(100)
9	There is maintenance support and replacement of the equipments in the warehouses when they are not working	3(6.8)	26(59.1)	13(29.5)	2(4.5)	0	2.32	0.674	44(100)

(Data source: Survey questionnaire 2018)

From the table 4.2, in the first question, the responses of the respondents are 9.1% responded strongly disagree, 50% responded disagree, 34.1% % responded neutral, 6.8% responded agree. Most of the respondents showed their disagreement on the sufficient number of the staff to run the warehouse. Whereas; substantially high number of respondents, 34.1%, are unaware whether the number of staff are sufficient or not.

On the second question, from the total number of respondents, 6.8% said strongly disagree, 47.7% said disagree, 27.3% said neutral and 18.2% said agree. Most of the respondents, 54.5%, replied their disagreements that the warehouse staff is not aware of the warehouse management principles which mean the staff are aware of the principles. But 27.3% are not sure the awareness of the staff on these principles. Without proper number of staff with the required knowledge of principles, it will be difficult to manage the warehouse properly. Concerning the number of staff in the warehouse and their awareness in the principles of warehouse management, a literature explained that there should be adequate number of qualified personnel to achieve goods quality assurance objectives with proper training in relation to: good storage practice, regulations, procedures and safety for the activities they perform **(**WHO Technical Report Series, No. 908, 2003**).**

On the third question, the responses of the respondents showed that 11.4% strongly disagree, 43.2 disagree, 40.9% neutral, 4.5% agree. More than half of the respondents, 54.6%, do not accept that the warehouse personnel have job descriptions that show the demarcation for what to do for each of the workers. Somehow a number of the respondents, 40.9%, have no idea for the existence of job description for the warehouse personnel.

On the fourth question, the responses showed that 9.1% responded strongly disagree, 59.1% responded disagree, 29.5% responded neutral, 2.3% responded agree. Most of the respondents, 68.2%, showed their disagreement on the question there is no SOP in use in the warehouse management activities that means they agree the existence of the SOP for the activities while 29.5% are not sure on the existence at all. The SOP facilitates the work of the warehouse having a very detailed step by step procedures of each activities A written manual of SOP should cover the following:- general managements policy, managements structure, reporting procedures, stocks control and other record-keeping procedures, operational procedures, health and safety procedures and security (Geraldes et al., 2008**).**

On the fifth question, from the total number of respondents, 6.8% said strongly disagree, 65.9% said disagree and 27.3% said neutral. Very high number of respondents, 72.7%, is aware that there are no sufficient personal protective materials for the warehouse workers that used for their respective duties. Some of the respondents, 27.3%, have no idea on their existence. These materials protect the workers from fire, toxic and corrosive chemicals, hazards, etc and also give freedom for the workers for active participation and movement. The finding from Belayhun B, 2017, showed 81.5% of the respondents agreed there are no sufficient safety material in the warehouse he studied. The personnel in the warehouse should have the personal hygiene and sanitation and wearing suitable protective or working garments and materials appropriate for their activities (WHO Technical Report Series, No. 908, 2003).

On the sixth question, from the total number of respondents, 9.1% said strongly disagree, 56.8% said disagree and 34.1% said neutral. More than have of the respondents, 65.9%, responded that there are no safety materials like fire extinguisher and alarm which are very important in the warehouse in case something accidental occurs. and the other, 34.1%, have a neutral standing. These materials are very important that they prevent further damages of the workers and the warehouse. From the research studied, Belayhun B., 2017, more than 55% of the respondents confirm that there are no such materials for the warehouse safety.

On the seventh question, from the total number of respondents, 6.8% said strongly disagree, 52.3% said disagree, 38.6% said neutral and 2.5% said agree. A large number of the respondents, 59.1%, did not agree where there is on the job training on the warehouse management for the personnel concerned. Some of the respondents, 38.6%, don't know at all. Most warehouses jobs are nontechnical and in-service training and supervision of staff are likely to be the most effective approach (Geraldes et al.,2008).

On the eight question, the responses collected showed that 9.1% responded strongly disagree, 45.5% responded disagree, 43.2% responded neutral, 2.3% responded agree. The majority of the respondents, 54.6%, reported that the materials and equipments in the warehouse are not sufficient enough to care on the activities but substantially large number, 43.2%, are not sure.

The ninth question, the respondents reported that 6.8% strongly disagree, 59.1% said disagree, 29.5% neutral and 4.5% agree. About 65.9% of the total respondents approved that the materials

and equipments are not maintained and replaced with the new ones when they are out of use where as 29.5% of the respondents have no idea on the maintenance and replacement of the materials. The efficiency of the movement of the goods in and out is determined by the operations of these material and they protect the goods from damages. From the research from Admasu T., 2017 on the same Warehouse, mechanical machines or goods handling equipments are important to support loading and unloading process during shipment. From the results, more than half of the results, 52.5%, believed machines are moderately available in the warehouse. However 30% of them believe the availability of machine in the warehouses is low. The results indicated that all warehouses are not fully equipped with supporting machines and there is also shortage of spare parts and maintenance strategy in the agency for those broken mechanical machines.

