ANALYSIS OF PHARMACEUTICALS SUPPLY CHAIN MANAGEMENT PRACTICES AND CHALLENGES - THE CASE OF ETHIOPIAN PHARMACEUTICALS SUPPLY AGENCY NEKEMTE BRANCH

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DECEMBER 2021

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL COMMERCE
LOGISTICS AND SUPPLY CHAIN MANAGEMENT UNIT

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

DECEMBER 2021
ADDIS ABABA, ETHIOPIA

Declaration

I, Edosa Emiru declare that a thesis entitled with **"*Analysis of Pharmaceuticals Supply Chain Management Practices and Challenges – the case of Ethiopian Pharmaceuticals Supply Agency Nekemte Branch***" is my original research work and have never been submitted to any other university for any Degree. I also declare that all the resources used under this research has been acknowledged clearly.

Declared By: Edosa Emiru

Date: _____

Signature_____

Statement of Certification

This is to certify research undertaken by Edosa Emiru under my advice entitled with ***"Analysis of Pharmaceuticals Supply Chain Management Practices and Challenges – the Case of Ethiopian Pharmaceuticals Supply Agency Nekemte Branch"*** submitted to the Addis Ababa University, School of Commerce in partial fulfillment of the requirements for the Degree of Master of Arts in Logistics and Supply Chain Management complies with the regulations of the Addis Ababa University and meets the accepted standards with respect to originality and quality.

Name: Busha Temesgen (PhD)

Signature: _____

Date: _____

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Acknowledgements

First and foremost, I want to thank my God for His kindness and grace for giving me this chance of academic achievement. I would also like to extend my sincere appreciation to my adviser Dr. Busha Temesgen for his continuous support and encouragement to complete this research.

I would also like to thank my wife and children for their support and patience during my long time stay working for this thesis work.

I further extend my special thanks to all colleague at workplace and colleague students at the university who shared me their time, knowledge, and effort in assisting for the completion of this thesis. Without their tireless support and encouragement this thesis wouldn't have been a reality.

Finally, I would also like to thank Ethiopian Pharmaceuticals Supply Agency Nekemte branch staffs who gave their time and provided their valuable information during their participation on the research. Moreover, my heartfelt thanks go to everyone that has contributed to this thesis directly or indirectly.

List of Acronyms and Abbreviations

CSCMP- Council of Supply Chain Management Professionals

EPSA- Ethiopian Pharmaceuticals Supply Agency

FEFO- First to Expire First Out

HR- Human Resource

HRH- Human Resource for Health

IPLS- Integrated Pharmaceuticals Logistics System

IT- Information Technology

JSI – John Snow Inc.

MSH- Management Science for Health

NPPL- National Pharmaceuticals Procurement List

PFSA- Pharmaceuticals Fund and Supply Agency

PLMP- Pharmaceuticals Logistics Master Plan

RRF- Report and Requisition Form

SC- Supply Chain

SCM- Supply Chain Management

SOP- Standard Operating Procedure

VMI- Vendor Managed Inventory

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Abstract

This study was conducted to identify pharmaceuticals supply chain management practices and challenges at Ethiopian Pharmaceuticals Supply Agency Nekemte branch. Descriptive study design with mixed research approach was employed. The data was collected from 60 staffs of Nekemte branch using structured questionnaire. Then, the data was analyzed using descriptive statistics and Kendall's W Test was also conducted. The results were presented by charts and tables. Analysis of the data collected from respondents shows that: inventory management practice includes conducting physical inventory of pharmaceuticals at least once per year; the proper use of stock keeping logistics forms; availability and well documentation of pharmaceuticals procurement list, and implementation of electronic inventory management system. Availability of special storage area for cold chain items; availability of enough storage space; full functionality of storage equipment; implementation of Standard Operating Procedures were attributes of pharmaceuticals storage management practice. Distribution management practice include availability of enough vehicle and delivery of pharmaceuticals within recommended timeline. Nekemte branch will be benefited from implementation of pharmaceuticals warehouse management practice like regular compliance check of storage equipment; fitting transport vehicles with temperature and humidity monitoring devices; availing more special vehicles for transportation of cold chain items; striving to solve pharmaceuticals supply chain management challenges related to human resource management; working closely with relevant body to solve financial resource related challenges. Improving culture of using available data helps Nekemte branch to use its strong infrastructure for better decision making.

Key Terms*: Pharmaceuticals, Supply Chain Management, Practices, Challenges*

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Supply Chain Management (SCM) is the set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations and at the right time to minimize system wide costs while satisfying service level requirements (Simichi-Levi D., Kaminiski P., and Simichi-Levi E., 2008).

Supply chain management and its practices is becoming a topic high on the international research agenda as well as in practice. New business models based on new ways of designing logistics flows and supply chains have emerged during the past couple of decades. Companies such as Dell and the Spanish apparel retailer Zara are renowned in the global business world for their innovative thinking in logistics and supply chain solutions for reaching their customers. Logistics and logistics innovation are, however, not only about industrial production and products. Recently, firms and organizations from other sectors such as healthcare have started working with SCM practices and programs to increase the flow of production and to improve their service provision. The health care industry is undergoing major revolutions as far as supply chain management is concerned in both developed and developing countries (Su *et al*., 2009).

Most reference books such as handbook of supply chain management of pharmaceuticals by MSH (2012) & The Logistics Handbook by JSI (2004, 2006): explain the different SCM Practice (functions) of public health supply chain in almost similar manners. The public health SCM practices in general, pharmaceuticals SCM practices, includes different activities that involve selection of essential commodities/demand management/, procurement, inventory management, storage management, transport management that must be carefully planned and coordinated to ensure the right commodities of acceptable quality get to the right place at the right time so that customers use for diagnosis, treatment, and care when needed.

Workshop by WHO (2006) outlines the difficulties of the medicine supply of African countries; the main challenges being poor information, lack of communication and consumption data, inadequate storage facilities and temperature control systems and a lack of quality assurance procedures.

In Ethiopia about 666 million USD was spent on import of medicinal and pharmaceutical products in 2018. Currently about 85 percent of pharma products consumed in the country are supplied through imports (UNCTAD, 2020). However, there are lack of skills in SCM in pharmaceutical sector; the schools are focused more on clinical skills (Sutton and Kellow, 2010).

This study thus, investigates pharmaceuticals SCM practices and related challenges at Ethiopian Pharmaceuticals Supply Agency (EPSA)Nekemte branch.

The finding of the study assists the management of EPSA Nekemte branch to define its current SCM practices and to identify challenges experienced in the supply chain management of health care commodities in the organization. Policy makers, scholars & academicians may also use the findings of the study.

1.2 Statement of the Problem

In today's world, SCM is a key strategic factor for increasing organizational effectiveness and for better realization of organizational goals. So SCM can achieve the organization goal through enhancing competitiveness, better customer care and by increasing profitability. The era of both globalization of markets and outsourcing has begun, and many companies select supply chain and logistics to manage their operations (Gunasekaran, Patel and Tirtiroglu, 2001).

The integration of supply chain processes can provide an effective means by which costs can be reduced and customer service levels improved. To achieve it, organizations should become part of an extended, integrated supply network can also expect that this will require an infrastructure enabling effective information flows and streamlined logistics (Power, 2005).

The provision of complete health care necessitates the availability of safe, effective, and affordable drugs & related supplies of the required quality, in adequate quantity always. Accordingly, the government of Ethiopia is focusing to increase the availability of essential health commodities, pharmaceuticals, at public health institutions to at least 90 percent according to the five years Pharmaceuticals Supply Transformation Plan (PSTP 2015/16-2019/20) of the Federal Ministry of Health of Ethiopia. One of the ways to achieve this objective is through effective & efficient SCM of those commodities.

However, in Ethiopia there have been numerous complaints on the non-availability of the pharmaceuticals at service delivery points that has been largely blamed on PFSA, the organization mandated to provide these items in government health facilities. There have been numerous complaints from the public health facilities regarding erratic supply of the essential drugs and other medical supplies (PFSA,2012).

Despite this, few study conducted on SCM practice & challenge of institutions involved and no study on EPSA Nekemte branch.

Thus, this study investigates pharmaceuticals SCM practices at EPSA Nekemte branch and the challenges that the organization faces in pharmaceuticals supply chain management. The findings of the study are expected to help EPSA Nekemte branch and other similar institutions in identifying pharmaceuticals SCM practices to be improved and challenges to be solved towards better performance in pharmaceuticals supply chain management and in turn to improve pharmaceuticals availability at service delivery points.

1.3 Objectives

1.3.1 General Objective

The general objective of the research is to assess and analyze pharmaceuticals supply chain management practices and related challenges at Ethiopian Pharmaceuticals Supply Agency Nekemte branch.

1.3.2 Specific Objectives

The specific objectives of the research are:

- To describe pharmaceuticals supply chain management practices in EPSA Nekemte branch in terms of inventory management.
- To determine pharmaceuticals supply chain management practices in EPSA Nekemte branch in terms of storage management.
- To assess pharmaceuticals supply chain management practices in EPSA Nekemte branch in terms of distribution management.
- To identify the human resource challenges of pharmaceutical supply chain management in EPSA Nekemte branch.
- To assess the financial resource challenges of pharmaceutical supply chain management in EPSA Nekemte branch.
- To identify infrastructure related challenges of pharmaceutical supply chain management in EPSA Nekemte branch.

1.4 Research Questions

The study aims to answer the following questions:

i. What the pharmaceuticals supply chain management practices in EPSA Nekemte branch look like in terms of inventory management?
ii. What the pharmaceuticals supply chain management practices in EPSA Nekemte branch look like in terms of storage management?
iii. What the pharmaceuticals supply chain management practices in EPSA Nekemte branch look like in terms of distribution management?
iv. What is human resource related challenges faced by EPSA Nekemte branch?
v. What is financial resource related challenges faced by EPSA Nekemte branch?
vi. What is infrastructure related challenges faced by EPSA Nekemte branch?

1.5 Significance of the Study

Supply chain management is the backbone of healthcare delivery. This arises from the fact that health care is so dependent on the availability of drugs and other medical supplies at the right time and in the right quantities for the management of patients. Lack of the pharmaceutical product at

the point of need often leads to an unnecessary loss of lives which could otherwise have been prevented.

The intention of the study is to assess the current pharmaceuticals SCM practices and related challenges in EPSA Nekemte branch. The effective and efficient implementation of the SCM by such firms will produce core competencies so that they can compete in market and contribute to national health care objectives.

