



**ASSESSMENT OF PHARMACEUTICAL WAREHOUSE PERFORMANCE AND  
CHALLENGES: A CASE OF ADDIS ABABA REGIONAL HEALTH BUREAU**

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**A Thesis Submitted to Addis Ababa University School of Commerce in Partial Fulfillment of  
the Requirements for Masters of Arts Degree in Logistics and Supply Chain Management**

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## **Declaration**

I, Lidiya Alemu, state that this thesis titled “Assessment of Pharmaceutical Warehouse Performance and challenges: A Case of Addis Ababa Regional Health Bureau”, is my original work. It has not been previously presented by any other university for a degree, and all reference used for this paper have been acknowledge accordingly

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

## Letter of Certification

This is to certify that **Lidiya Alemu** has accomplished this research work on “assessment of warehouse performance and challenges. A Case of Addis Ababa Regional Health Bureau” under my supervision. This work is original in nature and it can be submitted for partial requirements of the award of Master of Arts in Logistics and Supply Chain Management

Fisseha Afework (Prof.)

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**ADDIS ABABA UNIVERSITY**  
**SCHOOL OF BUSINESS AND ECONOMICS**

Assessment of warehouse performance and challenges: A Case of Addis Ababa Regional Health  
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## ***Abstract***

*The purpose of this study is to assess pharmaceutical warehousing performance and challenges in hospitals that are found under the Addis Ababa regional health bureau. For the study, a descriptive method with a cross-sectional study design had employed. Besides, this study applies a quantitative research approach. Data were collected by using the Questionnaire. Due to the size of the studies' population is few and below 100, which is 53, this research is a census study. A total number of 53 questionnaires were distributed, 51 were filled and returned, from these three (3) were filled in completely, thus, 48 questionnaires were correctly filled & used to make the response rate 90.57%. Mean, frequency, and percentages have used to analyze the data, with the support of SPSS software. Generally, the finding of the study showed that the levels of Pharmaceutical warehouse performance are found to be moderate in the case of Addis Ababa regional health bureau hospital pharmacy warehouses. Moreover, inconvenience of the design/layout of the pharmaceutical warehouse for performing warehousing activities; insufficient availability of space for loading & unloading of pharmaceuticals; absence of well-developed technology for warehouse inventory control, absence of procedure for disposal of expired and damaged items from inventory and Insufficient manpower to do the loading/unloading of pharmaceuticals are found to be the major challenges of warehousing. Furthermore, low attention is given to the provisioning of training for employees. The hospitals higher management should plan to visit the warehouses on a certain period interval and gather information from employees, then work on challenges that are identified to improve pharmaceutical warehousing performance.*

*Key Words: pharmaceutical Warehouse, Warehouse performance, challenges in warehousing.*

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## List of abbreviations

<b>AARHB:</b>	Addis Ababa regional health bureau
<b>EHTG:</b>	Ethiopian Hospital Transformation Guidelines
<b>KPI:</b>	key performance indicators
<b>MSH:</b>	Management Science for Health
<b>PFSA:</b>	Pharmaceutical fund supply agency
<b>SCM</b>	Supply chain management
<b>SIAPS:</b>	System for Improved Access to Pharmaceuticals and Services
<b>SOP:</b>	Standard operating procedure
<b>SPSS:</b>	Statistical Package for Social Science
<b>USAID:</b>	United States Agency for International Development
<b>WMS:</b>	Warehouse management system
<b>WIP:</b>	work in process

# CHAPTER ONE

## INTRODUCTION

The introduction section of the study presents background on investigating pharmaceutical warehouse performance and challenges in hospital pharmacies registered in Addis Ababa regional health bureau. It also presents the problem statement, research questions, research objectives, scopes, and significance of the study. Definition of terms and study's limitations are also discussed in this chapter.

### 1.1 Background of the study

The warehouse is crucial for the supply chain of pharmaceuticals. This is especially true in resource poor environments where they act as buffers against uncertainties and breakdowns within the supply chain of health commodities. When appropriately managed and properly stocked, the warehouse provides a constant supply of pharmaceuticals as they are needed. Warehousing health commodities are much more than a building that provides a space for storage. Pharmaceutical warehouses must be designed to receive, store, and organize products efficiently and must provide effective distribution for life-saving commodities. This involves having sufficient shipping and receiving a place for the loading and unloading, storage in appropriate conditions for the commodities, and sufficient workspace to access and compile onward shipments for items going to regional, or district warehouses or service delivery points. (USAID | DELIVER PROJECT, 2014)

Pharmaceuticals are handled in a warehouse to equalize the imbalance and changeability of material flow caused by factors such as setting up of production, seasonality in demand, consolidation, and shipping of products. Inventories in pharmaceutical warehouses are resources that require handling tools, storage spaces, and database systems. In addition, warehouse operations are cyclic and labor-intensive activities. From the total logistics costs, 20-25% represents the capital and operating costs of the warehouses. Therefore, progresses in the planning, and control of warehousing systems can contribute to the victory of any supply chain. (Bodnar, 2013).

Warehouse currently plays an important part in the supply chain in giving the anticipated level of client service at the lowermost total cost (Faber, 2015) The function of warehousing remains the

same, and the objectives that must be done for the layout of the warehouse are exploit the use of tools, exploit the use of manpower, exploit the use of areas, and exploit availability and safeguard of all products. (Tonelli, Schenone, Nan, & Zunino, 2002)

Pharmaceuticals are warehoused at every facility in the pipeline. Good pharmaceutical warehousing guarantees the physical integrity and safety of products and their packaging throughout several storage facilities until they are distributed to clients (John Snow, I, 2017). Warehousing is an essential element of activity in the distribution of goods from raw materials and works in progress through to finish products. It is a vital part of the supply chain network within which it operates and as such its roles and objectives should synchronize with the objectives of the supply chain. It is not a Stand-alone element of activity, and it must not be a weak link in the whole supply chain network (More, 2016)

Good performance of health information, personnel, financing, and supply chain affects the health outcomes positively. The significance of having medicines and other supplies available at the health facility cannot be overstated, and their availability often depends on how well or how unwell the supply chain is performing. Understanding how supply chain is performing currently, will improve performance. Thus supply chain performance needs to be measured. The performance measurement result helps to indicate where the supply chain is inefficient and this inefficiency will be addressed accordingly. (Aronovich, et al., 2010)

Measuring pharmaceutical warehouse metrics is serious for providing managers with a clear vision of possible issues and opportunities for improvements. If warehouses are going to contribute to adding value to the supply chain, then it is essential to measure the performance with perfect metrics (Ramaa, et al., 2012). The objective of warehouse is reducing costs, raising productivity, and improving client receptiveness. Determining warehouse performance gives a response about how the warehouse performs compared to the requirements. Moreover, it can also give a response on the adequacy and efficiency of an implemented Warehouse Management structure (Faber, 2015)

Pharmaceutical warehouses are a substantial component of logistic operations, and an important contributor to speed and cost in supply chains (Johnson & McGinnis, 2011).

In functioning activities in the warehouse, there are challenges that hinder the performance of the warehouse. Some of them are, insufficient space, stock discrepancy, weak communication with the employees, layout issues, lack of manpower to do the loading/unloading, etc

## **1.2 Background of the organization**

Addis Ababa is the capital city of Ethiopia with 10 sub-cities and a population of 3.24 million (1.49 million male and 1.75 million female) according to 2018 projection (CSA, 2018). There is a total of 56 hospitals (14 governments owned hospitals), more than 760 clinics, 96 health centers, and more than 720 pharmacies in Addis Ababa (Sami, 2018) Out of the 14 governments owned hospitals, five are under the federal ministry of health, six are general hospitals under Addis Ababa city administration and the other three are army and police hospitals.

The six public hospitals under Addis Ababacity Administration health bureau are Zewditu memorial hospital, Ras Desta hospital, Minilik hospital, Yekatit 12 hospital, Gandhi hospital, and TiruneshBejing hospital. These hospitals are located in different sub-cities in Addis Ababa. The main objective of these hospitals is to provide inpatient, outpatient, and emergency health care services to the patients referred from different health centers under their catchment areas and different regional hospitals, depending on level of specialty. Moreover, these hospitals have a different warehouse of different size and activities for receiving and storing of all pharmaceuticals until distributed to the dispensing units of pharmacies and other operating units.

The hospitals have also been serving as a teaching and researching center for many public and private universities and college students.

## **1.3 Statement of the problem**

Pharmaceuticals represent a large portion of the cost in the healthcare system. They account for 20–60% of health spending in developing countries (Cameron, Ewen, Ross-Degnan, Ball, & Laing, 2009). As pharmaceuticals are an essential and indispensable resource element in health facilities, they need to be managed efficiently to prevent a shortage, stock out, and all types of wastage including pilferage and expiry. Warehouse management is a key component of the pharmaceutical supply chain system. When properly managed and appropriately stocked, the warehouse provides a consistent supply of pharmaceuticals as they are needed. (USAID | DELIVER PROJECT, 2014). However, poor warehousing results in shortages, stock-outs and

millions of dollars in lost pharmaceuticals and other essential products due to expired products in warehouses (SIAPS, 2014)

Accessibility of safe, efficient, and reasonably priced drugs and medical supplies of the required quality, and quantity is required to give health care service for the clients'. However, in Ethiopia, the pharmaceutical supply chain system has numerous problems. Some of them are non-affordability, unavailability, poor stock and store management (PFSA, 2015)

Warehouse management is an important constituent of supply chain management. Therefore, performance of the entire supply chain is affected by ineffective warehouse management, and poor performance of supply chain and warehousing will disturb the quality of health care services greatly. (Nigatu, 2018)

Warehouse constitutes the most significant part of the current supply chain management of health commodities. It is very important to manage warehouses effectively to avoid unnecessary costs and to ensure a high level of customer service. Despite this fact, assessing pharmaceutical warehouse performance has been largely ignored in the research literature (Johnson & McGinnis, 2011). Performance measurement and metrics are not simple to operate and measuring dimensions of performance is often not understood well. Moreover, there is an inadequately formulated definition of performance measurement and matrix (Melnik, Stewart, & Swink, 2004)

Berhane (2017) in Teshome (2019) stated that warehouse Management is an important constituent of supply chain management. However, ineffective warehouse management has an impact on the entire supply chain management process. The field of SCM, especially modern pharmaceutical warehouse management is somewhat new to Ethiopia. There is also a shortage of research and documented evidence that sufficiently shows the performance of pharmaceutical warehouse management and challenges. The current inadequate researches haven't assessed the challenges of pharmaceutical warehouse performance in Ethiopia through the use of explicit dimensions and corresponding assessments. Until just a few years ago, the health system of Ethiopia was struggling with the insufficient supply of quality and affordable medicines, weak stock management and poor warehouse settings. This results in stock-outs of vital drugs. Also, the healthcare supply chain in Ethiopia has suffered from weak systems with limited data visibility which result in stock-outs, wastage, and poor health outcome.