4.3.2 Receiving Activities

Table 4.3 Summary of Receiving Activities

B	Sub Part 2-2- Receiving Activities	SD (n(%))	D (n(%))	N (n(%))	A (n(%))	SA (n(%))	Mean	SD	Total (n(%))
1	There is a pre-notification of the incoming goods that will be received in warehouses	0	2(4.5)	10(22.7)	29(65.9)	3(6.8)	3.75	0.651	44(100)
2	During the time of receiving goods, there are procedures for the cross checking of the documents and the goods	0	0	11(25.0)	27(61.4)	6(13.6)	3.89	0.618	44(100)
3	There are procedures for the notification of discrepancies to the suppliers for the returning and re-receiving of goods	0	2(4.5)	6(13.6)	30(68.2)	6(13.6)	3.91	0.676	44(100)
4	The warehouse worker inspect the goods received in the receiving area before putting away	0	1(2.3)	8(18.2)	29(65.9)	6(13.6)	3.91	0.640	44(100)
5	There are no sufficient good handling equipments for unloading and moving the incoming goods	0	1(2.3)	18(40.9)	24(54.5)	1(2.3)	3.57	0.587	44(100)
6	The receiving space is not convenient for the movement of the good handling equipments	0	1(2.3)	16(36.4)	20(45.5)	7(15.9)	3.75	0.751	44(100)

(Data source: Survey questionnaire 2018)

From the table 4.3 summary first question, the participants responded as 4.5% disagree, 22.7% neutral, 65.9% agree and 6.8% strongly agree. Most of the respondents, 72.7%, approved there is a pre notification procedure before the actual arrival of the goods for preparation where as some of the respondents, 27.7%, don not know the procedure. Receiving begin with advance notification of the arrival of goods. This allows the warehouse to schedule receipt and unloading to coordinate efficiently with other activities within the warehouse (Bartholdi & Hackman, 2011).

For the second question, the participant replied with 25% neutral, 61.4% agree and 13.6% strongly agree. A large number of the respondents`, 75%, agreed on the procedure of crosschecking of the documents and goods during the incoming goods receiving which is a very important procedure. At its most fundamental level, receiving is the process of confirming what is received is what is ordered. Whether the material received matches the purchase order (Smart turn inc, 2014).

For the third question, from the total number of the respondents, 4.5% said disagree, 13.6% said neutral, 68.2% said agree and 13.6% said strongly agree. Most f the respondents conformed that when there are discrepancies and unconformities of goods received; there are procedures that notify the suppliers for the return and re receiving which inappropriate loss of costs for the recipients.

On the fourth questions, the respondents responded 2.3% disagree, 18.2% neutral 65.9% agree and 13.6% strongly agree. Substantially large numbers of the respondents, 79.5%, approved their agreement for the existence inspection of goods after they are received and before putting them away. Receiving includes typically carrier processing (i.e., unloading), item identification, recording the goods receipt, quantity and quality inspections, un-packing, and sorting activities (Bodnar, 2013).

On the fifth question, from the participants 2.3% disagree, 40.9% neutral, 54.5% agree and 2.3% strongly agree. Most of the respondents, 57.8%, confirmed that the good handling equipments for unloading and moving in the warehouse activities are not sufficient which there is a shortage of these equipments where as somewhat large number of the participants are not sure the how sufficient the equipments are. From the research study of other warehouse management practice,

more than 60% of the respondents agreed that there are loading and unloading equipments in that warehouse (Belayhun B., 2017).

On the sixth question, from the total number of the respondents, 2.3% said disagree, 36.4% said neutral, 45.5% said agree and 15.9% said strongly agree. Higher number of the participants, 61.4%, the receiving area is not convenient for the receiving and the movement of the goods handling materials in the warehouse which facilitate the activities. But some of respondents, 36.4%, are not sure the convenience of the receiving area.

4.3.3. Putting away activities

Table 4.4 Summary of Putting away Activities

C	Sub Part 2-3- Putting away activities	SD (n(%))	D (n(%))	N (n(%))	A (n(%))	SA (n(%))	Mean	SD	Total (n(%))
1	There are adequate storage areas like shelves, cabinets, pallets, etc to store the inspected goods	6(13.6)	24(54.5)	11(25.0)	3(6.8)	0	2.25	0.781	44(100)
2	The goods are moved and stored to the storage areas with their categories like pharmaceuticals, medical supplies, chemicals, etc	4(9.1)	25(56.8)	14(31.8)	1(2.3)	0	2.27	0.660	44(100)
3	There are sufficient aisle space for the movements of good handling equipments and warehouse workers	2(4.5)	22(50.0)	18(40.9)	2(4.5)	0	2.45	0.663	44(100)
4	Goods are organized and stored in their areas in the sequence of First Expire First Out(FEFO)(The early expiry in the front)	4(9.1)	14(31.8)	22(50.0)	4(9.1)	0	2.59	0.787	44(100)
5	Goods are not organized and stored in their areas Randomly	5(11.4)	22(50.0)	12(27.3)	5(11.4)	0	2.34	0.861	44(100)
6	The locations of the stored goods are recorded and traceable	2(4.7)	27(62.8)	10(23.3)	3(6.8)	1(2.3)	2.40	0.791	43(97.7)
7	There is no updating of the records when putting the goods away in their areas	4(9.1)	21(47.7)	16(36.4)	3(6.8)	0	2.45	0.791	44(100)
8	The non usable goods (damaged and expired) are stored with the usable goods	3(6.8)	25(56.8)	10(22.7)	6(13.6)	0	2.43	0.818	44(100)