Therefore, the study has practical significance to assess the practice of the SCM as well as the challenges faced in it. The finding of the study assists the management of EPSA Nekemte branch to address the shortcomings in its service delivery; challenges experienced in the supply of health care commodities and provide guidance in the scaling-up of its activities for enhanced service delivery. Policy makers such as the government may find the study very useful in the implementation of policies aimed at achieving effective supply chain management in public organizations. The policy makers may also obtain knowledge of supply chain management dynamics and the responses that are appropriate and specific for both governmental and non-governmental organizations, they may therefore obtain guidance from this study in designing appropriate policies that can ensure effective logistics management especially in the health and medical sector.

The study is also useful to scholars and academicians. It may provide information to potential and current scholars on supply chain management in various organizations and those who wish to use the findings as a basis for further research on supply chain management implementation both in the public and private sector.

1.6 Scope of the Study

The study tried to assess practices and challenges in pharmaceuticals SCM of EPSA Nekemte branch.

As clearly stated in background of the study and literature review parts, the public health SCM practices in general, pharmaceuticals SCM practices, includes different activities that involve

selection of essential commodities/demand management/, procurement, inventory management, storage management, distribution management.

From these SCM practices the study focused only on assessment of pharmaceuticals SCM practices that are applicable at EPSA branches level i.e., practices related to inventory management, storage management, and distribution management. This is because the remaining practices such as selection & quantification (applied at national level and service delivery points, Hospitals & Health Centers, level only) and procurement practice are applied only at national level.

Additionally, the study tried to identify challenges faced in pharmaceuticals SCM of EPSA Nekemte branch in terms of human resource, financial resource, and infrastructure. As per student researcher review of related literatures majority of possible challenges in pharmaceuticals SCM can be categorized under those three categories.

1.7 Limitation of the Study

One of the limitations of the study is, it focused only on the case of EPSA Nekemte Branch i.e., the data was only collected from Nekemte branch due to resources (money and time) constraint. Thus, assessing the practices of other remaining branches and EPSA home office; and detail analyzing of data is needed for further conclusion.

The data was collected using only questionnaire. Therefore, detail depth interview, observations, and focus group discussion with all relevant stakeholders in the sector are also needed.

The study covers only selected pharmaceuticals supply chain management practices and challenges.

1.8 Operational Definition of Terms

- **Bin/stock Card:** A card attached to each site or bin in which individual items of stock are stored to record the receipts, issues, and balances of each item of stock in units.

- **Cold Chain:** is a low temperature-controlled supply chain. It is an uninterrupted series of refrigerated production, storage, and distribution activities, along with associated equipment and logistics, which maintain quality via a desired low-temperature range.
- **Pharmaceuticals:** substance or mixture of substances manufactured, sold, offered for sale, or represented for use in the diagnosis, treatment, mitigation or prevention of disease, abnormal physical state, or the symptoms thereof in man; (and for use in) restoring, correcting, or modifying organic functions in human only. Includes drugs, medicines, chemicals & reagents, and other health care commodities. (Britannica,T. Editors of Encyclopaedia (9 May 2018).
- **Physical Inventory:** is an actual count of the goods in stock.
- **Service Delivery Points:** the end point where the user receives the service those include Hospitals, Health Centers and Clinics.

1.9 Organization of the study

The project paper was organized into five chapters: chapter one contains the introduction part dealing with background of the study, the research problem, objectives of the study, scope, and significance of the study. The second chapter discusses the literature review of the subject matter. In chapter three the research methodologies were presented. In chapter four the results and discussion of the study findings and finally chapter five present the summary major findings, conclusions, and recommended suggestions.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 Theoretical Literature Review

2.1.1 Supply Chain Management (SCM) Defined

Heizer and Render (2011) define SCM as the integration of the activities that procure materials and services, transform them into intermediate goods and final products and deliver them to customers. These activities include purchasing and outsourcing activities, plus many other functions that are important to the relationship with suppliers and distributors. SCM includes determining transportation vendors, credit and cash transfers, suppliers, distributors, warehousing, and forecasting and production information. Also, the Council of Supply Chain Management Professionals (CSCMP, 2021); consider supply chain management encompasses the planning and management of all activities involved in sourcing & procurement and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, SCM integrates supply and demand management within and across companies. Also, some studies expand that SCM encompasses recycling or reuse stated by Baatz cited in Tan (2001).

2.1.2 The Concept and Nature of Pharmaceutical Supply Chain Management

The pharmaceutical supply chain provides the means through which medicines are delivered to patients. Pharmaceuticals are produced by local manufacturers or imported from foreign countries by pharmaceuticals importers; are transferred to wholesale distributors; stocked at health facility stores or retail outlets; dispensed by pharmacies; and ultimately delivered to clients with appropriate information and the patients take the pharmaceuticals accordingly. Pharmaceutical supply chain management spends hundreds of millions of dollars per year. The pharmaceutical supply chain is more complex and more uniformed related to other sectors because it has impacts on human health and requires accuracy in conforming to the patients' need and, they are vital products and availability and accessibility of them are important issues for both companies and governments. It is crucial that drugs be delivered at the right time to the right person in standard conditions. Improper distribution of pharmaceuticals results in negative effects on public health

and client's dissatisfaction and affects companies' goodwill and profits. Pharmaceutical stock outs expose clients to adverse events, and in some cases death (John *et al*. 2015; Nazila ,2015).

The key stakeholders in pharmaceutical supply chain include multiple government agencies, health facilities, drug manufacturers, drug distributors, pharmacies, research organizations, and authorities. Again, there are numerous other organizations, such as insurance companies and healthcare management organizations that further increase the complexity. They have different business objectives which result in managing pharmaceutical supply chain more difficult. And it is stated that the regulatory nature of the industry and numerous merger and acquisitions to acquire more research and development expertise, many pharmaceutical supply networks have grown in an uncontrolled fashion rather than being planned for optimal performance (Kapoor *et al*., 2018).

Jaberidoost stated that the pharmaceutical supply chain should provide medicines in the right quantity, with the acceptable quality, to the right place and customers, at the right time and at affordable price to be consistent with health system's objectives and it should make benefits for its stockholders. Unable to fulfill these criteria results in the deterioration of health service by threatening patients' life (Jaberidoost *et al,* 2013).

2.1.3 Major Activities in the Public Health Supply Chain Practices

Most reference books such as handbook of supply chain management of pharmaceuticals by MSH in (2012) & The Logistics Handbook by JSI (2004, 2006): explain the different SCM Practice (functions) of public health supply chain in almost similar manners. In general, the public health SCM practices involves different activities that must be carefully planned and coordinated to ensure the right commodities of acceptable quality get to the right place at the right time so that customers use for diagnosis, treatment, and care when needed. These include:

2.1.3.1 Selection of Pharmaceuticals:

The foundation for a real time accessibility to drugs and other essential medicines involves selection of drugs based on the evidence or diagnosis, rational utilization, price affordability, optimal resources (monetary and personnel) and a reliable, robust, and self-sustaining supply system (Kolikam, Joshi and Kamathi, 2015). Health facilities must select their pharmaceuticals by

depending on the national list of pharmaceuticals. At national level, a national formulary and therapeutics committee, pharmaceutical board, board of physicians, or other government appointed group may be responsible for pharmaceuticals selection of a particular country. Most countries have developed essential medicine lists patterned on the World Health Organization (WHO) Model List. Products selected for use will impact the logistics system, so the logistics requirements must be considered during the product selection (USAID | DELIVER, 2011). Essential medicines are selected depending on public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness. Careful selection of a limited range of essential medicines results in a higher quality of care, better management of medicines, and more cost-effective use of health resources (WHO, 2002).

Selection starts at national level and cascades to the specific place where the care is to be provided. It involves establishing a list of pharmaceuticals at national and facility levels. Therefore, the list should be developed based on the prevailing health care needs and should address the essential health package of the country. Selection of pharmaceuticals should be an inclusive and participatory process to develop a consensus list. In Ethiopia, product selection is done at the national level by national advisory board and health programs in collaboration with Ethiopian Food and Drug Administration (EFDA). Drug and therapeutics committees (DTCs) develop facility-based formularies (PFSA,2012).

2.1.3.2 Quantification of Pharmaceuticals:

The quantity of selected products must be determined. Quantification is the process of estimating the quantity and cost of the products required for a specific health program (or service), and, to ensure an uninterrupted supply for the program, determining when the products should be procured and distributed (USAID | DELIVER, 2011). Pharmaceuticals' quantification refers to the process of calculating the quantities of specific Pharmaceuticals required for a health program for a given resources available, e.g., for a given budget (Emelia *et al*., 2014).

Quantification could be based on minimum/maximum quantities, where health facilities order medicine up to maximum levels, when drugs reach minimum levels. For quantification it is necessary to recruit dedicated personnel, who train, supervise, and check health workers regarding quantification (Allan, 2013).

Quantification is a critical supply chain management activity that, once the outputs have been produced by the exercise, should drive an interactive process of reviewing and updating the quantification data and assumptions, and recalculating the total commodity requirements and costs to reflect actual service delivery and consumption of commodities, as well as changes in program policies and plans over time (EPSA, 2016).

It is difficult to predict the exact demand for medicines. One of the issues is the availability of accurate data on consumption. However, the lack of standard nomenclature for healthcare products, plus the preferences of clinicians creates further uncertainties (EPSA, 2016).

2.1.3.3 Procurement of pharmaceuticals

After the products are selected, quantity needed and supply plan are known through appropriate forecasting and supply planning, the products need to be procured. This process is to ensure supply plans are met and the available budget is aligned with the commodity overall cost. The procurement shall base on the supply plan. There should also be appropriate procurement methods in place to ensure continuous availability and improve cost efficiency. In procurement adherence to the procurement regulations and directives is key likewise clients' management and relationship (John Snow Inc. /DELIVER, 2004).

The quantified pharmaceuticals must be procured by coinciding with the available budgets. Health systems or programs can procure from international, regional, or local sources of supply; or they can use a procurement agent for this logistics activity. In any case, procurement should follow a set of specific procedures that ensure an open and transparent process. Since services cannot be produced for storage like physical products, providers adopt customer waiting as a remedy. However, because of the differences between healthcare and other services, long waiting times are not affordable in healthcare systems because patient condition may worsen substantially during the waiting. This therefore calls to duty all functions including procurement which must ensure that pharmaceuticals are always available. Underscore the role of the procurement function in healthcare systems; they contend that simultaneity of production and consumption of services results in highly unpredictable and unique demand which is difficult to match with service

capacity; hence the need for sufficient inventory. Some aspects of procurement performance such as inefficient processes and delayed delivery or stock outs of medical supplies may affect both efficiency and effectiveness of healthcare systems (Kizito and James, 2013).