Addis Ababa regional health bureau (AARHB) oversees and evaluates all hospitals and health centers every year based on the Assessment Tool for the operational Standards of the Ethiopian Hospital Transformation Guidelines (EHTG). But pharmaceutical warehouse performance and challenges were not assessed by these Guidelines. However, regular checking of pharmacy annual reports shows that poor warehouse condition and distribution systems, as well as weak stock management (AARHB annual report, 2016).

Therefore, Considering the above-mentioned gaps, this particular study assesses the pharmaceutical warehouse performance and challenges in public hospitals under Addis Ababa regional health bureau, Investigate the current pharmaceutical warehousing performance along with the four most frequently used warehouse key performance indicators, namely Quality, response time, cost/financial, and productivity as suggested by Edward Frazelle (2001) and provide necessary recommendations based on the result. The study may also help future researchers to use it as a reference.

#### **1.4 Research questions**

The basic research questions of this study are

1. What is the level of pharmaceutical warehouse performance of public hospitals under Addis Ababa regional health bureau measured regarding quality indicator?
2. What is the level of pharmaceutical warehouse performance of public hospitals under Addis Ababa regional health bureau measured regarding response indicator?
3. What is the level of pharmaceutical warehouse performance of public hospitals under Addis Ababa regional health bureau measured regarding financial indicator?
4. What is the level of pharmaceutical warehouse performance of public hospitals under Addis Ababa regional health bureau measured regarding productivity indicator?
5. What are the major challenges faced by warehouse managers in practicing efficient warehouse management?
6. Which key performance indicator mostly affects the warehouse performance of Public hospitals under Addis Ababa regional health bureau from the perspective of the employees?

## **1.5 Research Objectives**

### **1.5.1 General objective**

The general objective of this study is to determine the pharmaceutical warehouse Performance and challenges of public hospitals registered under Addis Ababa regional health bureau.

### **1.5.2 Specific objectives**

The study's specific objectives are;

1. To determine the pharmaceutical warehouse performance of public health facilities regarding quality indicator.
2. To determine the pharmaceutical warehouse performance of public health facilities regarding responsiveness indicator.
3. To determine the pharmaceutical warehouse performance of public health facilities regarding financial/cost indicator.
4. To determine the pharmaceutical warehouse performance of public health facilities regarding productivity dimension
5. To identify the major challenges faced by warehouse managers in practicing efficient warehouse management
6. To determine the key performance indicator that mostly affects the warehouse performance according to the employees

## **1.6 Significance of the study**

In general, any research is performed either for the addition of new knowledge or to solve problems. In this study, the finding of this research will provide information to decision-makers related to the challenges of pharmaceutical warehousing performance in the health facilities and indicate them the possible challenges that require improvement in practicing effective warehouse management, so that the decision-makers could adjust or make a decision according to recommendations provided in this study. Moreover, a lack of research in assessing the challenges of pharmaceutical warehousing performance showed that the area has not received attention. Thus, this study may help to provide background materials for future research and anyone can use the findings for reference purposes.

## **1.7 Scope of the study**

The study is done to determine pharmaceutical warehouse performance and challenges of public Hospitals under Addis Ababa regional health bureau such as Zewditu Memorial, Gandhi

Memorial, Yekatit 12, Ras Desta Memorial, Minilik II Memorial and Tirunesh Beijing Hospital. It is geographically limited only on Public Hospitals Case of Addis Ababa City administration, excludes private sectors due to time constraints. This research limited itself only on the performance of pharmaceuticals warehouse management to find out the challenges of Pharmaceutical warehouse performance in the case of public hospitals under AARHB. The performance of pharmaceutical warehouses is measured based on 4 dimensions which are financial, productivity, response time, and quality.

### **1.8 Limitation of the study**

This study was designed to collect appropriate data to answer the research question and attain the objectives. The limitation of the study was respondents were too busy and takes long time to complete the questioner. Close follow-up and contact with the respondents were done to monitor and maximize the collection of questionnaires.

### **1.9 Definition of terms**

**Pharmaceutical warehousing:** is the physical movement of products into, through and out of a pharmaceutical store (SIAPS, 2014)

**Warehouse:** is a place which store goods to reduce transportation cost and response time, achieve economies of scale in purchasing or manufacturing, or provide value-added processes (Ramaa et al., 2012)

**Performance measurement;** is the method of determining the effectiveness & efficiency of a doing (Neely, Gregory, & Platts, 2005)

**Quality:** tells how well, a given set of activity is performing (Aronovich, et al., 2010)

**Cost:** help managers identify the supply chain cost drivers, and help move toward a more efficiently managed supply chain (Aronovich, et al., 2010)

**Response Time:** is the time taken to complete a specific activity (Aronovich, et al., 2010)

**Productivity:** tells how well resources are used (Aronovich, et al., 2010)

### **1.10 Organization of the study**

There are five chapters in this study. The first chapter introduce the background of the study about warehousing. It also consists of problem statement, research questions, research objectives,

scopes, and significance of the study. Definition of terms and study's limitations are also discussed in this chapter. The second chapter deals with literature reviews including theoretical and empirical review and conceptual framework. Research methodology; data Presentation; analysis and discussion of the research is presented in Chapters three and four respectively. The last chapter provides a discussion, conclusion, and related recommendations based on the findings of the study.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2 Introduction

Before conducting any research, an exhaustive review of the existing body of knowledge has an indispensable role to have a clear image of the research area and to develop a conceptual framework. Therefore, in this chapter, theoretical review, empirical review and the developed conceptual framework will be discussed.

#### 2.1 Theoretical Literature Review

##### 2.1.1 Overview of Warehouse management

Warehouse is a place where items are stored in large quantities. In other words, warehousing means storing or keeping items in a sufficient amount and making them available when requested for use or sale. In a warehouse items are placed in an orderly, and systematic manner. Overall, warehouses are central for product and information flow between sources of supply and receivers (Anteneh, 2017). A warehouse is a place where products are temporary place. It also is a buffer in supply chains. It aids as a static unit in the main matching product availability to consumer demand. The primary aim of warehouse isto make a smooth flow of products from suppliers to customers, meeting demand on time and inreasonable cost (Richards, 2014). Warehouses aim to simultaneously reduce cost, increasing productivity, and improving customer responsiveness (Faber, 2015).

Warehouses play a serious role in matching product supply with demand across different levels in the supply chain. Today, warehouses function not only as centers for storage but also as centers for value-addition. Several warehouses have assembly, packaging, and repairing operations within their premises (Koster, Johnson, & Roy, 2017) Requirements for warehousing operations have significantly increased. Specifically, the customer needs regarding the order accuracy and response time, order frequency, order quantity, and order size have dramatically changed with the global economy and new demand trends. The main function of the warehousing systems is to receive products (from inbound and manufacturing lines), to store materials until they are requested, and then to extract products from inventory and ship them in response to the customer's orders (Accorsi, Manzini, & Maranesi, 2013).

Warehouse management has been defined as the coordination of the flow and storage of items within a warehouse and processes associated. In the warehouse, transactions of items takes place including receiving, put-away, picking, and transporting (Mutai & Moronge, 2017). Warehouse Management controls, plans, and optimizes the use of the resources and the material movement in a warehouse in a daily setting to allocate products following customer needs while reducing expenses which are related to operating the warehouse. (Faber, 2015).

### **2.1.2 Why warehouse**

According to Key (2015), a warehouse is an important element in a supply chain. Warehouse keeps raw materials, work-in-process, or finished products for varying lengths of time. Warehouses can be used to add value to a supply chain in two, basic ways: Storage: allows the product to be available where and when it's needed and Transport economies: allows the product to be collected, sorted, and distributed effectively. Warehouses only add value if the benefits of storing products in a warehouse enough to counterbalance the additional cost associated with holding any inventory. Other potential benefits associated with storage include the following: time bridging, which allows the product to be available when it is needed; processing, where for some products, storage can be considered as a processing operation because the product endures a required change during storage; and secure.

According to Faber (2015), the reasons for warehousing of products are:

- to achieve transportation and production economies of scales
- supporting the firm's customer service policies
- supporting the just-in-time programs of suppliers and customers
- to take advantage of quantity purchase discounts and forward buys
- maintaining a source of supply
- giving temporary storage of materials to be disposed or recycled with reverse logistics, and
- Instead of providing a single product, warehousing provides consumers with a mixture of product

### **2.1.3 Types of activities in the warehouse**

To guarantee an effective flow through the warehouse, a sequence of internal warehouse activities takes place. Warehouses can serve quite different ends. However, most share the same general pattern of material flow. They receive bulk shipments, stage them for quick retrieval

then, in response to customer requests, retrieve and sort and ship them out to clients (Bartholdi & Hackman, 2019)

John Snow, I (2017), illustrates basic warehousing activities as Receiving and incoming inspection, Put away, Visual inspection, Picking, packing, transporting. Those warehouse activities are discussed below;

**Receiving and incoming inspection:** is the activity that occurs during the unloading of inbound vehicles and includes the visual inspection of delivered packages to ensure that products were not damaged during transport. During this activity, it is important to confirm the quantities of products received against the packing slip or shipping invoice and report any discrepancies.

**Put away:** is the process of moving products from the unloading dock, or receiving area, after they are released for storage; and transfer them to their selected storage area (rack, shelf, floor, etc.). During this activity, it is essential to confirm that every item moved into or out of the racks, shelves, or any storage area is properly recorded on the stock keeping records.

**Storage:** is the process of assigning items in the warehouse. Since warehouse storage locations and pickers are generally scarce resources, high distribution efficiency is necessary regarding the utilization of both picker effort and storage capacity (Bodnar, 2013).

**Visual inspection:** Is the process of inspecting products and their packaging to look for obvious problems with the product quality

**Replenishment:** is the process of moving products from secondary storage to primary storage locations to facilitate picking (USAID | DELIVER PROJECT, 2014).