(Data source: Survey questionnaire 2018)

From the above table 4.4, first question, of the total number of the respondents, 13.6% said strongly disagree, 54.5% said disagree, 25% said neutral, 6.8% said agree. A high number of the respondents, 68.1%, replied that there are no adequate storage areas of different kinds in the warehouse so that the goods are stored while quarters of the respondents have neutral standing on it. In a research study in PFSA by Admasu T., 2017 showed that the respondents perceived that availability of shelves is adequate. At that time, this result shows as there is no shortage of shelves and pallets in the warehouses of PFSA. As there are great increments of demands health commodities by PFSA for the health facilities, there will be a shortage of the material since the increased demands accommodated in the same warehouse.

Before product can be put away, an appropriate storage location must be determined. This is very important because where you store the product determines to a large extent how quickly and at what cost you later retrieve it for a customer. At all times what storage locations are available, how large they are, how much weight they can bear, and so on are very important (Bartholdi & Hackman, 2011). Putt away Moves material from the receiving area to the storage, replenishment, or pick areas. Where there are no available space or storage areas, there are the chances of creating transaction errors, product will become more susceptible to damage—both from remaining on the ground, as well as being moved multiple times (Smart turn Inc., 2014).

On the second question, from the total number of the respondents, 9.1% responded strongly disagree, 56.8% responded disagree, 31.8% responded neutral, 2.3% responded agree. Among the total respondents, 65.9% confirmed that goods are not stored by their categories while the 31.8% of the respondents are not sure the categorical storage of goods.

On the third question, the responses showed that 4.5% replied strongly disagree, 50% replied disagree, 40.9% replied neutral, 4.5% responded agree. Most of the respondents, 54.5%, responded that the aisle is not sufficient for the movement of the warehouse workers and the good handling equipments as a whole while substantial number of the respondents about it. from the earlier research done by, Admasu T., 2107 using a scale ranging from very low to very high, 45% of the respondents in his study replied moderate which is equivalent to this research outcome resulted with 40.9% of the respondents replied neutral.

For the fourth question, the participant replied with 9.1% strongly disagree, 31.8% disagree, 50% neutral, 9.1% agree. Half of the respondents replied that they are not sure the storage and organization of the goods in the warehouse but only 40.9% of the respondents disproved the arrangement is by FEFO principle. Item sequencing determines the order, according to which items are sorted to be processed, e.g., allocated or shuffled. It is typically based on an earliest due date order. The sequence of storage Location where different access methods can be chosen like: LIFO (last in first out, FIFO (first in first out), FEFO (first expire first out) or Random Access. However, items can be consolidated (or clustered) according to decisions and restrictions determining whether different items can be placed in the same compartment(Bodnar, 2013).

On the fifth question, from the total number of the respondents, 11.4% said strongly disagree, 50% said disagree, 27.3% said neutral and 11.4% said agree. A large number of the respondents, 61.4%, refused the non-random arrangements of goods in the storage areas; hence these respondents agreed the arrangement is in a random order.

On the sixth question, 4.7% of the respondents replied strongly disagree, 62.8% of the respondents replied strongly disagree, 23.3% of the respondents replied neutral, 6.8% of the respondents replied agree and 2.3% of the respondents replied strongly agree. Most of the respondents, 67.5%, confirmed that the location of the stored goods is not recorded in the warehouse but only 23.3 % of the respondents are not sure.

On the seventh question, responses showed that 9.1% replied strongly disagree, 47.7% replied disagree, 36.4% replied neutral, 6.8% responded agree. More than half of the respondents, 56.8%, approved when the goods are putt away to the storage areas, the records are updated which balances the inventories on hand. Some of the respondents, 36.4%, substantially replied they don't know the record updating when putting away.

On the eighth question, the responses showed that 6.8% responded strongly disagree, 56.8% replied disagree, 22.7% replied neutral, 13.6% responded agree. 67.6% of the total participants replied that the damaged and expired goods are stored in separate areas which are not actually mixed with the usable ones this is important that it prevent issuing of the non usable to the customers. From the early research by Admasu T., 2017, only 27.5% of the respondents

disagreed and the rest are from moderate to very high acceptance on the usable and non usable goods are separated in PFSA warehouse practice.