Good purchasing practice is prerequisite for efficient accessibility to appropriate and good quality drugs. The main objectives of the procurement system are purchasing of right quantities of drugs in a cost-effective way, selection of reliable suppliers of higher quality goods, assuring timely delivery and distribution of drugs and other requirements and achieving the lowest possible total cost associated with the transaction in the procurement system (Kolikam, Joshi and Kamathi, 2015).

2.1.3.4 Pharmaceuticals Inventory management:

Inventory management system provides information to efficiently manage the flow of materials, effectively utilize people and equipment, coordinate internal activities, and communicate with customers. Inventory Management does not make decisions or manage operations but provides the information to managers who make more accurate and timely decisions to manage their operations (Aarti and Dhawa, 2010).

According to the World Health Organization (WHO) Managing inventory manual (2008), the main purposes include the decoupling of supply and demand through the creation of buffer stocks and the buildup of anticipation stocks to meet planned or expected demand. When we come to pharmaceutical inventory, it is a major component of any health system and just like other inventory it requires proper planning, managing, and controlling to achieve the basic aims of minimizing costs at acceptable levels of investment and providing the desired levels of customer service.

According to the Deliver logistics handbook (2006), proper inventory management avoids overstocking, under stocking and stock out, minimizes wastage of product from damage and expiry of the pharmaceuticals, simplifies inventory control decision making and it aids forecasting when there is a consistency of stock levels. Warehouses, clinics, and any facility that stores products within the public health system need to have inventory management systems to maintain an

appropriate stock level for all products to avoid shortages and oversupply. In general, there are two methods for managing inventory in a warehouse—automated or manual. Public health warehouses often use manual inventory systems, which are hand-written stockkeeping records, such as ledgers, stock cards, and bin cards.

2.1.3.5 Storage of Pharmaceuticals

Storing is the safe keeping of pharmaceuticals to avoid damage, expiry, and theft. Proper storage procedures help to ensure that storage facilities protect the shelf life of products, that only high-quality products are issued, and that there is little or no waste due to damaged or expired products. If proper storage procedures are followed, customers can be assured that they have received a high-quality product. Storage conditions will affect the quality of the pharmaceuticals being stored. Rooms that are too hot, stacks of cartons that are too high, and other poor storage conditions can cause damage or cause a reduction in shelf life. A well-organized storeroom will simplify a facility ‘s work; time will not be wasted trying to find needed supplies (PFSA, 2012).

The Guideline for storage of essential medicines and health commodities by Deliver project in collaboration with WHO (2003), states maintaining proper storage conditions for health commodities are vital to ensure their quality and product expiration dates are also based on ideal storage conditions and protecting product quality until their expiration date is important for serving customers and conserving resources.

Every health facility, large or small, needs to store and manage its medicine stocks, for a better outcome of the patient satisfaction. Health facilities should have a good pharmaceutical inventory management in which a system must be in place to ensure secure storage, storage in correct environmental conditions, accurate record keeping, effective recording, effective stock rotation and expiry monitoring and effective fire and theft prevention. Good pharmaceutical inventory control makes ordering and pharmaceuticals management easier. (Management Science for Health, 2012).

2.1.3.6 Pharmaceuticals Distribution Management:

This is the process of transferring products from the source of supply to the place of consumption. It is the art of getting the right amounts of commodities to the right places at the right time. It involves transportation, delivery, and receiving of commodities, proper storage, and inventory control for receipt and disbursement and information systems. Moreover, there are need to have quality monitoring activity for each activity to perform properly and ensure continuous availability of products to the customers. Also, other crosscutting issues are important in SCM including but not limited to finance and budgeting management, human resources management and management information systems (John Snow Inc. /DELIVER, 2006).

Because most product manufacturers are based internationally, the most common in-country distribution system is a system where products flow from central medical stores to districts and/ or regions; and, ultimately, to service delivery points. As with warehousing, distribution plays an essential role in the health logistics system. Distribution consists of moving products down the pipeline from the national central warehouse until they are dispensed to the final customers (JSI,2017).

2.2 Empirical Literature Review

2.2.1 Supply Chain Management Practices

Asamoah *et al*., (2011) studied the pharmaceutical supply chain for anti-malarial drug in Ghana. It was found that there are two main supply channels i.e., private, and public channels. But both chains lack information technology leading to disruption and delay in the supply chain system. These lead huge implication in drug security and affordability. To achieve availability of drugs at the right time and place the availability of information infrastructure is mandatory for the supply chain.

Msimangira, (2003) studied the SCM practices of Botswana companies. The result of the study shows that supply chain management is not as such a strategic rather it is a clerical and operational activities only. Top managers don't recognize its importance and there are very limited trainings and education are available for SCM as a profession.

Voordijk (1999) studied obstacles and precondition of logistics and manufacturing as case study of the East African country of Eritrea, the result showed that each element of the supply chain network causes problems. The basic condition for logistics and manufacturing are well developed infrastructure: such as transport system and telecommunication network, enabling environment: such as sound industrial policy and educational system for skill development, and at firm level: such as purchasing materials, manufacturing capabilities and export and distribution. Such factors impede the efficient logistics and manufacturing of the country.

SCM practices and challenges in different industry of Ethiopia were studied in different dissertations. The results of research in the practices of SCM in different commercial sectors of Ethiopia are poor. Admaw (2010) studied the practice of SCM for Ethiopian textile firms. It was found that, SCM practices in Ethiopian textile firms are weak and not considering SCM as a strategic tool for competition. Business managers of the textile firms didn't give attention for SCM theories and practices. Also, Dereje, (2012) studied the impact of SCM practices on the organizational performances in metal and engineering industries. The result of the study shows that the implementation of SCM in this industry is weak.

In addition, Belay, (2011) studied the practices of SCM in cement industries. The result of the thesis shows like other industries in the country i.e., the practice of SCM in cement industry is almost poor. There seems that since the demand outweighs the supply of the cement, which contributes for not using SCM as a competitive strategy.

Mesfin (2007) also studied the SCM and model development study as a case study of Mesfin Industrial Engineering plc. The result of this study shows that most of the employees of the company don't have awareness of SCM. The company also don't use supply chain cost analysis rather than using the traditional accounting system. Also, there are problems in their warehouses. As per the result of this study machine handling problem, ageing, poor preventive maintenance, lack of proper operation, and wear of spare parts are the main reasons for the breakage of machines in Mesfin Industrial Engineering.

According to Sutton and Kellow (2010), and different experts; the pharmaceutical supply chain of Ethiopia have two wings. The first is addressing those of the public health facilities through Pharmaceuticals Fund and Supply Agency (PFSA) (currently EPSA). The second is addressing the private health facilities through different importers, wholesalers and PFSA to some extent. The mandate of PFSA is it is a sole provider of forecasting, procurement, storage, inventory management and distribution of pharmaceuticals to the public health sector in Ethiopia. PFSA's current supply chain starts with the import of most drugs via the port of Djibouti. These products are then trucked into central warehouses of PFSA based in Addis Ababa, before being distributed to the various distribution centers (branches) and on to the hospitals and health centers. The system is still largely push system as demand profiles that are used for pulling system is unknown except for HIV and AIDS drugs and supplies (World Bank, 2009).

Recently PFSA has established pull system known as integrated pharmaceutical logistics system (IPLS) primarily using the essential data items reported from health facilities regularly every other month. Using its 11 distribution centers (Branches), PFSA will distribute drugs and supplies to public health facilities throughout the country (PFSA, 2012).

2.2.2 Challenges in Pharmaceutical Supply Chain Management

A workshop by WHO (2006) outlines the difficulties of the medicine supply of African countries: the main challenges being poor information, lack of consumption data and inadequate storage facilities. The workshop designed a regional framework to improve procurement and supply management systems for essential medicine in African regions and outlines challenges, goals and tasks for quantification and forecasting and storage and distribution. This framework lists challenges for selection and quantification, lack of transparent procurement procedures, inadequate storage facilities and capacity, lack of inappropriate planning, inadequate budget allocation, and irrational use. Medical Supply Chains are different from Commercial Supply Chains due to access constraints, security constraints, traceability, and the value of products and often it is run by governmental monopolies, which hinder small-scale business model innovations. The problem within the medicine sector is the unpredictability of demand and a lack of market research. It is so difficult to predict demands and forecast quantities considering actual demand data, population, and seasons for epidemic diseases and to be able to learn from previous periods.

There are the constraints for planning and organizational transparency. It is because of a lack of uncertain processes such as emergency order points, human resource capacity and expertise such as dedicated personnel or poor communication possibilities. It is possible to collect data during resupply, in practice there are more challenges than just the collection of consumption data. It is more about the use, adjustment, and quality of data. There are several good practical examples for inventory management such as Vendor Managed Inventory (VMI), for communication possibilities such as mobile phones, for transportation possibilities such as delivery, outsourcing or public-private partnerships, for the use of guidelines and performance measurements and for innovative training approaches, but it is still a relatively underdeveloped area. Pharmaceutical availability due to a lack of defined processes and management approaches such as the use of individual lead times, quality and quantity of available transport or appropriate planning considering total quantity, weight, and volume of supplies (Allan, 2013).

2.2.2.1 Human Resource Challenges in Pharmaceutical Supply Chain Management:

Human resource management is the practice of integrating procedures, policies, and practices to recruit, develop, and maintain employees who are needed by an organization to meet its goals. Robust human resource management is defined by a strategy that enables an organization to systematically address the dynamics of the health workforce across the working lifespan from entry to development and performance, and then exit. By clearly defining each employee's responsibilities as they link to an organization's mission and building the policies and systems needed to enable those responsibilities, human resource capacity management can increase the capacity of an organization. Human resources are a key performance driver in supply chain management. Therefore, the effective management of a supply chain demands quality human resource managements. By proactively managing plans, polices, and procedures associated with human resource, an organization can expand operations that sustain supply chain performance. To run effectively, a public health supply chain requires enough motivated staff with the competency required to fulfill essential supply chain functions; they must also be empowered to make decisions that positively impact health supply availability and supply chain operations. Insufficient amounts of adequately trained and/or motivated personnel are often the cause of supply chain system breakdowns and poor system performance as well, which is often demonstrated with product stock outs. This is compounded by a lack of recognition among many health institutions of the vital role

supply chain personnel play in the performance of health systems. By strengthening the capacity of public health supply chain personnel, both supply chains and, ultimately, health systems, will operate more effectively; thus, ensuring clients have improved access to lifesaving health supplies (USAID/Deliver, 2013).