**Picking /packing:** To fill shipping requests (or picking lists), products must be located, pulled from inventory, and prepared for shipment. But before that can take place, a request needs to be processed through the inventory system to reserve those products that are available for picking. The individual items that make up that order can then be picked from the storage locations throughout the warehouse by the warehouse team and transported to a packing station. At the packing station, the workforce will administer a series of quality control checks to approve that the right products have been picked in the right quantity.

**Shipping:** includes preparing products for shipment to customers and placing those products on vehicles.

#### **2.1.4 Type of warehouses**

Bartholdi & Hackman (2019), categorizes Warehouses by type which is primarily defined by the customers, they serve. A number of the more important distinctions are presented below:

**A retail distribution center:** typically supplies items to retail stores. The direct customer of the distribution center is a retail store, which is likely to be a regular or even captive customer, receiving shipments on regularly scheduled days.

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

**A catalog fulfillment or e-commerce distribution center:** mainly, small orders are received from individuals by phone, Internet, or fax. Orders are typically small, for less than 3 items, but there could also be many such orders, and they are to be filled and shipped instantly after receipt.

**A 3PL warehouse:** is one to which an enterprise might outsource its warehousing operations. The 3PL provider might service multiple customers from one facility, thereby gaining economies of scale or complementary seasons that the customers would be not capable to achieve on their own.

**A perishables warehouse:** may handle fresh flowers, foods, vaccines, or other pharmaceutical products requiring refrigeration to protect its very short shelf life.

#### **2.1.5 The Role of Warehouse in Supply Chain**

Warehousing facilities play an important role in the overall supply chain process. Across the supply chains, warehousing is a main element of activity in the distribution of products, from raw materials and work in progress through to finish products. It is an integral part of the supply chain network within which it operates (More, 2016). Warehousing is a fundamental element of pharmaceutical supply chain management. It ensures the constant availability and flow of essential quality health commodities, in appropriate quantities, in a timely and cost-efficient manner through the supply chain system (SIAPS, 2014)

Warehousing connects the items movement between the suppliers and customers and its function is essential in a supply chain. (Ramaa et al., 2012). Warehouse performance will have

direct impact on the whole performance of supply chain, and it is expensive regarding of the facilities, workforces and tools required (More, 2016).

In the supply chain, warehouse functions linking the material flow between the consumer, and the suppliers. This forces companies to improve their warehousing operation. Many companies have also modified their warehousing operation to better meet customer demands. This leads to customize in the role of warehousing. Thus, material handling, and order processing will be improved. And, this can bring significant cost savings and increase customer value (Asemelash, 2017)

### **2.1.6 Warehouse Performance Measurement**

Liviu, Ana-Maria & Emil (2009), has defined Performance as; how work is done. In their studies they stated that there can be a good performance or a poor one. Moreover, Explained by Neely et al., (2005) performance measurement is the process of determining the effectiveness & efficiency of a doing or action. Performance measurement aims to find out whether things are going the right way or not. It investigate the cause of poor performance if things are not going well. After that, they finds solutions for improving performance. Avoiding problems early, Improving performance, monitoring customer relations, control cost and process, and retaining quality are the main reasons for measuring performance. Instrument that is used for evaluating performance are key performance indicators. Matching process values with normal, or standard values is the best way of using indicators. Poor results implies poor performance. Thus, the method needs improvement. The main reason of using indicators are to compare with expected values.

It is difficult to judge the performance of warehouse operations based on daily observations (Bartholdi & Hackman, 2019) However, Staudt et al., (2015) identified indicators utilized by different authors to measure warehouse performance, and then classified them according to the dimensions of quality, cost/financial, time and productivity.

Activity performance, program, or service which are provided by the warehouse are measured by warehouse performance measurement with key performance indicators (Kusrini, Novendri, & Helia, 2017). There is a lack of research on warehouse performance regarding to key performance indicators. Performance measurement and metrics are not simple to operate and measuring dimensions of performance is often not understood well. Moreover, there is

inadequately formulated definition of performance measurement and matrix. However, metrics are an important measurement of a warehouse. It aids the employees to evaluate their performance, address their problems early (Axelsson & Frankel, 2014).

### **2.1.7 Warehouse management system**

The warehouse management system (WMS) is a database system that allows real-time, paperless control of warehouse operations (Kay, 2015). A WMS is a computer application that aids in managing storage sites, products, and the employees. This computer application guarantees that customer orders are picked speedily, packed, and transported (Bartholdi & Hackman, 2019).

Information technology has developed rapidly within the previous decades. Today, computer systems can take many simple, or complicated decisions more quickly and more accurately than human operators. Information is available at the moment it is generated, and it is possible to analyze information and compare it with other relevant information before it is presented to the user. Timely and accurate information is key to managing the increasing complexity of warehouses (Faber, 2015).

The main aims of WMS are to monitor the products' motion from one place to another place in the warehouse. Moreover, it monitors the storage of products inside a warehouse and processes the related transactions, comprising transporting, picking, receiving, and put-away. WMS is used to enhance the performance and productivities of the warehouse and to take care of accurate inventory by recording warehouse transactions. The systems also give direction and optimize stock supported on real-time information about the status of bin utilization (Ramaa et al., 2012).

In summary, a WMS supports the planning, control, and optimization of all the activities in the warehouse, such as put-away, storage, and order-picking. The system records all activities in particular and generates considerable amounts of data, which gives valuable input for management information (Faber, 2015).

### **2.1.8 Warehousing/storage performance indicators**

There are a number of dimensions which helped to determine the supply chain activities. It is difficult to select the type of indicator to determine performance. Giving high emphasis on one part of indicator could be risky. Viewing these indicators wholly is very important. A model developed by Edward Frazelle, (2001) is universal and includes four types of indicators:

financial, quality, time, and productivity. Aronovich, et al., (2010), describes the four performance indicator dimensions as below:

**Quality:** is an indicator that is the simplest to implement and measure. Usually, this indicator tells, how well a specific activity is performing. Accuracy is a common logistics indicator of a quality indicator. It contains inventory accuracy, picking accuracy, order accuracy, and the like.

**Time:** is the time taken to complete a specific activity. Time indicator shows where saving time during specific activities can improve the whole supply chain performance.

**Financial:** These indicators help managers determine the supply chain cost drivers, and help move toward a more efficiently managed supply chain.

**Productivity:** These indicators analyze how well resources are used.

The warehouse activities' performance with performance indicators is explained in the table below

**Table 1: Warehousing/Storage Performance indicators**

<b>Quality Indicators</b>	<b>Response Time Indicators</b>	<b>Financial Indicators</b>	<b>Productivity Indicators</b>
Inventory Accuracy Rate	Warehouse Order Processing Time	Total Warehousing Cost	Storage Space Utilization
Put-Away Accuracy	Put-Away Time	Value of Product Damaged in the Warehouse	Units Moved Per Person Hour
Picking Accuracy Rate			
Warehouse Accident Rate			

Source: Modified from(Aronovich, et al., 2010)

### **2.1.8.1 Quality**

#### **A. Inventory Accuracy Rate**

It is a method which measures the percentage of storage location that has no inventory discrepancy when comparing bin card with a physical inventory count during a defined period of time.

The inventory accuracy rate is used to assess overall inventory control performance for a group of storage facilities or one storage facility over a set of review periods. Manager uses inventory accuracy rate for two purpose. Those are to know when a new order must be placed and to know how much they have in stock at any given point in time. This discrepancy analysis can help managers recognize storage locations that are having difficulties with inventory management; the analysis could lead to opportunities for improvement.

### **B. Put-Away Accuracy**

This dimension measures percentages of items located in the right bin or location in the warehouse. This helps to know whether the warehouse manager is practicing good warehouse management and adhere to the guidelines.

### **C. Picking Accuracy Rate**

This dimension measured the percentages of products picked accurately from storage based on a request, and then placed into appropriate container.

### **D. Warehouse Accident Rate**

This dimension measures the total number of accidents occurs in a warehouse or other storage facility during a specified period of time.

## ***2.1.8.2 Response Time***

### **A. Warehouse Order Processing Time**

This indicator measures the average amount of time (e.g., minutes, hours, days, weeks) from the moment an order is received at the storage facility until the time the order is transported to the consumer.

### **B. Put-Away Time**

This indicator measures the amount of time it takes from when a product(s) has been unloaded from a truck after arriving at a warehouse or other storage location when it is stored in its designated place and is ready for picking. This indicator can be calculated by product, or by shipment, or as an average across products or shipments, during a specified period of time.

### ***2.1.8.3 Cost/Financial***

#### **A. Total Warehousing Cost**

The total warehousing costs gather all costs related to warehousing, such as labor costs and warehouse rent; or mortgage payments, utility bills, equipment, material, and information handling systems, etc. It also consists of costs related to systems, supplies, and any other material with a particular use in warehousing. This indicator is usually measured annually.

#### **B. Value of Product Damaged in the Warehouse**

This indicator calculates the value of products damaged, during a defined period of time (usually one year), in the warehouse as a percentage of the value of all transported products during that period.

### ***2.1.8.4 Productivity***

#### **A. Storage Space Utilization**

Storage space utilization shows, the percentage of the total storage space being used out of the total storage space available. Depending on this indicator, managers can monitor storage capacity and utilization at a warehouse.

#### **B. Units Moved Per Person-Hour**

This indicator measures the number of units (e.g., pallets, boxes) or weight moved during a defined period of time, per person-hour, for each person working during that period. It can be considered both when receiving and transporting inventory.

### **2.1.9 Challenges of Warehouse management**

The challenges of warehousing activities of different articles are presented below:

According to Ramaa et al., (2012), Warehouses have been facing several challenges such as; Globalization, integrates supply chain, fluctuations of technologies that happen speedily, and customers need. Advanced approaches such as warehouse management systems are approved to resolve the challenges

Christopher (2016) in Endaykiros (2019) described that the top five warehouse management problems are: Inaccurate receipts and purchase orders, Lack of communication between

employees, Lack of cooperation between departments, Time management, Warehouse space, and organization.

Discussed in the Common Challenges in Warehouse Management, Posted at warehousing Solutions on December 5, 2017:

**Managing Warehouse Space/Layout:** Used in the best likely way, it will ensure that you can do more with all of the space you have on-hand. This means improving storage systems, as well as rack/pallet patterns. Make sure that receiving areas have the needed space for speedy operations. Create pre-decided pick paths to transfer things through your warehouse more effectively.