4.3.4 Issuing Activities

Table 4.5 Summary of Issuing Activities

D	Sub Part 2-4- Issuing processes Activities	SD (n(%))	D (n(%))	N (n(%))	A (n(%))	SA (n(%))	Mean	SD	Total (n(%))
1	The goods are picked based on the printed order picking format	0	3(6.8)	4(9.1)	33(75)	4(9.1)	3.86	0.668	44(100)
2	Goods are picked in the order of First Expire First Out(FEFO) (The early expiry retrieve first)	3(6.8)	1(2.3)	13(29.5)	23(52.3)	4(9.1)	3.55	0.951	44(100)
3	Goods are not picked randomly	0	0	14(31.8)	25(56.8)	5(11.40	3.80	0.632	44(100)
4	Warehouse workers update records when goods are picked from their storage areas	1(2.3)	2(4.5)	11(25.0)	24(54.5)	6(13.6)	3.73	0.845	44(100)
5	There are no sufficient areas for packing, rapping and labeling of goods for dispatching	0	2(4.5)	16(36.4)	25(56.8)	1(2.3)	3.57	0.625	44(100)
6	The picked goods are moved by handling equipments to the dispatching areas and finally inspected for shipment	2(4.7)	2(4.7)	9(20.9)	23(53.5)	7(16.3)	3.72	0.959	43(97.7)
7	The warehouse workers pack and label the goods to the customers for shipment	2(4.5)	4(9.1)	14(31.8)	20(45.5)	4(9.1)	3.45	0.951	44(100)
8	Good handling equipments like forklifts and pallet Jacks are used when loading the vehicles	1(2.3)	3(7.0)	8(18.6)	28(65.1)	3(7.0)	3.67	0.808	43(97.7)

(Data source: Survey questionnaire 2018)

From the table 4.5 summary first question, the participants responded as 6.8% disagree, 9.1% neutral, 75% agree and 9.1% strongly agree. Most of the respondents, 86.1%, confirmed that there are orders picking formats used to pick the goods accordingly. On receipt of a customer order, the warehouse must perform checks such as verifying that inventory is available. Then the warehouse must produce pick lists to guide the order-picking. Finally, it must produce any

necessary shipping documentation and schedule the order-picking and shipping, mainly the activities are typically accomplished by a WMS (Bartholdi & Hackman, 2011).

On the second question, from the total number of participants, 6.8% responded strongly disagree, 2.3% responded disagree, 29.5% responded neutral, 52.3% responded agree and 9.1% responded strongly agree. Of the respondents replied, 61.4% agreed that the goods picked according to FEFO principle, the early expiry retrieved first which reduces expiry of goods and make uses of the near expiry goods while 29.5% of the respondents are not sure the picking principles.

On the third question, 31.8% of the respondent replied neutral, 56.8% of the respondent replied agree and 11.4% of the respondent replied strongly agree. The responses from the participants showed, most of them, 58.2%, are agreed that goods are not picked randomly from the storage areas but 31.8%, have no idea how goods are picked.

On the fourth question, the responses showed that 2.3% responded strongly disagree, 4.5% replied disagree, 25% replied neutral, 54.5% responded agree and 13.6% responded strongly agree. More than half of the respondents, 68.1%, approved that when goods are picked from their storage areas, the records are updated which is used to know the current balance after transaction.

On the fifth question, from the total number of the respondents, 4.5% said disagree, 36.4% said neutral, 56.8% said agree and 2.3% said strongly agree. From the responses collected, 59.1% of the respondents agreed that the areas for packing, rapping and labeling activities for the dispatching goods are not sufficient in the warehouse.

On the sixth question, from the total number of participants, 4.7% responded strongly disagree, 4.7% responded disagree, 20.9% responded neutral, 53.5% responded agree and 16.3% responded strongly agree. Data responded by the respondents shows, a large number of the respondents know the goods picked from their areas moved to the dispatching areas by handling equipments which prevent damaging during movement.

 On the seventh question, respondents responded that 4.5% strongly disagree, 9.1% disagree, 31.8% neutral, 45.5% agree and 9.1% said strongly agree. More than half of the respondents,

54.6%, confirm that the issued goods will be packed and labeled to the customers for loading and shipments

On the eighth question, from the total number of participants, 2.3% responded strongly disagree, 7.0% responded disagree, 18.6% responded neutral, 65.1% responded agree and 7.0% responded strongly agree. The collected responses indicated higher number of the respondents, 72.1%, when goods are loaded; handling equipments like forklift and pallet jack are used for the safety and effectiveness of the activities.

4.3.5 Warehouse Management System activities

Table 4.6 Summary of Warehouse Management System activities

E	Sub Part 2-5- Warehouse Management System activities	SD (n(%))	D (n(%))	N (n(%))	A (n(%))	SA (n(%))	Mean	SD	Total (n(%))
1	There is a computer data base software(HCMIS) to control the inventories in the warehouses	0	0	10(22.7)	28(63.6)	6(13.6)	3.91	0.603	44(100)
2	The computer data base used as a tool for the receiving, putting away, issuing, reporting, auditing, etc of the goods	0	1(2.3)	13(29.5)	25(56.8)	5(11.4)	3.77	0.677	44(100)
3	All the users: warehouse managers, supervisors and others are trained how to use the data base	0	1(2.3)	17(38.6)	21(47.7)	5(11.4)	3.68	0.708	44(100)
4	Verified data feed to the system accurately and in timely fashion when there is transaction	0	4(9.3)	12(27.9)	24(55.8)	3(7.0)	3.60	0.760	43(97.7)
5	The generated inventories reported by the data base are similar to the actual inventories in the warehouses	0	4(9.1)	17(38.6)	23(52.3)	0	3.43	0.661	44(100)
6	The data base simplifies the work and is important for the productivity of the warehouse management	0	0	7(16.7)	29(69)	6(14.3)	3.98	0.563	42(95.5)
7	The data base is effective in performing the warehouse operations	0	1(2.3)	12(27.3)	26(59.1)	5(11.4)	3.8	0.668	44(100)
8	The data base saves time, energy and money as compared to the manual works	0	1(2.3)	5(11.4)	32(72.7)	6(13.6)	3.98	0.590	44(100)