Vujicic stated that shortages, geographic imbalances, and poor performance of health workers pose major challenges for improving service delivery in developing countries. These health workforce challenges are major problems to improved health systems and health service delivery in developing countries. Many low- and middle-income countries are experiencing a crisis in human resources for health (HRH). The factors affecting this crisis are also key contributors to challenges countries face addressing human resources (HR) for the supply chain. In addition to shortage of workers, the workers that exist are overworked, undertrained, and often deployed in ways that do not best use their skills or meet the needs of the people they serve. In response to these challenges, development agencies have increasingly recognized the need to invest in human resources for health (HRH). The Global Fund for AIDS, Tuberculosis, and Malaria (the Global Fund), since its inception in 2002, has recognized the need to invest in HRH and has encouraged countries to use its grants for this purpose through all funding rounds. Through its health systems strengthening funding stream, the Global Alliance for Vaccines and Immunization (GAVI) has also encouraged countries to include HRH-related activities in proposals (Vujicic et al., 2011).

2.2.2.2 Financial Resource Challenges in Pharmaceutical Supply Chain Management:

Financing of pharmaceuticals is a critical issue to save lives and improve health service. Pharmaceutical financing must ensure access to medicines for all classes of the society. In most countries, medicines represent the largest expenditure for the ministry of health after staff salaries. Inadequate funding for medicines results in expenditures for staff salaries and other health care costs may be used inefficiently or simply wasted (MSH, 2012). In many low- and middle-income countries (LMICs), the high cost of medicines, together with economic instability, continued population growth, and a heavy burden of disease, makes it a challenge to ensure adequate financing for a stable and adequate supply of medicines. The emergence of diseases such as HIV/AIDS and drug-resistant strains of malaria and tuberculosis is further straining country health systems, resulting in reduced availability of medicines and rising pharmaceutical expenditures.

Resource-poor countries face numerous challenges in ensuring access to affordable medicines, including sustainable financing and optimal allocation of resources, a lack of efficient and reliable supply and distribution channels, and inequity. A lack of or limited local production of medicines in these countries can add to these challenges. In many LMICs, spending on medicines is the largest driver of out-of-pocket payments less than one-third of pharmaceutical expenditures are publicly funded (Bhawalkar and Taddese, 2014).

2.2.2.3 Infrastructure Challenges in Pharmaceutical SCM:

Supply chain management is a very critical part of any business. Well-coordinated SCM can improve the efficiency of the business and help in cost reduction. As information technology (IT) is being used widely across all businesses, SCM can benefit to a large extent using IT. IT has made a significant impact in improving the efficiency of SCM (Saybal and Ajeya, 2018).

Healthcare organizations often cannot access supply chain data to develop actionable step to increase efficiency. The lack of health IT to gather and analyze supply chain data can lead to billions in wasteful spending (LaPointe, 2017). The supply chain management of many healthcare centers and institutes are not configured towards integrated system. They do not have a proper tracking mechanism to detect the consumption and expiry of products. This makes the healthcare industry weak in its supply chain management and inefficient in reaching customers on right time (Shetty, 2015).

Health IT solutions facilitate data-sharing, which can help healthcare organizations reduce costs by decreasing process variations. The technologies can also help better track supplies from purchase to exportation to eliminate wasteful spending (Lapointe, 2017).

In developing countries poor planning and forecasting, insufficient information about consumption and current stock levels, funding and capacity constraints and a poor infrastructure result in inappropriate stock levels. Public warehouse infrastructures consist of Central Medical Store (CMS), Regional Medical Store (RMS) and Health Facilities, whereas challenges increase further down the supply chain with moisture, leaking ceilings, drains, inappropriate cold storage capacity and non-existent designated areas for reception, delivery, and quarantined products. Stock

management is done manually with stock holding cards and follows the first-expired-first out (FEFO) strategy (Allan, 2013).

2.2.3 Pharmaceutical Supply Chain in Ethiopia Context

The provision of complete health care requires the availability of safe, effective, and affordable pharmaceuticals of the required quality, in adequate quantity always. Despite this fact, in the past, the pharmaceutical supply chain management system of Ethiopia had several problems including non-availability, unaffordability, poor storage conditions and stock management and irrational use. To solve these problems in public health facilities, Pharmaceuticals Fund and Supply Agency (PFSA), now called Ethiopian Pharmaceuticals Supply Agency (EPSA), was established in 2007 by Proclamation No. 553/2007 based on the Pharmaceuticals Logistics Master Plan (PLMP). The Agency is mandated to avail affordable and quality pharmaceuticals sustainably to all public health facilities and ensure their rational use. To execute its mandate in pharmaceuticals supply in an efficient and effective manner, integrated pharmaceuticals logistics system (IPLS) has been developed and implemented since 2010 and it is under implementation currently. IPLS is the term applied to the single pharmaceuticals reporting and distribution system based on the overall mandate and scope of the PFSA. It aims to ensure that patients always get pharmaceuticals they need (PFSA, 2012).

To help maintain adequate stock levels, the maximum months of stock, minimum months of stock and an emergency order point have been established for each health facility in the system. The inventory control system for the IPLS is a Forced Ordering Maximum/Minimum inventory control system. This means that all facilities are required to report on a fixed schedule (every other month) for all products. In addition, all products are re-supplied each time a report is completed. PFSA delivers pharmaceuticals to Hospitals and Health Centers which have submitted a completed and approved Report and Requisition Form (RRF) on time. (PFSA, 2012).

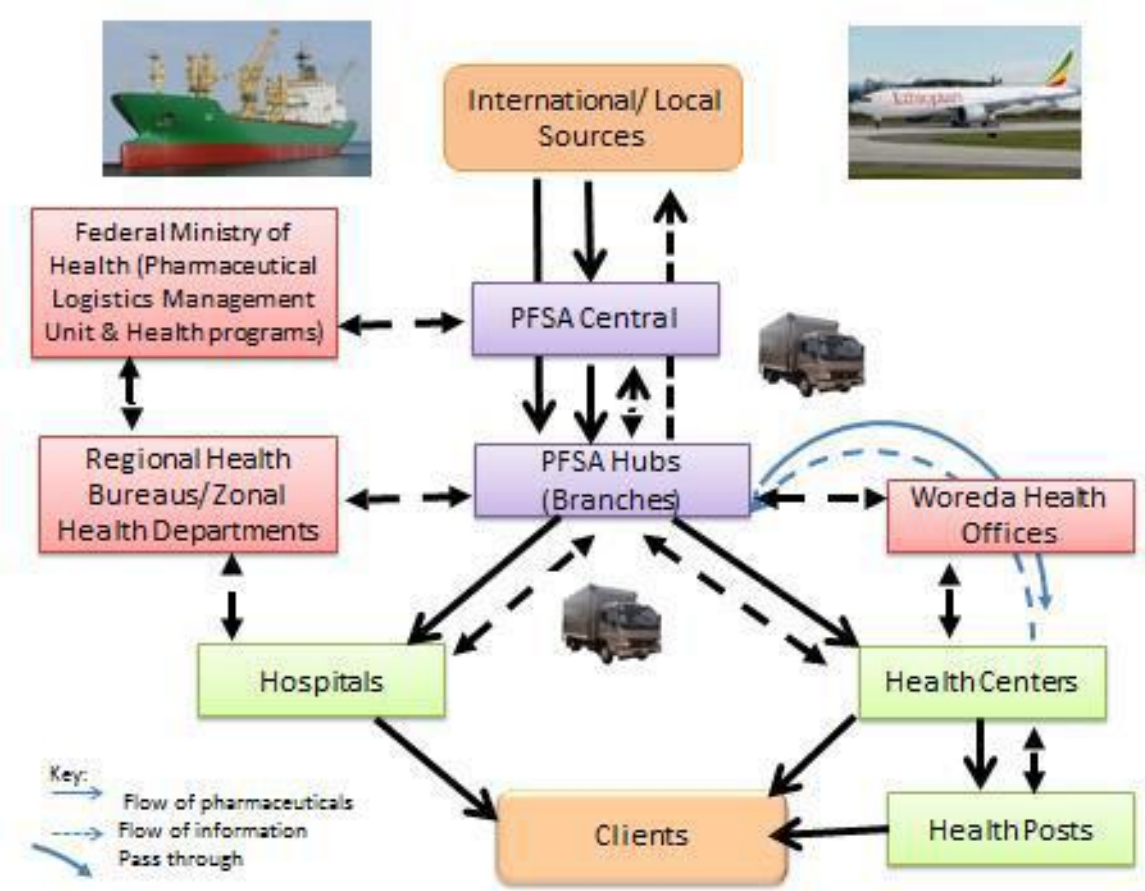


Figure 2.1: Flow of Pharmaceuticals and Information in the Integrated Pharmaceutical Logistics System (IPLS**)**

Source: PFSA, 2012

2.3 Conceptual Framework of the Study

Based on literature reviews, conceptual frameworks have been developed for pharmaceuticals SCM practices and challenges at EPSA Nekemte branch as follows

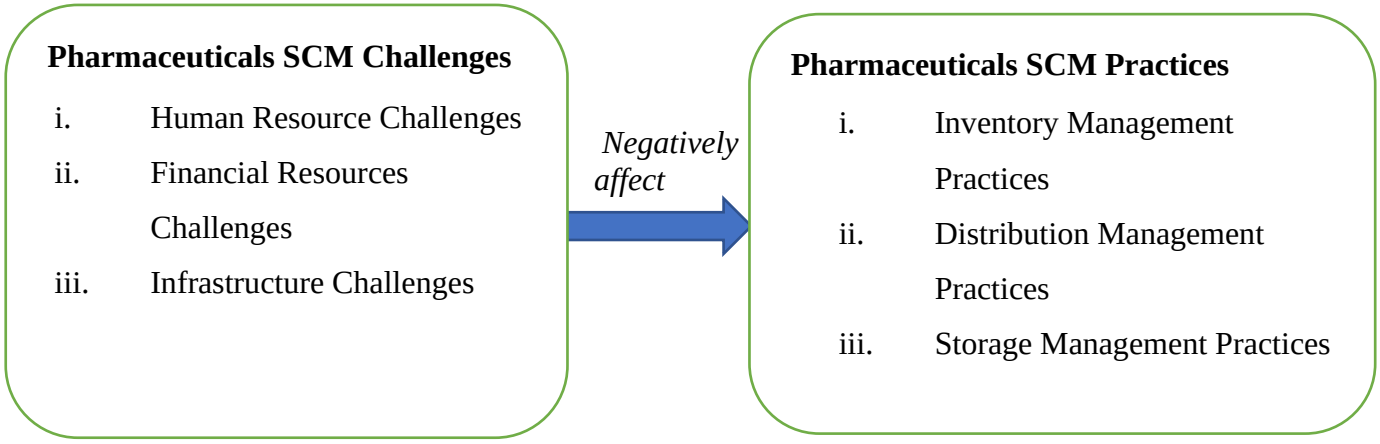


Fig 2.2 Conceptual framework of pharmaceutical supply chain management practices and challenges, developed by student researcher based on literature.