**Communication:** A major challenge in supply chain is lack of communication within employees and between employees and top level managers. If there is good communication, warehouse plan and perform activities effectively. Communication can be accomplished using appropriate software, or applications

**Time Management:** This is significant though that comes down to having procedures ready to fulfill orders and ship them out. Order picking should not take so much time that it costs your business money. To successfully manage time, guesswork in the location of stock must be removed.

**Inventory Accuracy:** Stock should always be stored in its right place, inappropriately identified areas. A breakdown inaccuracy or tracking of items can be traced to several areas. There might be improper receipts and purchase orders. If information is documented via a manual tracking system, it should always be confirmed for accuracy. A warehouse staff must also be appropriately trained to handle mistakes from other departments.

**Customer Expectations:** now a days, customer expects more. Customer expectations includes perfect order accuracy, shorter shipping time, and a wonderful customer service. Customers' requests to get services appropriately. If the correct service is not delivered to customer, it will be risky. an effective warehouse makes a correct types of labels for individual client's preference

**Redundant Processes:** Repeating similar processes results in increased labor costs. One example is how documents like pick tickets sometimes have to pass through many channels. This can all be removed by using barcode technology, which is found in warehouses that use modern automated systems. Cut down on the time it takes to fulfill an order by using a system to manage

purchase orders that gives all the important information (picklist, SKU number, and location) to increase efficiency.

**Product Diversification:** Every business functions on the 80/20 rule where 20 percent of your inventory produces 80 percent of your sales. Look closely at the other 20 percent of products to see what else clients are demanding. Being able to frequently meet their needs, while eliminating stock that isn't in demand, will make your business a winner every time.

**Product Picking Optimization:** to speed up the process of picking orders, avoid manually entering SKU's, and instead, use a scanner or image capture on a smartphone or tablet to get the most up-to-date reading of inventory. Automated processes and set picking routes will permit you to enhance your warehouse management. Also, consider moving the aisle/walkway width based on your forklift configuration.

**Inaccurate Purchase Orders:** seriously, invoices match what is received on purchase orders. A business that is growing can have many things happening that are unnoticed or not scrutinized enough because purchase orders will be greater and more complex. Having correct information aids remedy issues much more easily.

**Managing Fluctuations in Demand:** seasonality, fluctuations in the economy, weather, and many other factors play a role in the volatility of demand. For example, a global financial crisis will result in reduced client confidence, and therefore, extra products sitting in warehouses. Warehouses must always use timely and correct information to forecast demand.

**Globalization:** the net outcome of globalization has been a huge influx of competition from abroad. Products from some countries do not continually provide the same level of workmanship that you might take personal pride in contribution, but their lower production costs can destroy a corporate.

According to Adaptalift Group website (2013), some of the most common warehousing issues are discussed below

**Insufficient Warehouse Space:**It is important to avail sufficient amount of storage space for a business. Disordered or disorganized warehouse space results in unnecessary labor cost. Companies' full warehouse shelves and unable to accept new products is the result of improper uses of storage system and pallet arrangement.

**Slow Picking Processes and Stock Discrepancies:** Slow picking processes have a main effect on labor costs. When the site of products are disorganized and simply unavailable, the picking process will be time consuming. This results in backup in manpower.

**Warehouse Slotting Problems:** Disorganized allocation of pallets may result to warehouse operators to make several journey in the warehouse seeing for pallets for newly arrived products. Slotting problem results in disordered inventory. Due to inadequate warehouse space, requesting products will be difficult

## **2.2 Empirical Review**

Previous studies and researches in the area explained results they found from different perspectives/dimensions. Some researches finding related to warehouse performance are summarized as follows

A research done by Tewodros (2016) at Addis Ababa University on, "assessment of warehouse performance in Ethiopian trading enterprise" shows that the warehouse performance of Ethiopian Trading Enterprise is moderate regarding the four key performance indicators. It has also proposed that from the four key performance indicators, response time indicator is relatively better in the enterprise warehouse. The study recommended there is a need to focus on quality and cost indicators to achieve significant cost savings from the minimized total cost of warehousing and improved quality, and also maintain improved response time and improved efficiency or productivity, thus improving the organizational performance as a whole.

A study performed on "Determining of Performance Indicators in the Warehouse in Cameroon" introduced various categories of warehouse KPIs and elements of each category. The study aimed to prove the fact that warehouse performance can only be completely assessed if elements of cost, time, quality, and productivity are taken into account. The findings are summarized as below

- There is a negative change in the quality of warehouse operations
- There is an increase in the time with which warehouse operations are carried out
- There is an increase in the cost of warehouse operations
- There is a positive change in a warehouse productivity

The study concludes that an increase in the volume of goods received or shipped does not necessarily mean an increase in warehouse performance. Without warehouse indicators such as

those related to quality, cost, time, and productivity, it would be difficult to evaluate warehouse performance correctly (Derick, 2018).

### **Challenges of Warehouse management**

Endaykiros (2019), has concluded the result he found in his study of "Assessment of challenges of warehousing practices" as follows:

There major challenges in warehousing activities of the company he studied were; insufficient availability of space to loading and unloading of items; there was insufficient availability of equipment's to load, unload, and transport items. There was shortage of packaging materials. He also stated that there was insufficient storage area including insufficient pallets and shelves. Moreover, the warehouse manager take long time when doing the order picking activities in the warehouse; the reason for this is theuncomfortable layout of the storage area. There is also lack of providing trainingto the employees'. Furthermore, obsolete and scrape products, which are left here and there are not disposed on time.

A research done by Asemelash (2017) on, "Assessment of warehousing practices in Finfine furniture factory" discloses there were several major challenges in warehousing practices of the company he studied such us; lack of adequate warehousing facility, lack of information technology infrastructures, lack of training, lack of manpower and warehousing personnel's, etc. moreover, warehouse management theories and practices are not given attention by business managers. Still, the company is doing business in long-established traditions even there are no procedures and manuals to perform each warehouse activity and their information-sharing practices, and internal operation flexibility to address customer's demand is not adequate.

As we can see from the above reviews, most of the studies are focused on areas other than specific to Warehousing performance and challenges, so the researcher takes this as a gap. Therefore, the researcher considers this study will add to the literature and can be used as a reference for other researchers on similar problems.

## 2.3 Conceptual framework

The framework, which is developed for this study is formulated based on concepts identified in the literature review. The objective of this study is to assess the pharmaceutical warehouse performance and challenges of public hospitals with a focus on four major warehousing performance indicators. The 4 main warehousing performance indicators are:

**Quality:** This indicator states, how well a specific activity is performing.

**Cost:** It help managers detect the supply chain cost drivers and, help move toward a more efficiently managed supply chain.

**Time:** These indicators focus on the time it takes to accomplish specific activities. They show where saving time during specific activities can improve the whole supply chain performance.

**Productivity:** These indicators analyze how well resources are used.

There are challenges in performing the warehousing activities that hinder the function from smooth processing. Some warehousing related challenges, which are gathered from the literature, are listed below:

Inaccurate receipts and purchase orders

Insufficient Warehouse Space

Insufficient receiving Space

Lack of communication between employees

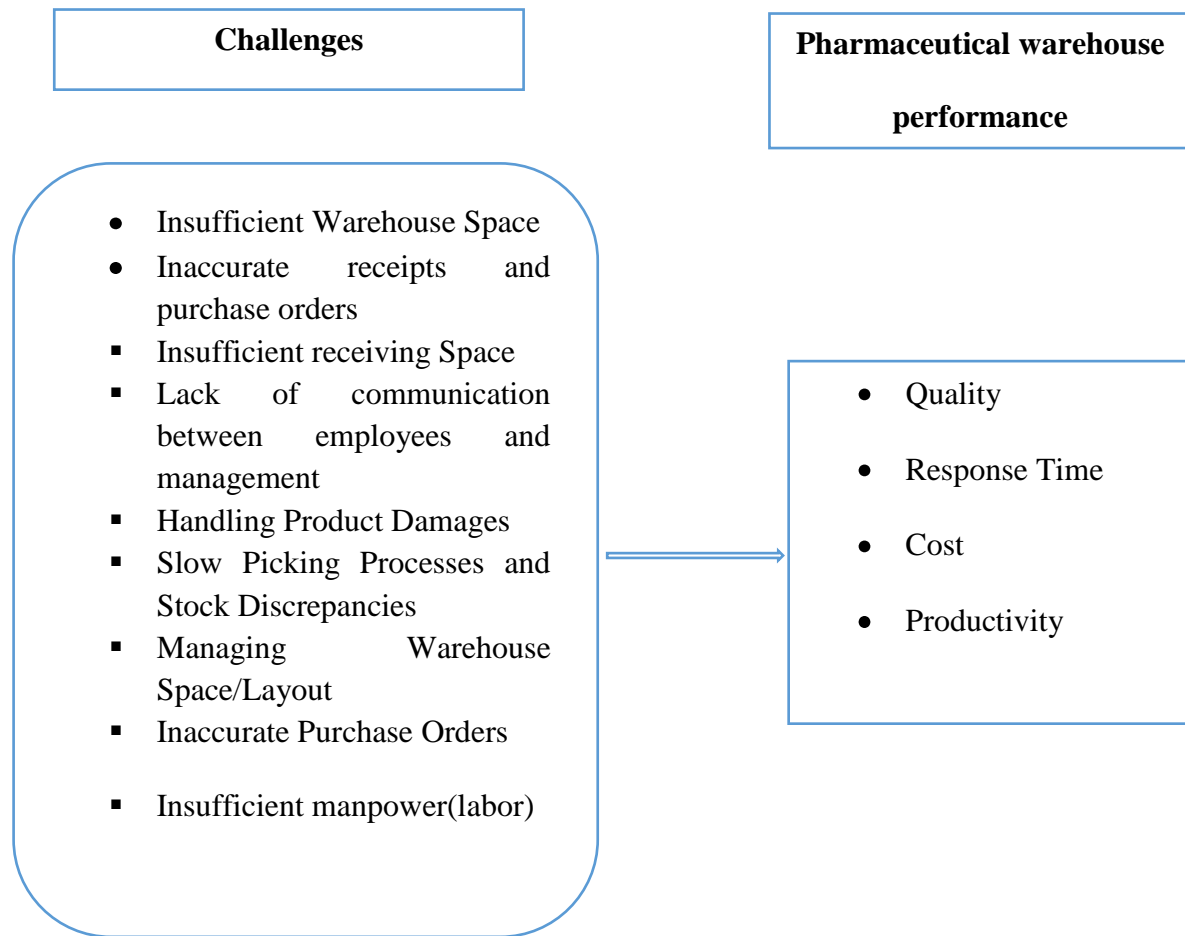
Handling Product Damages

Slow Picking Processes and Stock Discrepancies

Managing Warehouse Space/Layout

Inaccurate Purchase Orders

Insufficient manpower



Source: Prepared by the researcher, by making some modification from Endaykiros (2019).