(Data source: Survey questionnaire 2018)

From the table 4.6 in the first question, the responses of the respondents are 22.7% neutral, 63.6% agree and 13.6% strongly agree. Most respondents, 77.2%, are agreed that there exist warehouse management system, which is HCMIS, which control the inventories in the warehouse which is the basic purpose of WMS. Faber, 21015 explained that a warehouse management system primarily aims to control the movement and storage of materials within a warehouse and process the associated transactions. Whereas 10% of the respondents have no idea that the existed data base is to control the inventories or the existence of the data base at all.

On the second question, 2.3% said disagree, 29.5% said neutral, 56.8% said agree and 11.4% strongly agree. The great number of the respondents, 68.2%, confirmed that the purpose of the data base tool is used to receive, put away, issuing, etc in the warehouse system. While some number of the respondent are not sure that the tool used for those activities. The basic features of most WMS's include tools to support: Receiving, Put-away, Location tracking, Picking, Shipping, etc (Bartholdi & Hackman, 2011). But 29.5% have neutral on that the data base tool is used to receive, put away, issuing, etc in the warehouse system. This show that substantial number of the respondents are not actually aware the basic purpose of the data base on work.

On the third question, from the total number of the respondents, 2.3% said strongly disagree, 38.6% said neutral, 47.7% said agree, and 11.4% said strongly agree. Most respondents, 59.1%, agreed that the WMS user are trained how to use the data base. The larger number of the respondents, 38.6%, also answered that they have no idea the users are trained how to use the WMS.

On the fourth question, from the total number of the respondents, 9.3% said strongly disagree, 27.9% said neutral, 55.8% said agree, and 7.0% said strongly agree. More than 60% of the respondents, when there is transaction, the verified data will be fed to the data base which contributes the accuracy of the generated reports and out puts. 27.9 % are not sure the feeding of the verified data when there are transactions. As stated from a literature, warehouse accuracy is paramount for the software to operate and to do this; data will need to be entered accurately and in a timely fashion. Although most WMS implementations will reduce labor costs in the placement and removal of materials, there is often an added warehouse management function required just to operate the software (Karimi & Namusonge, 2014).

On the fifth question, respondents responded, 9.1% disagree, 38.6% neutral, 52.3% agree. More than half of the respondents, 52.3%, are agreed that there is similarity between the actual inventories and the inventories from the data base. High numbers of the respondents, 38.6%, have no idea on the similarity of the two and 9.1% did not agree on the similarity of the two as well.

On the sixth question, from the total number of the respondents, 16.7% said neutral, 69% said agree and 14.6 strongly agree. The very high number of the respondents, 83.3%, agreed that the WMS simplifies the warehouse management and is important tool for its productivities but of the respondents, but 16.7% are not sure whether this is true or not.

On the seventh question, from the total number of the respondents, 2.3% said disagree, 27.3% said neutral, 59.1% said agree, and 11.4 strongly agree. Most of the respondents approved that the WMS is effective enough on performing the warehouse activities while 27.3 are not sure its effectiveness.

On the eighth question, respondents responded, 2.3% disagree, 11.4% neutral, 72.7% agree and 13.6 strongly agree. The result shows that the large of respondents, 86.3%, are agreed that the WMS is highly cost effective by saving time, energy and money but a small number of respondents are unaware of its effectiveness. The literatures discussed that WMS reduces cycle time, improve inventory accuracy, increases storage capacity, has flexibility of warehouse operations (Karimi & Namusonge, 2014), improve the efficiency of the warehouse (Faber, 2015) and it ended the paper works and it decreases the errors in the inventory management (Naseed et al., 2013).

4.3.6 Challenges and strengths in the warehouse management

Most of the respondents replied to the challenges but only few of them answered the strengths of warehouse management practices in the open ended questions included on part III at the end of the questionnaire.

Table 4.7 Summary of challenges in the warehouse management

S,no	Challenges	Frequency	Valid percentage
1	HCMIS network connection interruption and slow speed	5	14.3
2	Lack of training before and on the job on HCMIS	4	11.4
3	Warehouse space(receiving and dispatching) is not enough	4	11.4
4	No maintenance of equipments and materials	3	8.6
5	Theft and no CCTV camera for security	3	8.6
6	Lack of safety materials	2	5.7
7	Shortage of goods handling equipments	2	5.7
8	Lack of trained warehouse workers, and laborer	2	5.7
9	Receiving and dispatching as the same time	2	5.7
10	The rental warehouses are not convenient for pharmaceuticals and are far for documentary communications	3	8.6
11	Law management attention for the warehouse workers	3	8.6
12	No toilet, water sources and office areas	2	5.7

(Data source: Survey questionnaire 2018)   **35**

Table 4.8 Summary of strengths in the warehouse management

S,no	Strengths	Frequency	Valid percentage
1	Most of the warehouse operations are done by the HCMIS	3	20.0
2	The HCMIS alerts the inventories status like near expiry, stock level, consumption, transaction, etc	4	26.7
3	The HCMIS is available in mobile application	3	20.0
4	The HCMIS saves time	2	13.3
5	New standard warehouses are on building which avoid many problems	3	20.0