2.4 Identified Literature Gap

In Ethiopia studies dedicated to assessing supply chain management practices and challenges of health sector are limited. To student researcher's knowledge despite they serve significant number of populations, no studies were found on supply chain management practices and challenges of branches of Ethiopian Pharmaceuticals Supply Agency including Nekemte branch. Thus, this study tried to fill the empirical gap found from literatures on the practice and challenges of the pharmaceutical SCM, particularly at branches of Ethiopian Pharmaceuticals Supply Agency.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Description of the Study Area

The unit of analysis for the study was EPSA Nekemte Branch. It is one of the branches of EPSA, the sole government agency mandated to supply pharmaceuticals to public health facilities in Ethiopia.

Pharmaceuticals Fund and Supply Agency (PFSA), currently named as Ethiopian Pharmaceuticals Supply Agency (EPSA) was established in 2007 by Proclamation No. 553/2007 based on the Pharmaceuticals Logistics Master Plan (PLMP). The Agency is mandated to procure, store/warehouse and distribute affordable and quality pharmaceuticals sustainably to all public health facilities and ensure their rational use. Currently EPSA has nineteen (19) branches across the country and Nekemte branch is one of them. The branch is in Oromia National Regional State, Nekemte town, 328KM to the West of Addis Ababa. Warehousing, storage, inventory management and transport & distribution of pharmaceuticals are main supply chain management functions applied at EPSA branches including Nekemte branch. The branch is managing its pharmaceuticals supply chain management operations using 120 staffs, 10 big size & 1 small size distribution vehicles and 1 midsize special vehicle for distribution of cold chain items. The branch uses one (1) main warehouse with storage capacity of 2600m^2 and 3 cold rooms with gross storage capacity of 120m^3 to store pharmaceuticals.

3.2 Research Approach

There are two approaches that provided in the research such as quantitative and qualitative, where one of them is not better than the others, all of this depends on how the researcher want to do research of study (Ghauri and Kjell, 2005).

Accordingly, the study adopted a mixed research approach; structured questions with five-point Likert Scale for quantitative and open-ended questions to collect respondents comment qualitatively. Quantitative approach enables the researcher to collect objective and numerical data

to apply statistical tools. In mixed research approach quantitative results are expressed in numerical and quantifiable terms, while qualitative results are expressed verbally.

3.3 Research Design

A research design is the framework or plan for a study that is used as a guide in collecting and analyzing the data. Research design is the blueprint for collection, measurement, and analysis of data. It is a map that is usually developed to guide the research (Prabhat, 2015).

Descriptive research design was used for this study. It is sought to describe SCM practices at EPSA Nekemte branch. A descriptive case study was chosen as it enables the researcher to gain an in-depth understanding of the situations under study.

3.4. Population and Sample

The total number of employees of EPSA Nekemte branch is 120, but the target population is 74; excluding employees whose job title is not related to pharmaceuticals SCM such as guards, cleaners, laborer, lawyers, drivers etc.

The sample size for this study is calculated by using the formula given by (Toro, 1967).

$$\mathbf{n= N/((1+N(e^2))}$$

Where:

n = the sample size

N = the population size

e =Margin of error acceptable or measure of precision is 0.05

Accordingly: $n= 74/((1+74(0.05)^2)$ = **62**

Then, purposive, or judgmental sampling was used to get respondents representing the top, middle and low-level management to provide important information that are required in describing situation under the study; and employees with job title of pharmaceuticals SCM were selected. Accordingly, 62 respondents selected include Branch Manager, Deputy Branch Manager, each Team Leaders (Warehouse & Inventory Management, Distribution & Fleet Management, Finance Human Resource, General Services), Officers and Warehouse Managers were selected purposively to respond on the questions.

3.5 Data Types and Sources

In the study, primary data was used. The data was collected from top, middle and low-level managers of EPSA Nekemte branch to ensure a broad perspective on pharmaceuticals SCM is incorporated. The main instrument for data collection was structured questionnaire that allowed for uniformity of responses to questions. The questionnaire is a fast way of obtaining data as compared to other instruments (Mugenda and Mugenda, 2003). Questionnaires give the researcher comprehensive data on a wide range of factors. Questionnaires allows greater uniformity in the way questions are asked, ensuring greater compatibility in the responses. A five-point Likert scale was used for the closed ended questions. Likert scale is simple to construct, and easy for the respondents to read, understand and respond appropriately to the statements put across. The Likert scale also enhances the production of highly accurate results during analysis. There are also open-ended questions to get additional thought of respondents on pharmaceuticals supply chain management practices and challenges.

The questionnaire was divided into three parts: Part I covers demographic profile of respondents, Part II deals with supply chain management practices, and part III entails the challenges in pharmaceuticals supply chain management (See Appendix 2).

Additionally, the researcher also observed actual pharmaceuticals SCM practices and challenges on the ground by his physical presence at EPSA Nekemte branch.

3.6 Data Collection Procedures

The data was collected using questionnaire where first the respondents were communicated to get their consent. Once their consent was known, the prepared questionnaires were distributed to each participant by appreciating their participation and devoting their precious time for the research. The data collector/ the researcher elaborated in each case of the misunderstanding of the questions. The questionnaires then were collected from participants by checking the completeness of the data. Finally, the activities were accomplished by appreciating the respondents.

3.7 Data Analysis and Presentations

A comparison of data collected with theoretical approaches and documentaries cited in the literature review was done. Data was checked for completeness, accuracy, errors in responses, omissions, and other inconsistencies. The data then was coded using numerals to put them in limited number of categories. Data on pharmaceuticals supply chain practices and challenges was analyzed using descriptive statistics including mean & standard deviation. Mean rank and coefficient of concordance was also computed using Kendall's W test. Accordingly, pharmaceuticals SCM practices & challenges were analyzed, described, and ranked. The data then was presented in the report in the form of tables and charts.

3.8 Validity and Reliability of Data Collection Instrument

3.8.1 Validity of the Instrument

As recommended by (Sanchez-Rodriguez, 2009), the questionnaire was developed based on a thorough review of the existing literature on the area under study. Validity is the degree to which a test measures what it is expected to measure (Creswell, 2009). It is the degree to which results obtained from the analysis of the data represents the phenomena under study. Questionnaires should be tested on potential respondents to make the data collecting instrument objective, relevant, suitable to the problem and reliable as recommended by (Adams *et al*., 2007).

A pilot pre-test study was conducted to refine the methodology and test instrument before administering the final phase. The survey instrument was tested by pretest study that was pilot tested on ten (10) respondents, to check the validity of the data collection instrument. Issues raised by respondents were gathered and questionnaires were refined accordingly. Finally, the improved version of the questionnaires was used.

3.8.2 Reliability Test

The statistical packages such as SPSS can be utilized to determine the reliability through evaluating the reliability coefficients using Cronbach's Alpha (Abdel Fattah, 2008). Cronbach's alpha is a coefficient of internal consistency. The Cronbach's Alpha value varies between 0-1. A high value of the Cronbach alpha coefficient suggests that the items that make up the scale are

internally consistent and measure the same underlying construct. A value of Cronbach alpha above 0.70 can be used as a reasonable test of scale reliability (Cronbach, 1951).

Cronbach's alpha was calculated by application of SPSS 25 for reliability analysis. The resulting Cronbach's alpha values of the variables are presented in the Table 3.1 as follows:

As shown by Table 3.1, the Cronbach's alpha value for each construct of pharmaceuticals SCM practices and challenges was greater than 0.7 that was acceptable. The Cronbach's Alpha has also been evaluated for the entire scales employed in the questionnaire and found to be 0.974 which means the questioners were highly reliable.

Table 3.1: Reliability Cronbach's Alpha

Variable	No. of Items	Cronbach's Alpha
Inventory Management Practices	8	0.875
Storage Management Practices	6	0.867
Distribution Management Practices	5	0.909
Human Resource Challenges	8	0.881
Financial Resource Challenges	3	0.737
Infrastructure Challenges	5	0.819
Overall Reliability	**35**	**0.974**

Source: own survey, 2021

3.9 Ethical Considerations

As suggested by (Sekaran, 2006; Trochim, 2000), the researcher ensured the strict adherence of the following ethical conducts:

- Respondents take part in the research voluntarily and data was collected based on the consent of the individual.
- The purpose of the research was clearly explained to respondents.

- Information provided by respondents was and will be treated with strict confidentiality and the researcher ensures that participants remain anonymous throughout the study.
- There was no misrepresentation or distortion of the actual data collected from respondents.

In this research all the above ethical considerations as well as other ethical concerns which are related to the conducted research was & will strictly uphold.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the data collected from respondents have been analyzed and interpreted. The chapter begins by presenting response rate of respondents, then background information of respondent under the demographic variables followed by descriptive statistics.