## CHAPTER THREE

### RESEARCH DESIGN AND METHODOLOGY

#### 3.1 Introduction

In this section, the research approach and design, data type and sources, sampling techniques, data collection instrument and procedures, data processing and analysis parts, and ethical issues are presented below.

#### 3.2 Description of the study area

This study focuses on assessing hospital pharmacies' pharmaceutical warehousing performance and challenges. Particularly, the study was done at the six public hospitals' pharmacy warehouses which are found under Addis Ababa regional health bureau.

The six public hospitals under Addis Ababa regional health bureau are Zewditu memorial hospital, Ras Desta hospital, Minilik hospital, Yekatit 12 hospital, Gandhi hospital, and TiruneshBejing hospital.

#### 3.3 Research design

Kothari (1990) in Nigatu (2018) stated that Research design is a master plan or blueprint which guides how the study will be conducted. Mainly, there are two main approaches to research problems; quantitative and qualitative methods. There is also a mixed approach that involves both qualitative and quantitative research design. This research used a quantitative research approach. Data was collected using a questionnaire. The respondents were shown their extent of agreement and disagreement using the scale.

According to Nigatu (2018), to answer research questions like, "what is/ are?" Or, "how?" descriptive method is pretty much suit. Therefore, this study uses a descriptive research design to assess the challenges of pharmaceutical warehousing performance in hospital pharmacy warehouses under AARHB, analyze the current pharmaceutical warehouse performance, and shows the potential challenges faced by warehouse managers in practicing efficient warehouse management in health facilities.

Tewodros (2016) has explained that the major purpose of descriptive research is explaining the characteristics of the populations as it currently exists

The study utilized cross-sectional in the sense that all relevant data is collected at a single point in time. According to Neuman (1992) Cross-sectional research is most consistent with a descriptive approach to research.

### 3.4 Population and sample

All Pharmacy warehouse managers, pharmacy purchasers, dispensary unit head pharmacies, and pharmacy case team managers are taken to constitute the study population. All public hospitals in AARHB are covered in this study. There are six hospitals in AARHB: Minilik II, Ras Desta, Zewuditu Memorial, Gandhi Memorial, yekatit 12, and Trunesh Beijing hospitals.

Due to the very small number of the target population, which is 53 in number, (As illustrated in table 3.1 below) entire population was taken in the study, rather than sampling from the study population i.e. to conduct census survey. Singh & Masuku (2014) Stated that, for small target population (e.g., 100 or less), a suitable method is census survey.

The table below depicts the number of respondents in public hospitals under Addis Ababa regional health bureau.

Table 3.1 Number of respondents in each hospital

S/ N	Name of Study Population	Head of Pharmacy	Pharmacy warehouse manager	pharmacy purchaser	Pharmacy Dispensary head pharmacies	Total # of Respondent
1	Zewditu Memorial Hospital	1	4	1	5	11
2	Gandhi Memorial Hospital	1	2	1	4	8
3	Yekatit 12 Hospital	1	4	1	4	10
4	Ras Desta Memorial Hospital	1	2	1	4	8
5	Minilik II Memorial Hospital	1	2	1	4	8
6	Tirunesh Beijing Hospital	1	2	1	4	8
<b>Total Number of Respondents</b>						<b>53</b>

Source: Survey Result, 2020

### **3.5 Data source and type**

Data is how our findings are presented in the research. Without which our research can be a waste of time. The data sources for this specific study was primary data that the researcher would get from respondents of the study by the questionnaires.

Kothari (1990) indicated that primary data are those which are collected afresh and for the first time, and thus happen to be original. Questionnaires were distributed for the target respondents identified above to gather detailed information about the performance of warehouse management and the challenges of pharmaceutical warehousing that are found under Addis Ababa regional health bureau hospital pharmacies.

### **3.6 Data collection procedure**

Data was collected, by using questionnaires that aim to gather all the information regarding the study's aim. The questionnaire is designed in a way that enabled to capture the demographic information of respondents and evaluation of pharmaceutical warehouse performance and challenges.

The respondents were requested to respond to the questions based on their knowledge of the warehouse they are working in. The questionnaire is developed based on the research questions so that it can answer those questions as correctly as possible.

As far as the procedure of data collection is concerned, contacts had been initially made to respondents to explain the purpose and nature of the study to achieve the desired response rate. Subsequently, the questionnaire was distributed to and collected physically from the potential respondents at their site by the researcher.

In conclusion, the questionnaires had been pre-tested and modified for reliability and validity before the execution of the survey to make the study more tangible and valuable. Then the developed data collection instrument/questionnaire was disseminated among the respondents, and data gathered from the respondents were analyzed as a result of the study.

#### **3.6.1 Validity**

The validity of the study was checked by pilot study. Validity refers to the extent to which a test measures what wish to measure (Kothari, 1990). A pilot study was conducted and the results had been scrutinized before the actual data collection tool is dispatched to the responders. The

purpose of a pilot study is to identify possible errors in the measurement procedures such as ambiguous instructions, and inadequate time limit given to fill the questionnaire items. It also helps to ensure the understandability of the question items. The researcher collects issues raised by the respondents, and questionnaires were corrected accordingly. Finally, the refined questionnaires were printed and distributed.

### 3.6.2 Reliability

Bhattacharjee (2012) has stated that Reliability is the degree to which the measure of a construct is consistent or dependable. Abdi (2019) also stated that 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. The reliability of the items composing the data gathering elements was checked by using Cronbach's alpha (Cronbach, 1951). The resulting Cronbach's alpha values of the items are presented in the table below.

Table 3. 2 Reliability statistics of the data

Indicators	N of items	Cronbach's Alpha results
Quality Indicators	5	0.887
Financial Indicators	4	0.784
Responsiveness Indicators	3	0.812
Productivity Indicators	5	0.798
Challenges of warehouse management	11	0.865

Source: Survey Result, 2020

The value of the Cronbach's alpha for all measurement constructs of this study is greater than 0.7 as shown in table 3.2 above, which were well above the suggested cut-off value of 0.7 (Cronbach, 1951) Therefore, the values imply that the research instrument is reliable & consistent.

### 3.7 Data analysis

The collected data by the questionnaires were checked for completeness and become ready for the analysis. Descriptive analysis was used like frequencies and percentages to describe the demographic and general information of the respondents. Descriptive data analysis like mean, standard deviation, and percentage was used to analyze the data collected from self-administered

questionnaires. The data was analyzed by statistical packages for social science (SPSS) version 20 software. Finally, the results of the statistical analysis were interpreted and discussion.

### **3.8 Ethical considerations**

The study was approved by the research and ethical committee of the Addis Ababa Regional Health Bureau. Participants from the respective facilities were informed about the purpose of the study, the expected result, and how the result is used. All participants had been informed about their right to refuse or terminate the questionnaire at any point or not answering any question. The information gathered was kept strictly confidential. All data are anonymous; no individual or facility is identified in any reports or any publication based on this study.

## CHAPTER FOUR

### DATA ANALYSIS, RESULT AND DISCUSSION

#### 4.1 Introduction

In this section, the findings of the study which were the results of analysis using data analysis software, SPSS version 20 is discussed. It takes two weeks' to conduct the survey and 48 questionnaires were used for analysis. The resulting response rate was 90.57%

#### 4.2 Response Rate

Table 4.1: Respondents Response Rate

Sample	No	%
No of questionnaire distributed	53	100%
questionnaires Returned	51	96.23%
questionnaires which are Incomplete	3	1.59%
Total questionnaires used	48	90.57%

Source: Survey Result, 2020

As indicated in the previous section of this study, the participants of this study was all Pharmacy warehouse manager, pharmacy purchaser, dispensary unit head pharmacies and pharmacy case team managers. As these staffs are small in number all of them were taken in to participate in the study, in number they were fifty-three (53). 53 questioners were delivered for the respondents and only 48 are filled and respond the questionnaire as per the requirements. However, the rest 3 were rejected as it was not properly filled. Accordingly, the response rate resulted 90.57%. The demographic distribution of the questionnaires response rate has been presented as shown below.

### 4.3. Demographic Information

Table 4.2. Demographic Information of the Respondents

Variable	Choice	Frequency	Percent	Valid percent	Cumulative percent
Age	18-25	5	10.4	10.4	10.4
	26-35	26	54.2	54.2	64.6
	36-45	14	29.2	29.2	93.8
	above 45	3	6.3	6.3	100
	<b>Total</b>	<b>48</b>	<b>100</b>	<b>100</b>	
Sex	Male	27	56.3	56.3	56.3
	Female	21	43.8	43.8	100
	<b>Total</b>	<b>48</b>	<b>100</b>	<b>100</b>	
Educational status	Below college diploma	2	4.2	4.2	4.2
	College diploma	8	16.7	16.7	20.8
	First Degree	33	68.8	68.8	89.6
	Second Degree	5	10.4	10.4	100
	<b>Total</b>	<b>48</b>	<b>100</b>	<b>100</b>	
Years of service	less than 2 years	11	22.9	22.9	22.9
	2 to 5 years	17	35.4	35.4	58.3
	Above 5 years	20	41.7	41.7	100
	<b>Total</b>	<b>48</b>	<b>100</b>	<b>100</b>	

Source: Survey Result, 2020

The data in this section contains age group, gender, educational status and years of service of the respondents. As the age distribution of the respondent data shown on the above table, 10.4% were between the age of 18-25 years, 54.2% were between 36 -45 years and the remaining 6.3% were above 45 years. The calculated data tells most of the respondents of this research were between 26 -35 years this means, AARHB has employed energetic and productive young employees.