(Data source: Survey questionnaire 2018)

The respondents are working in different areas where some are at the offices and the others in warehouses which are scattered in Addis Ababa city. The respondents have mainly different challenges. Some of the challenges are shared by the others, the others are more specific for the given warehouses and offices and there are also strengths that were addressed by some of the respondents. From the respondents who addressed the challenges, most of the respondents replied, 25.6%, on the HCMIS network speed, connection and training problems. Again as per the respondents replied on the strengths of the warehouse management practice, 80% are also on the different aspects of the same HCMIS tool.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter includes summary of the major findings, conclusion, recommendation and area of further study

5.2 Summary

The study was intended to examine the current practices and to explore the gaps of the warehouse management with respect to human material resources management, the receiving activities, putting away activities, issuing processes activities, warehouse management system, and the strengths and challenges in the warehouse operations.

To address the study gap, four research questions were developed as follows;

1. How are the human and material recourses managed in the warehouses?
2. How are the receiving, putting away and issuing activities carried out in the Pharmaceutical Fund and Supply Agency warehouses?
3. What are the activities performed by warehouse management system in the warehousing?
4. What are the challenges faced in the warehouse management?

These research questions were addressed through questionnaires with closed ended and open ended questions distributed to PFSA employees related to the warehouse management from which the primary quantitative and qualitative data were collected, the secondary data from the earlier studies with related subject matter, relevant literature reviews and documents by collecting the required data and information. The data obtained were analyzed and interpreted by using SPSS 20 with descriptive statistics, frequency, percentage, mean and standard deviation.

The major findings of the study are summarized below:

Most of the respondents are in the age between 31 and 40, 75% of the respondents are First degree holders and above, 59.1% of the respondents are warehouse mangers and 63.7% have experience between 3-9 years in PFSA.

Summary on the human and materials resources management

The majority of the respondents, 54.5% and 68.2%, confirmed that the PFSA warehouse management related employees have the awareness on the principles of the warehouse managements and have the SOP for facilitating their activities respectively.

Most of the participant in the study, 59.1%, 54.6%, 72.7%, 65.9%, 59.1% showed their disagreement on the sufficient number of staff, the availability of job description to the staff for doing their works, the sufficiency personal protective and safety materials in the warehouses, and the support of staff by on job training on warehouse management respectively. The higher number of the respondents, 54.6%and 65.9%, again disagreed on the sufficient availability, and maintenance support and replacements of the materials and equipments when they are not functional.

Summary on the receiving activities

The majority of the participants, 72.7%, 75%, 71.8% and 79.5% approved that the warehouse manger will be pre-informed about the incoming goods; when the goods are received, the documents and the physical goods will be checked; if there are any discrepancies, the suppliers will be notified for the returning of the equivalent goods and the final received goods will be inspected and checked in the receiving areas to move to the storage areas respectively.

Large number of the respondents, 56.8% and 61.4%, confirmed that there are no sufficient good handling equipments to receive the goods, and convenient and sufficient space in the receiving areas for the movements of the equipments and the warehouses workers.

Summary on the putting away activities

Most of the respondents, 68.1%, 65.9%, 54.5% and 67.5%, approved that there are no adequate storage areas available, categorical storage system (pharmaceuticals, chemicals, etc) of the goods, sufficient space between shelves and records on the locations of the stored goods in the warehouses.

Half of the respondents, 50%, replied that the sequence of the stored goods in the warehouses are in the FEFO principle (first expiry, in the front), but 61.4% of the participant in the study, answered the sequence is random.

Majority of the respondents, 56.8% and 63.6%, agreed the records are updated when new goods put away to their storage areas and the usable and non usable goods are stored separately respectively.

Summary on the issuing processes activities

Most of the respondents, 84.1%, 61.4% and 68.1% agreed on that the goods are picked based on the order picking format prepared, the picking is in the order of first expiry first out (FEFO) to the customers and the records are updated when picking from the storage areas respectively and 67.2% of the of the respondents confirmed that the goods are not picked randomly.

Majority of the respondents' responses, 59.1%, showed that the dispatching areas are not sufficient for packing, rapping and labeling. Most of the respondents, 69.8%, 54.6% and 72.1%, agreed that the picked goods are moved to the dispatching areas by handling equipments, the goods moved are packed and labeled for the customers and finally loaded to the shipping vehicles by handling equipments like forklift and jack pallets, etc respectively.

Summary on the WMS activities

As replied by most respondents, 67.2%, there is a WMS software which is HCMIS and it is a tool used for receiving, putting away, issuing, reporting, etc in the warehouses and the offices. The users of this data base are trained how to use it and they feed verified data to the HCMIS accurately and in timely fashion when there is transaction as by 59.1% and 62.8% of the respondents respectively.

More than half of the respondents, 52.3%, responded that the generated reports from HCMIS is similar to the actual inventories in the warehouses but significant number of the respondents, 38.6%, also replied they are not sure.