4.2 Response Rate

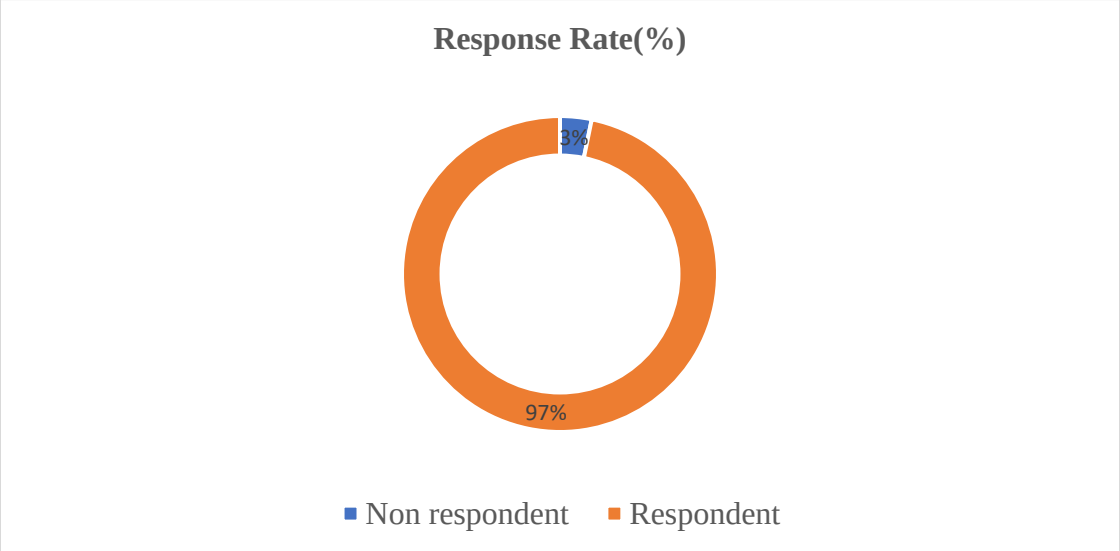
Analysis of the respondents' response rate was illustrated in the table 4.1 and by the be pie chart (Figure 4.1)

Table 4.1: Response Rate (%)

Rating	Frequency	Valid Percent
Non respondent	2	3%
Respondent	60	97%
Total	62	100%

Source: own survey,2021

Figure 4.1: Response Rate (%)



Source: own survey, 2021

Though the total number of sample of respondents were 62, sixty (60) of them have filled and returned the complete questionnaire constituting 97 percent response rate and of which 2 of them were found incomplete and hence rejected. The response rate was high, and thus it can be said that the finding is representative.

4.3 Respondents' Demographic Information

The demographic information of the respondents collected included the respondent's gender, age, level of education, years of experience and level of management category. Respondents who have filled and returned the complete questionnaire is presented on Table 4.2.

According to Table 4.2, Majority (86.67%) of the respondents were male, while female respondents constitute only 13.33%. Majority (80%) of the respondents were aged between 35 to 44 years whereas respondents of age category 18-24, 25-34, and 45-54 accounts 3.3%, 15% and 1.67 % respectively. None of the respondents are aged over 55 years. Majority (83.33%) of the respondents have educational level of bachelor's degree, while respondents with college/university diploma and master's degree accounts for 10% and 6.67% respectively. None of the respondents have PHD educational level. Majority (45%) of the respondents have 6-10 years of experience while respondents with 1-5, 11-15 and over 16 years constitute 43.33%, 8.33% and 3.33% respectively.

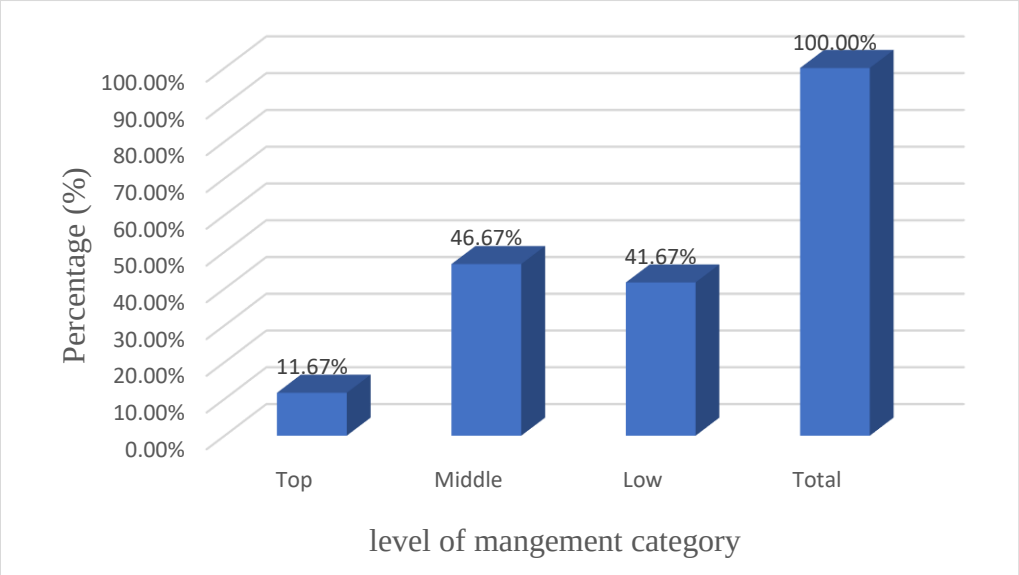
Table 4.2: Demographic Profile of Respondents

Demography	**Characteristics**	**Frequency**	**Percentage (%)**
Gender	Male	52	**86.67%**
	Female	8	13.33%
	Total	60	100.00%
Age (Years)	18-24 years	2	3.33%
	25-34 years	48	**80.00%**
	35-44 years	9	15.00%
	45-54 years	1	1.67%
	Over 55 years	0	0.00%
	Total	60	100.00%
Educational Level	College/University Diploma	6	10.00%
	Bachelor's Degree	50	**83.33%**
	Master's Degree	4	6.67%
	PHD	0	0.00%
	Other	0	0.00%
	Total	60	100.00%
Years of Experience	1-5 years	26	43.33%
	6-10 years	27	**45.00%**
	11-15 years	5	8.33%
	Over 16	2	3.33%
	Total	60	100.00%

Source: own survey, 2021

Regarding the level of management category of respondents as it was discussed in methodology part, purposive sampling technique was used to get representative respondents from all levels of management category. Accordingly majority (46.67%) of respondents represent middle level of management category, whereas 11.67% and 41.67% of respondents are from top and low level of management category respectively. See figure 4.2 level of management category of respondents.

Figure 4.2: Level of Management Category of Respondents(%)



Source: own survey,2021

4.4 Descriptive Statistics and Kendall's W Test

Respondents' feedback was captured along the 35 items corresponding to the six (6) dimensions of both pharmaceuticals supply chain management practices & challenges. Statistical package SPSS 25 was used to analyze data. The composite mean scores and standard deviations have been computed for all the variables of the dimensions. The mean rank and Kendall's coefficient of concordance (W) was also computed using Kendall's W Test (See Appendix 1).

The rule of thumb pertaining to the intervals for breaking the range in measuring variables that are captured with five-point scale (that ranges from strongly disagree to strongly agree) is 0.8, which is found by dividing the difference between the maximum and minimum scores to the maximum score Kidane (2012). Hence, a calculated composite mean value that ranges from 1 to 1.80 implies strong disagreement, whereas the remaining ranges of 1.81 to 2.6, 2.61 to 3.4, 3.41 to 4.2 and 4.21 to 5.00 representing respondents' perceptions of disagreement, neutrality, agreement, and strong agreement respectively.

Kendall's W statistic (Coefficient of Concordance) is a non-parametric statistic used to assess agreement between different raters, and ranges from 0 to 1. Zero is no agreement at all between

raters, while 1 is perfect agreement. The higher the value of Kendall's coefficient of conformance, the stronger the association. Usually, Kendall's coefficients (W) of 0.9 or higher are considered very good. A high or significant Kendall's coefficient means that the respondents are applying essentially the same standard when assessing the variables (Kendall, M. G., and Gibbons, J. D. (1990). Kendall's (W) was leveled the w value 0.00-0.20 poor, 0.21-0.40 slight, 0.41-0.6 moderate, 0.61-0.8 good, 0.81-1.00 excellent, the results in more accurate Type I error Legendre (2005).

4.4.1 Pharmaceuticals Supply Chain Management Practices

In this research pharmaceuticals supply chain management practices related to inventory management, storage management and distribution management were studied. The result of study for each dimension was presented as follows.

4.4.1.1 Pharmaceuticals Inventory Management Practices

During this study, 8 items were used to evaluate respondents' attitude towards pharmaceuticals inventory management practices. Table 4.3 shows summary of responses regarding pharmaceuticals inventory management practices at EPSA Nekemte branch.

As it is depicted on Table 4.3, respondents agree or strongly agree that physical inventory is done at least once per year (M 4.98, SD 0.129); proper use of stock keeping logistics forms like bin cards & stock cards (M 4.20, SD 0.403); regarding availability of pharmaceuticals procurement list of the agency (M 4.78, SD 0.715); appropriate documentation of the procurement list (M 4.05, SD 0.287) and implementation of electronic inventory management system for proper management of stock (M 4.20, SD 0.684). Respondents disagree that overall inventory management of pharmaceuticals in the organization is satisfactory (M 2.17, SD 1.06); pharmaceuticals are not out of stock frequently (<5% stock out rate) with in the branch (M 2.13, SD 0.929) and pharmaceutical's wastage is within the acceptable annual wastage rate (2%)/ in the branch (M 1.95, SD 0.769).

It was noted that most of the respondents agree with inventory management practices at EPSA Nekemte branch with aggregate mean of 3.56.

According to Kendall's W test, there exist near to perfect or excellent agreement (W=0.909) among the respondents on their rating of attributes of inventory management practice. Depending on the mean rank inventory management practices were ranked from highest ranked to the least ranked as follows: conducting physical inventory at least once a year (Mean Rank = 7.26), availability of pharmaceuticals procurement least (Mean Rank = 6.94), implementation of electronic inventory management system (Mean Rank = 5.48), proper use of stock keeping logistics forms (Mean Rank = 5.33), appropriate documentation of procurement least (Mean Rank = 4.85), prevention of frequent stock out of pharmaceuticals (Mean Rank = 2.12), and maintain pharmaceuticals wastage rate within acceptable range (Mean Rank = 1.90), Accordingly, conducting physical inventory at least once a year is the highly practiced attribute while maintaining pharmaceuticals wastage rate within acceptable range is the least practiced attribute of inventory management practices.

Respondents also commented that there is frequent stock out and high wastage rate of pharmaceuticals in the branch.

Table 4.3: Summary of responses on pharmaceuticals inventory management practices at EPSA Nekemte branch.