As indicated on the abovementioned table, the 56.3% of the respondents were male and 43.7% were females. Regarding their educational background distribution, 68.8% or the majority of the respondents were first degree holders, 16.7% were diploma holders, 10.4% were second degree, and the remaining 4.2% were below college diploma. Hence, from this data we can consider all the respondents can read, understand and respond the questions very well.

As indicated above, the majority of the respondents have above 5 years' experience (41.7%) followed by 2 to 5 years of experience (35.4%) and less than 2 years of experience (22.9%). This implies that, the respondents were worked for years in the hospital pharmacy and can give feedback about the pharmaceutical warehousing performance and challenges.

#### 4.4 Descriptive Analysis

In this section, the gathered data were analyzed in respective of the study objectives aimed to assess pharmaceutical warehouse performance & challenges in public hospitals under AARHB. The weighted average performance of each indicator is also presented on each table for each key performance indicator. An average score of 0.5-1.5 equals, 'very low', 1.5-2.5 equals, 'low', 2.5-3.75 equals 'moderate', 3.75-4.5 equals, 'high' and above 4.5 equals, 'very high' (Bezuayehu, 2018)

##### 4.4.1 The first Research Question

**What is the level of pharmaceutical warehouse performance of public hospitals under Addis Ababa regional health bureau measured in terms of quality indicator?**

Table 4.3 Quality indicator measurement items mean and standard deviation of respondents at Public hospital pharmacy warehouses

Measurement Items (Quality Indicator)	Mean	Standard Deviation
In the warehouse pharmaceuticals are stored properly according to appropriate stock location.	3.37	1.104
Most of the time our warehouse has no inventory discrepancies when bin cards were compared to a physical stock count.	3.44	0.987
products are properly sorted in our warehouse	2.98	1.194
In the warehouse, pharmaceuticals are picked accurately (i.e., the correct items and quantities) from storage based on a request.	3.54	0.988
Most of the time accidents are not occurred like physical accident on daily laborers, warehouse personnel, and also on equipment's	3.75	0.978
<b>Weighted average performance of quality Indicator</b>	<b>3.42</b>	<b>1.051</b>

Source: Survey Result, 2020

#### 4.4.1.1 Perception of Respondents' on Quality Indicator

As shown on the above table, there are five measurement items of quality indicators. The calculated mean values of the measurement items were between 2.98 and 3.75. The calculated standard deviation were between 0.97 and 1.19. The calculated mean value for items are properly sorted in our warehouse in the way that avoids the risk of spoilage or damage was 2.98 which is the lowest mean among the five measurement items. Pharmaceuticals are stored properly according to the appropriate bin location is in the second place. warehouse has no inventory discrepancies when bin cards were compared to a physical stock count and pharmaceuticals are picked accurately from storage based on a request has got a very comparably close mean values of 3.44 and 3.54 respectively; while warehouse accidents rate comes last in the ascending order. Overall, the average value for quality indicators was calculated with a mean value of 3.42 and with a standard deviation of 1.051. The AARHB hospital pharmacy warehouse performance with regard to quality indicators can be taken as moderate.

#### 4.4.2 The second research question

**What is the level of pharmaceutical warehouse performance of public hospitals under Addis Ababa regional health bureau measured in terms of responsiveness indicator?**

Table 4.4 Responsiveness Indicator measurement items mean and standard deviation at public hospitals of pharmacy warehouses.

<b>Measurement Items ( Response Time Indicator )</b>	<b>Mean</b>	<b>Standard Deviation</b>
The warehouse manager serve our customer on the reasonable time i.e. the amount of time it takes from an order is received at the storage facility until the time the order is actually transported to the client.	3.54	0.967
The warehouse manager is informed of the pharmaceutical products being procured before arrival to warehouse so that unloading time is reduced.	3.37	1.214
The warehouse personnel serve our supplier on thereasonable time	3.44	1.147
<b>Weighted average performance for Responsiveness indicators</b>	<b>3.45</b>	<b>1.117</b>

Source: Survey Result, 2020

#### 4.4.2.1 Perception of Respondents' on Response Time Indicator

As shown on the above table, there are three measurement items of response time indicators. The calculated mean values of the measurement items were between 3.37 and 3.54. The standard deviation was calculated between 0.96 and 1.21. The calculated mean value for informing the warehouse manager of the pharmaceutical products being procured before arrival to the warehouse to decrease the unloading time was 3.37 which is the lowest mean value among the three measurement items. The scores of the scale of responsiveness indicator in a public health facility pharmacy warehouses for the warehouse manager is informed of the items being procured before arrival to the warehouse to reduce unloading time, the warehouse personnel serves suppliers on time and the warehouse manager serves customer on time was found with very comparably close mean values of 3.37, 3.44 and 3.54 respectively. The weighted average value of responsiveness indicators on pharmaceutical warehouse performance was calculated with a mean value of 3.42 and a standard deviation of 1.117. The result indicates that the perception of the respondents on the pharmaceutical warehouse performance of the hospital pharmacy warehouses on responsiveness indicator was moderate

#### 4.4.3 The third research question

**What is the level of pharmaceutical warehouse performance of public hospitals under Addis Ababa regional health bureau measured in terms of cost/financial indicator?**

Table 4.5 Cost/financial indicator measurement items mean and standard deviation of public hospitals pharmacy warehouses

<b>Measurement Items ( Financial Indicator )</b>	<b>Mean</b>	<b>Standard Deviation</b>
Most of the time our warehouse personnel utilizes a reasonable warehouse spaces during the reception of goods.	3.48	0.825
We are effective in minimize total product damage/expired in the warehouse like product breakage, leakage, deterioration etc	3.40	0.917
There is a procedure for disposal of pharmaceuticals being surplus or isolated for disposal.	2.96	1.220
Most of the time pharmaceuticals are consolidated for full truck load capacity.	2.69	1.133
<b>Weighted average performance for Cost\Financial indicators</b>	<b>3.13</b>	<b>1.024</b>

Source: Survey Result, 2020

#### 4.4.3.1 Perception of Respondents' on Financial Indicator

As shown on the above table, there are four measurement items of financial indicators which are utilizing a reasonable warehouse space, expiry/damage of pharmaceuticals, availability of procedure for the disposal of pharmaceuticals and consolidating products for full truckload capacity. The calculated mean value of the items were 3.48, 3.40, 2.96 and 2.69 with Standard deviations of 0.825, 0.917, 1.220 and 1.133 respectively. The largest mean value was observed in utilizing a reasonable warehouse space. Respondents believe that warehouse personnel utilizes a reasonable warehouse space during the reception of pharmaceuticals. The smallest mean was observed in consolidating items for full truckload capacity. Respondents believe that orders are not consolidated for full truckload capacity. The weighted average values for the financial indicator were calculated with a mean value of 3.13 and a standard deviation of 1.024. The average result shows that pharmaceutical warehouse performance on the financial indicator of public health facilities was moderate.

#### 4.4.4 The fourth research question

**What is the level of pharmaceutical warehouse performance of public hospitals under Addis Ababa regional health bureau measured in terms of productivity indicator?**

Table 4.6 Productivity indicator measurement items mean and standard deviation of public hospital pharmacy warehouse.

<b>Measurement Items (productivity indicator)</b>	<b>Mean</b>	<b>Standard Deviation</b>
The warehouse is using its space efficiently and so that it stored the line of items as it should store	2.73	1.300
Most of the time our daily laborer are not idle	3.46	1.010
There is appropriate office setup in a warehouse for warehouse workers	2.48	1.203
Most of the time our warehouse manager's work hard in reduction of stock out	3.31	0.993
Most of the time our warehouse personnel uses a reasonable warehouse spaces for product handling	3.38	0.914
<b>Weighted average performance for productivity indicators</b>	<b>3.07</b>	<b>1.082</b>

Source: Survey Result, 2020

#### **4.4.4.1 Perception of Respondents' on Productivity Indicator**

As shown on the above table, there are five measurement items of productivity indicators. The calculated mean values for the measurement items were between 2.48 and 3.46. The standard deviation was calculated between 0.914 and 1.300. Having an appropriate office set up in a warehouse for employees and using warehouse space efficiently has a mean value of 2.48 and 2.73 respectively. The score of the warehouse manager's work hard in a reduction of stock out and space utilization for product handling has relatively close mean values of 3.31 and 3.38 detailed on the above result table. The maximum mean value is registered in the case of units moved per person hour.

The weighted average values for the productivity indicator were calculated with a mean value of 3.07 and a standard deviation of 1.082. The average result shows that pharmaceutical warehouse performance on productivity indicators of hospital pharmacy was moderate.

#### **Performance of AARHB hospital pharmacy warehouses with regard to the key performance indicators**

The finding of the study shows that; from the questionnaire, each respondents' insight varies on the four key performance indicators on pharmaceutical warehouse. Accordingly, AARHB hospital pharmacy warehouses' overall performance was rated moderate.

From the finding of the study, the four key performance indicators can be ordered based on the weighted average mean value from the smallest to the largest as productivity indicator, cost/financial indicator, quality indicator, responsiveness indicator.

#### **4.4.5 The fifth Research Question**

##### **What are the major challenges faced by warehouse managers in practicing efficient warehouse management?**

As a fifth objective, the researcher sought to determine the challenges faced by AARHB hospital pharmacy warehouses in practicing warehousing activities. The results are discussed in the tables below:

**Table 4.7 warehouse design**

The layout of the warehouse is inconvenient for practicing efficient warehouse management

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
<b>Valid</b>	Strongly Disagree	2	4.2	4.2	4.2
	Disagree	8	16.7	16.7	20.8
	Neutral	7	14.6	14.6	35.4
	Agree	18	37.5	37.5	72.9
	Strongly Agree	13	27.1	27.1	100.0
	<b>Total</b>		<b>48</b>	<b>100.0</b>	<b>100.0</b>

Under table 4.7 the respondents were asked to reveal their level of agreement on; **the design of the warehouse makes inconvenient for practicing efficient warehouse management.** In connection to this, their response shows as, 2 (4.2%), 8(16.7%), 7(14.6%), 18(37.5%) and 13(27.1%) responded that strongly disagree, disagree, neutral, agree and strongly agree with the idea respectively. When we sum up these results 10(20.9%) respondents disagree and 31 (64.6%) respondents agree with the idea, hence, most of the respondents agree with the layout of the warehouse is inconvenient for practicing efficient warehouse management.

**Table 4.8 Availability of pallets & shelves**

In the warehouse spaces availability including pallets & shelves to store pharmaceuticals is insufficient and damage of items due to space unavailability is maximum.