HCMIS simplifies the operations and is important for the productivity of the warehouse management, as responded by 83.3% of the respondents and effective in performing the

warehouse activities which is confirmed by 70.5% of the respondents. Finally, 86.3% of the total respondents responded that HCMIS saves time, energy and money.

Summary on the challenges and strengths in the warehouse management practices

From the respondents who addressed the challenges, most of them replied on the HCMIS network speed and connection, and training problems, warehouses spaces constrictions, shortage of goods handling equipments and their maintenances and replacements, theft and no CCTV cameras for security, lack of safety and protective materials, lack human resources trainings and the inconvenience of the rental warehouses for pharmaceuticals and their distance. Generally, most of the respondents, 25.6%, who addressed the challenges, replied that HCMIS network speed, connection and training are the main problems, however; 80% of respondents who addressed the strengths replied that HCMIS performs most of the warehouse activities, it alert the inventories, it is available on mobile application and it saves time.

5.3 Conclusion

Based on the findings in the study conclusions are drawn as follows:

PFSA warehouse management related employees have the awareness on the principles and procedures of warehouse operations but the sufficient number of trained personnel, safety and personal protective materials, limited number of functional handling materials and equipments are the major problems that affect the day to day activities in the warehousing system.

In the processes of receiving goods, the warehouse managers are following the major procedures appropriately like receiving the pre-notification of the incoming goods for preparations, crosschecking the documents and goods on spot for completeness if there are any discrepancies, the suppliers are notified for the returning and replacing of goods, inspecting the goods in the receiving areas but the warehouse workers faced problems of receiving areas constriction and inconvenience of the receiving areas for moving equipments.

It is observed that in the warehouses: the storage areas, non-categorical and random arrangements of goods, spaces for in-house movement and records of the locations of goods in their areas are found to be the main challenges that affect the retrieval speed and effectiveness of the system when goods are issued.

In the warehouses, goods are issued in the sequences of first expiry first issued which enhance the timely and effective use of short shelf life products. The goods are moved to the dispatching areas by handling equipments for safety and prevention of mixing and damage but the main problems in this process are the constriction of dispatching areas for checking, packing, rapping, and labeling for customers which in turn compromise the speed and service label and are also the reasons for the dissatisfaction of customers.

The HCMIS is the most important tool to facilitate the main operations in the warehouses: receiving, putting away and issuing, and to communicate with the other warehouses. The users know how to input the verified data, extract the necessary reports and use the information from the HCMIS. It is efficient and effective in performing the warehouses and office operations.

The majorities of challenges of the employees faced are generally HCMIS connections interruption, warehouses space limitations, limited equipments and materials, lack of employees` on the job trainings, lack of safety and personal protective materials and inconveniency of the rental warehouses for pharmaceuticals.

5.4 Recommendations

Based on the findings and conclusions, the recommendations are forwarded as follows:

The human resources and materials availabilities are the most important inputs for the efficiency and effectiveness of the warehousing system, hence; the PFSA management needs to employ the necessary number of trained workers and provide the appropriate and on time capacity building trainings on technical and professional workers in the offices and warehouses who are engaged in the warehouse operations and the necessary handling materials and equipments so that the pharmaceuticals goods are safe as per their nature and characteristics.

The management needs to procure and install the safety and security materials like fire extinguishers, cameras, alarms, etc which are important inputs to protect the damage and theft of goods in the warehouses.

The management again needs to give attention to speed up the ongoing building of the new standard warehouses which the employees are hoping and waiting for which that will avoid most of the current challenges of the warehouses.

PFSA needs to employ its own Information Technology(IT) specialists who can fix and maintain the current interruptions of the HCMIS and who can train the new entry workers as this tool is important and has a lot of the agency`s information.

5.5 Further study areas

This research study emphasis on the assessment of the warehouse management in the head office PFSA warehouses and will give a baseline for further studies especially in PFSA. To address in-depth study on the warehouse manage in the pharmaceutical supply system especially in PFSA more studies need to be researched in the future on the efficiency and effectiveness of warehouse management in PFSA warehouses, the impact of warehouse management in the health supply chain managements since warehouse management is the core and node of the supply chain management system, and in-depth study on the efficiency and effectiveness of HCMIS in the central and branch PFSA warehouses because it is a tool for performing the warehouses operations are recommended.

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Appendix 1: Questionnaire

Addis Ababa University

College of Business and Economics

School of Commerce

Logistics and Supply Chain Management

Questionnaire

Dear respondent: My name is Tibebu Hailu, pursuing a Master of Art Degree in Logistics and Supply Chain Management at Addis Ababa University. The research is entitled as **"Assessment of Warehouse Management: The case of pharmaceutical fund and supply agency Head Office"** for the partial fulfillment of academic requirement. This questionnaire is designed to collect primary data for the study.

The questionnaire is only for study purpose and your genuine responses to the questions are highly demanded on which the success is depending on. I kindly request you to spend a few minutes of your valuable time to answer the questions as per the instruction below:

- You do not need to write your name
- All of the questions need to be responded by yourself
- In some of the questions, there are available place to put mark "x" in the given space
- For some of the questions that need your explanations, please try to honestly describe as per the questions on the space provided.

If you need anything concerning the study and for further explanation, you can reach me through the mobile phone number: +251 913871433 or email: tibebuh59@gmail.com. Please note that the information you are providing will be treated with utmost confidentiality.