Inventory Management Practices	N	Descriptive Statistics		Kendall's W Test	
		Mean (M)	Std. Deviation (SD)	Mean Rank	Coefficient of Concordance (W)
All available pharmaceuticals are listed in the procurement list of the agency	60	4.78	0.715	6.94	N 60
The procurement list of the agency is appropriately documented	60	4.05	0.287	4.85	**Kendall's W 0.909**
Stock keeping logistics forms like bin cards, stock cards, are properly used	60	4.20	0.403	5.33	Chi-Square 381.927
Physical inventory is done at least once per year	60	4.98	0.129	7.26	df 7
Pharmaceuticals are not out of stock frequently (<5% stock out rate) with in the branch	60	2.13	0.929	2.12	Asymp. Sig. .000
Pharmaceutical's wastage is within the acceptable annual wastage rate (2%)/ in the branch	60	1.95	0.769	1.90	
Electronic inventory management system is well implemented for proper management of stock	60	4.20	0.684	5.48	
Overall inventory management of pharmaceuticals of the organization is satisfactory	60	2.17	1.060	2.13	
Aggregate Mean		**3.56**			

Source: own survey, 2021

From this result, the student researcher can assume that even though most of the inventory management practices exist at EPSA Nekemte branch, it did not focus on reducing pharmaceuticals wastage and stock out. This in turn reduced staffs' satisfaction on overall inventory management practice of the branch (M 2.17, SD 1.060)

Most of respondents disagree or strongly disagree that prevention of frequent stock out & high wastage of pharmaceuticals is practiced at EPSA Nekemte branch. Respondents also commented

that there is frequent stock out (>5%) and high wastage rate (>2%) of pharmaceuticals at EPSA Nekemte branch. Most respondents also disagree or strongly disagree on availability of strong measures to reduce pharmaceuticals wastage. These may be some of the reasons of shortage of availability / non- availability / of pharmaceuticals at service delivery points as stated on most of the literatures cited in this study. There have been numerous complaints from the public health facilities regarding erratic supply of the essential drugs and other medical supplies (PFSA,2012).

4.4.1.2 Pharmaceuticals Storage Management Practices

Six (6) parameters were used to evaluate respondents' attitude towards pharmaceuticals storage management practices. Table 4.4 shows summary of responses regarding pharmaceuticals storage management practices at EPSA Nekemte branch.

From Table 4.4, respondents agree or strongly agree on availability of special storage area for cold chain pharmaceuticals (M 4.63, SD 0.486); regarding availability of enough storage space within the branch to store pharmaceuticals (M 4.10, SD 0.354), full functionality of material handling equipment (M 3.72, SD 0.846) and implementation Standard Operating Procedures (SOPs) to ensure proper storage of pharmaceuticals (M 3.90, SD 0.511). However, respondents disagree regarding regular compliance checkup of storage equipment (M 2.45, SD 1.213) and availability of measures to reduce pharmaceuticals wastage (M 2.37, SD 1.104).

It was noted that majority of respondents agree with pharmaceuticals storage management practices at EPSA Nekemte branch with aggregate mean 3.53.

As per Kendall's W test, there was good agreement (W= 0.748) among respondents regarding their rating of attributes storage management practice. Depending on the mean rank value storage management practices can be ranked from highest to least as follows: availability of special storage area for cold chain items (Mean Rank = 5.43), availability of enough storage space (Mean Rank = 4.23), implementation of SOPs (Mean Rank = 3.84), full functionality of storage equipment (Mean Rank = 3.72), regular checkup of storage equipment for compliance (Mean Rank = 1.96), and availability of measures to reduce pharmaceuticals wastage (Mean Rank = 1.83). Accordingly, availability of special storage area for cold chain items is best practiced while availing measures to reduce pharmaceuticals wastage is least practiced attribute of storage management practices.

Respondents also commented that there is no strong measure to reduce pharmaceuticals wastage within the branch.

Table 4.4: Summary of responses regarding pharmaceuticals storage management practices at EPSA Nekemte branch.

Storage Management Practices	N	Descriptive Statistics		Kendall's W Test	
		Mean (M)	Std. Deviation (SD)	Mean Rank	Coefficient of Concordance(W)
Storage space is enough to store pharmaceuticals within the branch	60	4.10	0.354	4.23	N 60; **Kendall's W 0.748**; Chi-Square 224.460; df 5; Asymp. Sig. .000
Special storage area for cold chain items is available within the branch	60	4.63	0.486	5.43	
Storage equipment/material handling equipment/ are fully functional	60	3.72	0.846	3.72	
Storage equipment are regularly checked for compliance	60	2.45	1.213	1.96	
There are measures in place to reduce pharmaceuticals wastage	60	2.37	1.104	1.83	
Standard Operating Procedures (SOPs) are followed to ensure proper storage of pharmaceuticals	60	3.90	0.511	3.84	
Aggregate Mean		**3.53**			

Source: own survey, 2021

4.4.1.3 Pharmaceuticals Distribution Management Practices

Five (5) items were used to evaluate respondents' attitude towards pharmaceuticals distribution management practices. Table 4.5 provides summary of responses regarding pharmaceuticals distribution management practices at EPSA Nekemte branch.

As shown by Table 4.5, respondents agree regarding availability of enough vehicles to meet demand for delivery of pharmaceuticals (M 3.65, SD 0.971); overall distribution management practices are satisfactory (M 3.82, SD 0.948). However, respondents disagree or strongly disagree with availability of sufficient special vehicles for transportation of cold chain items (M 1.57, SD

1.031) and transport vehicles are fitted with functional temperature & humidity monitoring devices (M 2.43, SD 1.419). Respondents are not sure or neutral regarding delivery of pharmaceuticals is done within recommended timelines (M 2.90, SD 1.492)

Table 4.5: Summary of responses on pharmaceuticals distribution management practices at EPSA Nekemte branch.

Distribution Management Practices	**N**	**Descriptive Statistics**		**Kendall's W Test**	
		Mean (M)	**Std. Deviation (SD)**	**Mean Rank**	**Coefficient of Concordance (W)**
Enough vehicles are available to meet demand for delivery of pharmaceuticals	60	3.65	0.971	4.04	N 60
There is/are sufficient special vehicles for transportation of cold chain items	60	1.57	1.031	1.38	**Kendall's W 0.687**
Transport vehicles are fitted with functional temperature and humidity monitoring devices	60	2.43	1.419	2.49	Chi-Square 164.963
Delivery is done within recommended timelines	60	2.90	1.492	3.09	df 4
Overall transport management practices are satisfactory	60	3.82	0.948	3.99	Asymp. Sig. .000
Aggregate Mean		**2.87**			

Source: own survey, 2021

It was noted that respondents were not sure or neutral with pharmaceuticals distribution management practices at EPSA Nekemte branch with mean score of 2.87.

According to Kendall's W test, there was good agreement (W= 0.687) among respondents on their rating of attributes of distribution management practice. Depending on the mean rank distribution management practices were ranked from highest to least as follows: availability of enough vehicles for delivery of pharmaceuticals (Mean Rank = 4.04), conducting delivery within recommended timeline (Mean Rank = 3.09), fitting transport vehicles with functional temperature and humidity monitoring devices (Mean Rank = 2.49), and availability of sufficient special vehicles for transportation of cold chain items (Mean Rank = 1.38). Accordingly, availability of enough

vehicles for delivery of pharmaceuticals was best distribution management practice while the weakest practice is availing sufficient special vehicles for transportation of cold chain items.

Respondents also commented that there is poor commitment on temperature monitoring during transportation of pharmaceuticals, especially for cold chain items. As commented by most of the respondents, timely delivery of pharmaceuticals to health facilities may sometimes be hindered by external factors such as road infrastructure and security problems.

Lack of sufficient special vehicles for transportation of cold chain items at EPSA Nekemte branch may have negative effect on timely delivery of vaccines and other biological products to service delivery points. Inability to fit transport vehicles with functional temperature & humidity monitoring devices will also affect quality of pharmaceuticals distributed to public health facilities.

From the study result, as agreed or strongly agreed by majority of respondents, most of the pharmaceuticals supply chain management practices categorized under inventory management, storage management and distribution management are practiced at EPSA Nekemte branch except few of them those were discussed in this section. This result contradicts with what majority of literatures indicate as per the studies conducted in Ghana, Botswana, and Ethiopia. At most of the organizations study was conducted, supply chain management practices are poor and not strategic. Admaw (2010) studied the practice of SCM for Ethiopian textile firms. It was found that, SCM practices in Ethiopian textile firms are weak and not considering SCM as a strategic tool for competition. Also, Dereje, (2012) studied the impact of SCM practices on the organizational performances in metal and engineering industries. The result of the study shows that the implementation of SCM in this industry is weak. Msimangira, (2003) studied the SCM practices of Botswana companies. The result of the study shows that supply chain management is not as such a strategic rather it is a clerical and operational activities only. Top managers don't recognize its importance and there are very limited trainings and education are available for SCM as a profession. This may be due to the reason that SCM is one of the core competences for EPSA Nekemte branch, while other industries may not focus on it.

4.4.2. Pharmaceuticals Supply Chain Management Challenges

Pharmaceuticals supply chain management challenges related to human resource, financial resource and Infrastructure were studied. The result of study for each dimension was presented as follows.

4.4.2.1 Human Resource Challenges

In this study Eight (8) items were used to evaluate respondents' attitude towards human resource challenges. Table 4.6 depicts summary of responses towards human resource challenges in pharmaceuticals supply chain management at EPSA Nekemte branch.

As shown by Table 4.6, majority of respondents disagree or strongly disagree that there is high work overload on the available staff (M 2.37, SD 1.025) and low awareness & understanding of top management regarding pharmaceutical SCM (M 1.37, SD 0.736). Respondents agree or strongly agree that salary payment for professionals working on pharmaceutical SCM is insufficient (M 4.18, SD 0.390); there is low leadership commitment to motivate professionals who perform best (M 4.33, SD 0.475); compensation for professionals overworked is insufficient (M 3.95, SD 0.341) and there is high turnover (attrition rate) of staff working on pharmaceutical SCM (M 4.02, SD 0.344). Respondents are not sure or neutral regarding there is lack/shortage of adequate skills & experiences of professionals working on pharmaceutical SCM (M 3.13, SD 0.999) and number of staff working on pharmaceutical SCM is insufficient (M 3.27, SD 1.326)

It was noted that respondents were not sure or neutral regarding human resource challenges of pharmaceuticals supply chain management at EPSA Nekemte branch with mean 3.33.

According to Kendall's W test, there was good agreement (W= 0.733) among respondents on their rating of attributes of human resource challenge. Depending on the mean rank value human resource challenges were ranked from the highest to the least as follows: low leadership commitment to motivate best performers (Mean Rank = 6.56), insufficient salary payment (Mean Rank = 6.11), high staff turnover (Mean Rank = 5.58), insufficient compensation for overworked professionals (Mean Rank = 5.42), insufficiency of number of staffs (Mean Rank = 4.63), lack of adequate skill (Mean Rank = 3.94), high workload (Mean Rank = 2.67), and low awareness & understanding of top management regarding pharmaceutical SCM (Mean Rank = 1.10).