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
<b>Valid</b>	Strongly Disagree	7	14.6	14.6	14.6
	Disagree	20	41.7	41.7	56.3
	Agree	15	31.3	31.3	87.5
	Strongly Agree	6	12.5	12.5	100.0
	<b>Total</b>		<b>48</b>	<b>100.0</b>	<b>100.0</b>

Under table 4.8 the respondents were asked to reveal their level of agreement on; **the availability**

**Of spaces including pallets & shelves to store pharmaceuticals is insufficient.**In connection to this, their response shows as, 7 respondents (14.6%), 20(41.7%), 15(31.3%), and 6(12.5%) responded that strongly disagree, disagree, agree, and strongly agree with the idea respectively. When we sum up these results 27(56.3%) respondents disagree and 21(43.8%) respondents agree with the idea, hence, most of the respondents disagree with the space including pallets&shelves to store pharmaceuticals is insufficient.

**Table 4.9 Stock accuracy**

The warehouse has a problem of stock inaccuracy (due to miscount due to human error, miswritten, misread, mixed up goods and inaccurate purchase order)

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>valid</b>	Strongly Disagree	9	18.8	18.8	18.8
	Disagree	20	41.7	41.7	60.4
	Neutral	7	14.6	14.6	75.0
	Agree	8	16.7	16.7	91.7
	Strongly Agree	4	8.3	8.3	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

As illustrated on the table above; the respondents provide their level of agreement to; **having a problem of stock inaccuracy in the warehouse.** Accordingly, 9(18.8%) respondents strongly disagree with the idea, 20(41.7%) of the respondents disagree with the idea, 7(14.6%) of the respondents stay neutral. 8(16.7%) and 4(8.3%) respondents agree and strongly agree with the idea respectively. Hence, the majority of the respondents 29(60.4%) disagree with having a problem with stock inaccuracy in the warehouse.

**Table 4.10 communication between management and employees**

There is weak communication between employees of the warehouse, across the warehouse and the hospitals top managers.

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	Strongly Disagree	5	10.4	10.4	10.4
	Disagree	10	20.8	20.8	31.3
	Neutral	8	16.7	16.7	47.9
	Agree	21	43.8	43.8	91.7
	Strongly Agree	4	8.3	8.3	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

Under table 4.10, respondents asked to show their level of agreement regarding; **there is weak communication between employees of the warehouse, across the warehouse, and the hospital’s top managers.** Therefore, their response indicates, 5 respondents (10.4%) strongly disagree and 10 respondents (20.8%) disagree with the idea and 8 respondents (16.7%) remain neutral. However, 21 respondents (43.8%) and 4 respondents (8.3%) agree and strongly agree with the idea respectively. In aggregate 25 respondents (52.1%) as there is weak communication between employees of the warehouse, across the warehouse, and the hospital’s top managers.

**Table 4.11 training**

There is a lack of appropriate & necessary training’s related to warehousing activity to warehouse employees.

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	Disagree	8	16.7	16.7	16.7
	Neutral	5	10.4	10.4	27.1
	Agree	24	50.0	50.0	77.1
	Strongly Agree	11	22.9	22.9	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

To inquire of **Lack of appropriate & necessary training's related to warehousing activity to warehouse employees**, the respondents share their feeling as; 8 respondents (16.7%) disagree with the idea and 5(10.4%) remain neutral; while 24(50.0%) and 11(22.9%) respondents agree and strongly agree with the idea respectively. Therefore, this tells us that most of the respondents 35(72.9%) agree with there is a Lack of appropriate & necessary training's related to warehousing activity to warehouse employees

**Table 4.12 Skill of employees**

There is a lack of skilled manpower in the warehouse to perform warehouse activities properly

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
<b>Valid</b>	Strongly Disagree	12	25.0	25.0	25.0
	Disagree	21	43.8	43.8	68.8
	Neutral	3	6.3	6.3	75.0
	Agree	9	18.8	18.8	93.8
	Strongly Agree	3	6.3	6.3	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

Table 4.12, asks **whether the warehouse is operated by skilled employees**. The response shows as; 12 respondents (25.0%) strongly disagree, 21(43.8%) disagree, and 3(6.3%) neutral. On the contrary, 9 respondents (18.8%) agree and 3(6.3%) strongly agree with the idea. Hence, most of the Respondents 33(68.8%) disagree with the enquire of lack of skilled manpower in the warehouse to perform warehouse activities properly

**Table 4.13 using automated system for warehouse activities**

There is no well-developed technology for warehouse inventory control

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
<b>Valid</b>	Disagree	9	18.8	18.8	18.8
	Neutral	4	8.3	8.3	27.1
	Agree	22	45.8	45.8	72.9
	Strongly Agree	13	27.1	27.1	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

Respondents asked to show their level of agreement on; **no well-developed technology for warehouse inventory control**. Consequently, the result shows, 9 respondents (18.8%) disagree & 4 respondents (8.3%) remain neutral. Though, 22(45.8%) and 13(27.1%) respond agree and strongly agree. This shows the majority of the respondents 35(72.9%) reply as agree on the idea.

**Table 4.14 space to load items**

In the warehouse there is insufficient space/area to load the items.

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>valid</b>	Strongly Disagree	5	10.4	10.4	10.4
	Disagree	9	18.8	18.8	29.2
	Neutral	6	12.5	12.5	41.7
	Agree	23	47.9	47.9	89.6
	Strongly Agree	5	10.4	10.4	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

Regarding **having insufficient space/area to load the items**; on the above table 4.14, the respondents provide their level of agreement as follows. 5(10.4%) & 9(18.8%) respondents strongly disagree and disagree respectively. Though, 23(47.9%) agree and 5(10.4%) strongly agree, the rest 6respondents (12.5%) remains neutral. As an aggregate, 28 respondents (58.3%) agree with having insufficient space/area in the warehouse to load the items.

**Table 4.15 Regular physical count**

Regular physical count is not conducted on time.

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	Strongly Disagree	8	16.7	16.7	16.7
	Disagree	19	39.6	39.6	56.3
	Neutral	4	8.3	8.3	64.6
	Agree	11	22.9	22.9	87.5
	Strongly Agree	6	12.5	12.5	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

Table 4.15, the respondents were asked to express their feeling on the inquiry of; **not conducting regular physical count on time in the warehouse.** Therefore, the response shows 8 respondents (16.7%) strongly disagree with the idea and 19(39.6%) disagreed, and 4(8.3%) respondents remain neutral. Though, 11(22.9%) & 6(12.5%) respondents agreed and strongly agreed. Hence, the majority of the respondents 27(56.3%) disagree with the idea.

**Table 4.16 having procedure for disposal of expired/damaged items**

There is no procedure for disposal of expired and damaged items from inventory.

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>valid</b>	Disagree	21	43.8	43.8	43.8
	Neutral	5	10.4	10.4	54.2
	Agree	18	37.5	37.5	91.7
	Strongly Agree	4	8.3	8.3	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

Table 4.16, tries to show the respondent’s level of agreement on; **Absence of procedure for disposal of expired and damaged items from inventory.** Their response indicates 21 respondents (43.8%) disagree and 5(10.4%) remain neutral with the idea. On the other hand, 18 respondents (37.5%) agree and 4(8.3%) strongly agree. As a result, most of the respondents 22(45.8%) agrees with the idea

**Table 4.17 labor person**

In the warehouse there is insufficient man power to do the loading of pharmaceuticals.

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	Strongly Disagree	2	4.2	4.2	4.2
	Disagree	5	10.4	10.4	14.6
	Neutral	5	10.4	10.4	25.0
	Agree	19	39.6	39.6	64.6
	Strongly Agree	17	35.4	35.4	100.0
	<b>Total</b>	<b>48</b>	<b>100.0</b>	<b>100.0</b>	

As indicated in table 4.17 the respondents show their level of agreement on; **in the warehouse, there is insufficient manpower to do the loading of pharmaceuticals.** Hence, their response specifies as, 2 respondents (4.2%) strongly disagree and 5(10.4%) disagree with the idea. Still, other respondents show their level of agreement as 19 respondents (39.6%) agree & 17 respondents (35.4) strongly agree with the idea. The rest remains neutral. As a result, the dominant number inclined to agree with the idea; most of the respondents 36(75%) agree with the availability of insufficient workers to do the loading.

#### **4.4.6The sixth research question**

**Which key performance indicator mostly affects the warehouse performance of Public hospital pharmacy warehouses under Addis Ababa regional health bureau from the perspective of the employees?**

Table 4.18 Warehouse performance indicator.

<b>Choice</b>	<b>Frequency</b>	<b>Percent</b>
Quality Indicator	15	31.3 %
Response Time Indicator	11	22.9 %
Financial Indicator	13	27.1 %
Productivity Indicator	6	12.5 %
All	3	6.3 %
<b>Total</b>	<b>48</b>	<b>100%</b>

Source: Survey Result, 2020

As can be seen from the table above the majority of the responses is taken by quality indicator registering 15(31.3%), the second response is taken by financial indicator registering 13(27.1%), followed by time indicator with the response rate of 11 (22.9%) and productivity indicator with the response rate of 6(12.5%) respectively. Three respondents responded that all the indicators equally affect pharmaceutical warehouse performance. This shows that most of the respondents agree on the quality indicator to be vital. So, attention should be given to this indicator. Financial and response time indicators are also rated as relatively important. However, for productivity indicators, they have less expectations.

## CHAPTER FIVE

### SUMMARY, CONCLUSION & RECOMMENDATION

#### 5.1 Introduction

This final chapter presents a summary of the basic findings of the study as well as the conclusions, and recommendations

#### 5.2. Summary of Findings

The purpose of this study was to conduct an assessment of pharmaceutical warehouse performance and challenges in hospital pharmacies which are found under Addis Ababa regional health bureau. Based on the analysis of the data, the following major findings were summarized as follows:

For AARHB hospitals, 53 questioners were delivered for the respondents and only 48 were filled and respond the questionnaire as per the requirements. Accordingly, the calculated response rate was 90.57%. From the demographic distribution of respondents, male respondents were 56.3% and female respondents were 43.8. 68.8% of the respondents were first degree holders. Respondents who served two years and above were 77.1%. This shows most of the respondents were professionals and had relatively better information on the subject matter. Namely, on the pharmaceutical warehouse performance and challenges.