Thank you in advance for your participation in the study!

Part-one- General information of the respondents

1. Age: Below 20yrs ☐   Between 31–40yrs ☐

                    Between 20-30yrs ☐   Between 41–50yrs ☐   Above 50yrs ☐

2. Sex: Male ☐   Female ☐

3. Educational Qualification: High School graduate ☐   Diploma ☐

                      First Degree & above ☐

4. Job Position: Warehouse manager ☐   Storage and distribution officer ☐

               Supervisor/Coordinator ☐   Director ☐

5. Years of service in PFSA: Below 3 years ☐   Between 6 – 10 years ☐

                     Between 3-6 years ☐   Above 10 years ☐

Part-two- warehouse management related issues

The purpose of this part is to gather information on how the warehouse management related activities look like. Please indicate your level of agreement to the following statement using the **five** level of scales given below: **Strongly Disagree=1, Disagree=2, Neutral=3, Agree=4, & Strongly Agree=5**

	Sub Part 2-1- The Human and Material Resource Managements	1	2	3	4	5
1	There are sufficient number of staff to run the warehouses					
2	The staff members are not aware of warehouse management principles					
3	The warehouse personnel have job description for their respected duties					
4	There are no standard operating procedures (SOP) for the warehouse management activities					
5	There are sufficient personal protective materials like gowns, masks, gloves, etc for the staff in the warehouse					
6	There are safety materials like fire extinguishers and alarms for unexpected incidents					
7	There are on the job (on site) trainings on warehouse management issues					
8	There are sufficient materials and equipments to facilitate the warehouse activities					
9	There is maintenance support and replacement of the equipments in the warehouses when they are not working					
	Sub Part 2-2- Receiving Activities	1	2	3	4	5
1	There is a pre-notification of the incoming goods that will be received in the warehouses					
2	During the time of receiving goods, there are procedures for the cross checking of the documents and the goods					
3	There are procedures for the notification of discrepancies to the suppliers for the returning and re-receiving of goods					
4	The warehouse worker inspect the goods received in the receiving area before putting away					
5	There are no sufficient good handling equipments for unloading and moving the incoming goods					
6	The receiving space is not convenient for the movement of the good handling equipments					

	Sub Part 2-3- Putting away activities	1	2	3	4	5
1	There are adequate storage areas like shelves, cabinets, pallets, etc to store the inspected goods					
2	The goods are moved and stored to the storage areas with their categories like pharmaceuticals, medical supplies, chemicals, etc					
3	There are sufficient aisle space for the movements of good handling equipments and warehouse workers					
4	Goods are organized and stored in their areas in the sequence of First Expire First Out(FEFO)(The early expiry in the front)					
5	Goods are not organized and stored in their areas Randomly					
6	The locations of the stored goods are recorded and traceable					
7	There is no updating of records when putting the goods away in their areas					
8	The non usable goods (damaged and expired) are stored with the usable goods					

	Sub Part 2-4- Issuing processes Activities	1	2	3	4	5
1	The goods are picked based on the printed order picking format					
2	The goods are picked in the order of First Expire First Out(FEFO) (The early expiry retrieve first)					
3	The goods arenot picked randomly					
4	Warehouse workers update records when goods are picked from their storage areas					
5	There are no sufficient areas for packing, rapping and labeling of goods for dispatching					
6	The picked goods are moved to the dispatching areas by handling equipments and finally inspected for shipment					
7	The warehouse workers pack and label the goods to the customers for shipment					
8	Good handling equipments like forklifts and pallet Jacks are used when loading vehicles					

	Sub Part 2-5- Warehouse Management System activities	1	2	3	4	5
1	There is a computer data base software(HCMIS) to control the inventories in the warehouses					
2	The computer data base used as a tool for the receiving, putting away, issuing, reporting, auditing, etc of the goods					
3	All the users: warehouse managers, supervisors and others are trained how to use the data base					
4	Verified data feed to the system accurately and in timely fashion when there is transaction					
5	The generated inventories reported by the data base are similar to the					

	actual inventories in the warehouses					
6	The data base simplifies the work and is important for the productivity of the warehouse management					
7	The data base is effective in performing the warehouse operations					
8	The data base saves time, energy and money as compared to the manual works					

Part three: Challenges and Strengths of the warehouse management

1. Do you think the warehouse management has major challenges that affect the productivities?

    Yes ☐   No ☐

2. If yes, write the challenges:

    2.1 In the human and material managements

       please specify   ....

       ....

    2.2 In the main warehouse activities (receiving, put away and issuing/dispatching)

       Please specify   ....

       ....

    2.3 In the warehouse management system software (HCMIS)

       please specify   ....

       ....

    2.4 In another areas

       please specify   ....

       ....

3. Do you think there are strengths in the warehouse management

   Yes ☐   No   ☐

4. If yes,   write the strengths:

   4.1 In the human and material managements

   please specify   ....

   ....

   4.2 In the main warehouse operations (receiving, put away and issuing/dispatching)

   Please specify   ....

   ....

   4.3 In the warehouse management system software (HCMIS)

   please specify   ....

   ....

If you have additional comments or ideas about warehouse management practice please express your feeling:

   ....

   ....

Thank you!