The first research question of this study was, to analyze the pharmaceutical warehouse performance of public health facilities regarding quality dimension. The average value for quality indicators was calculated with a mean value of 3.42 and with a standard deviation of 1.051.

The second research question of this study was, to analyze the pharmaceutical warehouse performance of public health facilities regarding responsiveness dimension. The weighted average value of responsiveness indicators on pharmaceutical warehouse performance was calculated with a mean value of 3.42 and a standard deviation of 1.117.

The third research question of this study was, to analyze the pharmaceutical warehouse performance of public health facilities regarding financial dimension. The weighted average

values for the financial indicator were calculated with a mean value of 3.13 and a standard deviation of 1.024.

The fourth research question of this study was, to analyze the pharmaceutical warehouse performance of public health facilities regarding productivity dimension. The weighted average values for the productivity indicator were calculated with a mean value of 3.07 and a standard deviation of 1.082.

The fifth research question of the study was, to identify the major challenges faced by warehouse managers in practicing efficient warehouse management. Accordingly, while performing the warehouse activities there are many potential challenges. Based on the data analysis, the following major findings were mentioned:

The majority of the respondents (64.6%) indicates that the design/layout of the pharmaceutical warehouses are uncomfortable for performing warehouse activities.

52.1% of the respondents mentioned that in the hospitals there is weak communication between employees of the warehouse, across the warehouse, and the hospital's top managers.

Among the total respondents, 72.9% of them have noticed there is a Lack of appropriate & necessary training's related to warehousing activity to warehouse employees that will help them to improve their performance

58.3% of the respondents mentioned there is insufficient space/area in the warehouse to load the items.

72.9% of the respondents indicate that the hospitals have no well-developed technology for warehouse inventory control

45.8% of the respondents mentioned there is no procedure for disposal of expired and damaged items from inventory.

From the total respondents, 75% of the respondents are indicated there is insufficient manpower (laborer) to do the loading of pharmaceuticals.

The last objective of the study was to determine which key performance indicator mostly affects the warehouse performance according to the employees. The result shows that 31.3% of

respondents believed that quality indicator seems to be the most valuable and high attention should be given for this indicator.

### **5.3 Conclusions**

The aim of this research is to investigate the pharmaceutical warehousing performance and challenges in hospitals that are registered under AARHB. As the findings are articulated on the above section, the following conclusions are drawn.

The average mean values of the key performance indicators namely response time, financial, productivity, and quality indicators have shown that Addis Ababa regional health bureau hospital pharmacy warehouses exert lower efforts in productivity and financial indicator of pharmaceutical warehouse performance. Their reflection in evaluating quality indicator as shown by the average mean value, shows that only average effort have been exerted by hospitals in improving pharmaceutical warehouse performance. Moreover, Response time dimension was rated as moderate, and slight above in improving the performance of their pharmaceutical warehouses.

Overall, the study concludes that the pharmaceutical warehouse performance of the public hospital pharmacies' is moderate regarding financial, responsiveness, quality, and productivity indicators.

The research concludes that major challenges are Inconvenience of the design/layout of the pharmaceutical warehouse for performing warehouse activities like easily moving of products to access/pass, free from damaging items, and uncomfortable to load and unload pharmaceuticals. The warehouse layout design is a highly important factor in creating an effective warehouse performance. Besides, there is insufficient space/area in the warehouse to load the items.

There is a problem of providing appropriate & necessary, training related to Warehousing activity to employees. It was found that staff working at the warehouses need better training to improve services in their operations.

Technological factors affect pharmaceutical warehouse performance in hospitals. It is found that hospitals have no well-developed technology for warehouse inventory control. Most activities in the warehouse are found to be manual.

The result shows there is weak communication between employees of the warehouse, across the warehouse, and the hospital's top managers. Besides the hospitals have no procedure for disposal of expired and damaged items from inventory. There is also no enough manpower to do the loading/unloading of pharmaceuticals.

The result shows that most respondents agree on the quality indicator to be vital. Cost/financial and response time indicators are also rated as relatively important. However, for productivity indicators, respondents have less expectations.

#### **5.4 Recommendations**

Based on the summary of findings from the research and conclusions drawn, the researcher suggests the following recommendations.

AARHB should sustain the strength shown on response time indicator and give attention to this indicator to enhance the performance of their warehouses

It is recommended that AARHB hospitals should focus on financial and productivity indicators, to achieve substantial cost savings from reduced total cost of warehousing and improved efficiency.

The hospitals' higher management should assess the current pharmaceutical warehouse layout/design to use the entire warehouse space as efficiently as possible, and to solve the space problem in the warehouse.

Most activities in the warehouse perform manually, this may result in some errors, and some delay while performing day-to-day activities in the warehouse. Lack of warehouse management system and way of performing warehousing activity manually may result in the de-motivation of the employees. An important way to improve warehouse management is by investing in information technology for the warehouse. Therefore, the use of technology will affect efficiency, product availability, and customer satisfaction outcomes positively.

The result of the assessment shown, there are expired and damaged products in the storage space of the warehouse. So, the hospitals should avail disposal procedures and plan for regularly separating expired and damaged items from usable inventory, and later, they can be disposed

according to the established guidelines. Besides, for the sake of safeguarding the products, enough labor shall be available to appropriately load and unload pharmaceuticals

The researcher recommends that the management should constantly expose its staff to training related to information technology, warehouse practice, and warehouse management, and so on to improve their skills in warehousing. Thus, the performance & productivity of employees will be improved.

The hospitals' higher management should plan to visit the warehouses on a certain period interval and gather information from employees, then work on challenges that are identified to improve pharmaceutical warehousing performance.

The hospitals' should give hierarchy to each of the performance indicators of the pharmaceutical warehouse and give attention to dimension's which contribute a lot in improving performance.

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## **Appendix: Questionnaire**

### **QUESTIONNAIRE**

#### **ADDIS ABABA UNIVERSITY**

#### **SCHOOL OF GRADUATE STUDIES**

#### **LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

Dear respondents:

My name is Lidiya Alemu. I am a graduate student at Addis Ababa university school of commerce. I am doing a research on 'Assessment of pharmaceutical warehouse performance and challenges in hospital pharmacies registered under AddisAbaba regional health bureau for my study on MA in Logistics and supply chain management.

The purpose of the study is to collect data for the above stated study. I generously asks u to fill my questionnaires' by taking some minutes. The information you give will stay confidential and I assure u that it is used only for the academic use.

Thank you in advance!

#### **Note:**

- You are not expected to mention your name
- You are expected to Show your answer with the check mark (✓) in the space provided.
- Please contact me if u need any clarification by my personal phone +251910058027 or email:lidiyalemu@gmail.com

**Part one: respondents' general information**

1. Age:     18-25 years       26-35 years     36-45 years       above 45 years
2. Sex:       Male                       Female
3. Educational Qualification:
  - Below college diploma       College diploma       First Degree (BSc, BA)
  - Second Degree (MSc, MA)
4. Your current working position: \_\_\_\_\_
5. Years of service in your current position:
  - less than 2 years                       2 to 5 years                       Above 5 years

**Part two: Main Questionnaire**

Please read the items below and show your choice by placing a mark (√) on the proper cell. **1 stands for Strongly Disagree, 2 stands for Disagree, 3 stands for Neutral, 4 stands for Agree, 5 stands for Strongly Agree.**

You are kindly requested to show your view to the following statements regarding the indicators of warehouse performance and challenges in your hospital warehouse.

No	Measurement Items	Score				
		1	2	3	4	5
<b>Quality Indicator</b>						
1	In the warehouse pharmaceuticals are stored properly according to appropriate bin site.					
2	Most of the time our warehouse has no inventory discrepancies when bin cards were compared to a physical stock count.					
3	Products are properly sorted in our warehouse					
4	In the warehouse, pharmaceuticals are picked accurately (i.e., the correct items and quantities) from storage based on a request.					

5	Most of the time accidents are not occurred like physical accident on daily laborers, warehouse personnel, and also on equipment's					
<b>Response Time Indicator</b>						
6	Most of the time our warehouse personnel serve our customer on the reasonable time i.e. the amount of time it takes from an order is received at the storage facility until the time the order is actually transported to the client.					
7	The warehouse manager is informed of the pharmaceutical products being procured before arrival to warehouse so that unloading time is reduced.					
8	Most of the time our warehouse personnel serve our supplier on the reasonable time					
<b>Cost/Financial Indicator</b>						
9	Most of the time our warehouse personnel utilizes a reasonable warehouse spaces during the reception of goods.					
10	We are effective in minimize total product damage/expired in the warehouse like product breakage, leakage, deterioration etc					
11	There is a procedure for disposal of pharmaceuticals being surplus or isolated for disposal.					
12	Most of the time pharmaceuticals are consolidated for full truck load capacity.					
<b>Productivity Indicator</b>						
13	The warehouse is using its space efficiently and so that it stored the line of items as it should store.					

14	Most of the time our daily laborer are not idle					
15	There is appropriate office setup in a warehouse for warehouse workers.					
16	Most of the time our warehouse manager's work hard in reduction of stock out.					
17	Most of the time our warehouse personnel uses a reasonable warehouse spaces for product					
<b>Challenges of warehouse management</b>						
18	The layout of the warehouse is inconvenient for practicing efficient warehouse management					
19	In the warehouse spaces availability including pallets & shelves to store pharmaceuticals is insufficient and damage of items due to space unavailability is maximum					
20	The warehouse has a problem of stock inaccuracy (due to miscount due to human error, miswritten, misread, mixed up goods and inaccurate purchase orders).					
21	There is weak communication between employees of the warehouse, across the warehouse and the hospitals top managers.					
22	There is Lack of appropriate & necessary training's related to warehousing activity to warehouse employees					
23	There is lack of skilled manpower in the warehouse to perform warehouse activities properly					
24	There is no well-developed technology for warehouse inventory control					
25	In the warehouse there is insufficient space/area to load the items.					

26	Regular physical count is not conducted on time					
27	There is no procedure for disposal of expired and damaged items from inventory					
28	In the warehouse there is insufficient man power to do the loading of pharmaceuticals					

29. Which key performance indicator do you believe mostly affects pharmaceutical warehouse performance

- A. Response Time Indicator                      B. Quality Indicator  
C. Productivity Indicator                      D. Cost/Financial Indicator                      E. All

30. What are the overall current challenges facing in doing warehousing activities in the public health facilities?

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**Thank you!**