Accordingly, low leadership commitment to motivate best performers was the major human resource challenge while low awareness & understanding of top management regarding pharmaceutical SCM was the least.

Table 4.6: Summary of responses towards human resource challenges in pharmaceuticals supply chain management at EPSA Nekemte branch.

Human Resource Challenges	**N**	**Descriptive Statistics**		**Kendall's W Test**	
		Mean (M)	**Std. Deviation (SD)**	**Mean Rank**	**Coefficient of Concordance (W)**
Lack/shortage of adequate skills and experiences of professionals working on pharmaceutical SCM.	60	3.13	0.999	3.94	N 60 **Kendall's W 0.733** Chi-Square 307.947 df 7 Asymp. Sig. .000
Insufficient salary payment for professionals working on pharmaceutical SCM.	60	4.18	0.390	6.11	
Insufficient number of staff working on pharmaceutical SCM.	60	3.27	1.326	4.63	
High work overload on the available staff	60	2.37	1.025	2.67	
Insufficient compensation for professionals overworked	60	3.95	0.341	5.42	
High turnover (attrition rate) of staff working on pharmaceutical SCM	60	4.02	0.344	5.58	
Low awareness and understanding of top management regarding pharmaceutical SCM	60	1.37	0.736	1.10	
Low leadership commitment to motivate professionals who perform best	60	4.33	0.475	6.56	
Aggregate Mean		**3.33**			

Source: own survey, 2021

Respondents commented that no/insufficient induction training/orientation is provided to newly hired staffs at EPSA Nekemte branch. Respondents also commented that leadership skills of staffs at each level of management is poor at EPSA Nekemte branch.

From the result, the student researcher can assume that human resource retention and development is not strategic focus of EPSA Nekemte branch. If not timely corrected, this may lead to high staff attrition rate which in turn reduce performance of the branch.

As better human resource management practices are one of the factors for successful supply chain organization a lot is expected from EPSA Nekemte branch management in solving challenges like insufficient salary payment for professionals working on pharmaceuticals SCM; low leadership commitment to motivate professionals who perform best; lack/shortage of adequate skills & experiences of professionals working on pharmaceutical SCM; insufficient compensation for professionals overworked and high turnover (attrition rate) of staff working on pharmaceutical SCM.

4.4.2.2 Financial Resource Challenges

Respondents' attitude was evaluated towards 3 items of financial resource challenges. Table 4.7 shows summary of response regarding financial resource challenges in pharmaceuticals supply chain management at EPSA Nekemte branch.

As shown by Table 4.7, respondents disagree that there is poor understanding of pharmaceutical SCM costs during budget planning (M 1.95, SD 1.126). Majority of respondents agree that budget allocation by the government is inadequate to avail all essential pharmaceuticals (M 3.95, SD 0.341) and utilization of the allocated budget for essential pharmaceuticals availability is inefficient (M 3.47, SD 1.069).

Table 4.7: Summary of response regarding financial resource challenges in pharmaceuticals supply chain management at EPSA Nekemte branch.

Financial Resources Challenges	**N**	**Descriptive Statistics**		**Kendall's W Test**	
		Mean (M)	**Std. Deviation (SD)**	**Mean Rank**	**Coefficient of Concordance (W)**
Inadequate budget allocation by the government to avail all essential pharmaceuticals	60	3.95	0.341	2.53	N 60 **Kendall's W 0.758** Chi-Square 90.936 df 2 Asymp. Sig. .000
Poor understanding of pharmaceutical SCM costs during budget planning	60	1.95	1.126	1.12	
Inefficient utilization of the allocated budget for essential pharmaceuticals availability	60	3.47	1.096	2.35	
Aggregate Mean		**3.12**			

Source: own survey, 2021

It was noted that respondents were not sure or neutral regarding financial resource challenges of pharmaceuticals supply chain management at EPSA Nekemte branch with mean 3.12.

As per Kendall's W test, there is good agreement (W= 0.758) among respondents on their rating of attributes of financial resource challenge. Depending on the mean rank value financial resources were ranked from highest to the least as follows: inadequate budget allocation by the government to avail all essential pharmaceuticals (Mean Rank = 2.53), inefficient utilization of the allocated budget for essential pharmaceuticals availability (Mean Rank = 2.35), and poor understanding of pharmaceutical SCM costs during budget planning (Mean Rank = 1.12). Accordingly, inefficient utilization of the allocated budget for essential pharmaceuticals availability is the major financial resource challenge while poor understanding of pharmaceutical SCM costs during budget planning is the least.

Respondents also commented they believe there is shortage of foreign currency to avail imported pharmaceuticals timely and in sufficient quantity.

The availability of pharmaceuticals at EPSA Nekemte branch and at service delivery points supplied by the branch may also be negatively affected by the financial resource challenges as agreed or strongly agreed by majority of the respondents: inadequate budget allocation and inefficient utilization of allocated budget (PFSA,2012).

4.4.2.3 Infrastructure Challenges

Respondents' attitude was evaluated towards 5 selected constructs regarding infrastructure challenges. Table 4.8 shows summary of responses on infrastructure challenges of pharmaceuticals supply chain management at EPSA Nekemte branch.

Table 4.8: Summary of responses on infrastructure challenges of pharmaceuticals supply chain management at EPSA Nekemte branch.

Infrastructure Challenges	**N**	**Descriptive Statistics**		**Kendall's W Test**	
		Mean (M)	**Std. Deviation (SD)**	**Mean Rank**	**Coefficient of Concordance (W)**
Inadequate storage capacity to handle all required pharmaceuticals	60	2.00	0.319	3.30	
Lack of adequate& standardized racks/shelves for pharmaceuticals storage	60	1.98	0.469	3.22	
Lack of adequate vehicles for timely delivery of pharmaceuticals	60	2.00	0.638	3.18	
Non automated warehouse & inventory management activities	60	1.78	0.415	2.80	
Information/data/ not available for decisions making	60	1.67	0.475	2.51	
Aggregate Mean		**1.89**			

N	60
Kendall's W	**0.200**
Chi-Square	47.926
df	4
Asymp. Sig.	.000

Source: own survey, 2021

As shown by Table 4.8, respondents disagree or strongly disagree with all infrastructure challenges: information/data/ is not available for decisions making (M 1.67, SD 0.475); warehouse & inventory management activities are non-automated (M 1.78, SD 0.415); inadequate storage capacity to handle all required pharmaceuticals (M 2.00, SD 0.319); lack of adequate and standardized racks/shelves for pharmaceuticals storage (M 1.98, SD 0.469) and lack of adequate vehicles for timely delivery of pharmaceuticals (M 2.00, SD 0.638).

It was noted that respondents disagree with infrastructure challenges of pharmaceuticals supply chain management at EPSA Nekemte branch with mean score 1.89.

As per the Kendall's W test, there was poor agreement (W= 0.200) among the respondents regarding their rating of attributes infrastructure challenge. Similarly, as we have seen above the descriptive statistics result shows that respondents disagree with all infrastructure challenges.

Respondents commented that the culture of using available data for decision making is poor at EPSA Nekemte branch.

As per the result on infrastructure challenges of pharmaceuticals supply chain management at EPSA Nekemte branch, using its strong infrastructure EPSA Nekemte branch can improve its culture of using data for decision making for improvement of its pharmaceuticals supply chain management practices.

Regarding human resource, financial resource, and infrastructure related challenges in pharmaceuticals supply chain management most of the human resource and financial resource problems are real challenges at EPSA Nekemte as agreed or strongly agreed by majority of respondents while most of the infrastructure challenges do not exist at the branch. Most of the literatures used in this study also support the same idea. Vujicic stated that shortages, geographic imbalances, and poor performance of health workers pose major challenges for improving service delivery in developing countries. These health workforce challenges are major problems to be improved at health systemps and health service delivery in developing countries. Many low- and middle-income countries are experiencing a crisis in human resources for health (HRH). In addition to shortage of workers, the workers that exist are overworked, undertrained, and often deployed in ways that do not best use their skills or meet the needs of the people they serve. (Vujicic *et al*., 2011). In many low- and middle-income countries (LMICs), the high cost of medicines, together with economic instability, continued population growth, and a heavy burden of disease, makes it a challenge to ensure adequate financing for a stable and adequate supply of medicines. A lack of or limited local production of medicines in these countries can add to these challenges (Bhawalkar and Taddese, 2014).

Using Kendall's W Test, the mean rank of the composite variables of pharmaceuticals supply chain management practices and challenges at EPSA Nekemte branch was calculated (See Table 4.9).

From Table 4.9, we can conclude that, inventory management practices (Mean Rank = 6.00) are highest ranked followed storage management practices (Mean Rank = 4.29) and distribution management practices (Mean Rank = 2.91). Human resource challenges (Mean Rank = 4.71) are highest ranked followed by financial resource challenges (Mean Rank =1.61) and infrastructure challenges (Mean Rank = 1.48).

Table 4.9: Mean Rank of pharmaceuticals supply chain management practices and challenges at EPSA Nekemte branch.

Practices and Challenges	**Mean Rank**
Inventory Management Practices	6.00
Storage Management Practices	4.29
Distribution Management Practices	2.91
Human Resource Challenges	4.71
Financial Resource Challenges	1.61
Infrastructure Challenges	1.48

Source, Own Survey,2021

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

This research was conducted to investigate pharmaceuticals supply chain management practices and challenges in EPSA Nekemte branch. This chapter presents the summary of the findings based on the objectives of the research. It also contains conclusion and recommendations.

5.1 Summary of the Findings

The following summary have been drawn based on the findings as per the result of data analysis.

- From pharmaceuticals inventory management practice perspectives majority of respondents agree or strongly agree that conducting physical inventory of pharmaceuticals at least once per year; the proper use of stock keeping logistics forms like bin cards & stock cards; availability and well documentation of pharmaceuticals procurement list and implementation of electronic inventory management system for proper management of stock are practiced at EPSA Nekemte branch. However, most of respondents disagree or strongly disagree that prevention of frequent stock out and high wastage of pharmaceuticals are practiced at EPSA Nekemte branch. Most of the respondents agree with inventory management practices at EPSA Nekemte branch with aggregate mean of 3.56.
- Majority of respondents agree or strongly agree on availability of special storage area for cold chain items; availability of enough storage space to store pharmaceuticals within the branch; full functionality of storage equipment; implementation of SOP to ensure proper storage of pharmaceuticals from perspectives of pharmaceuticals storage management practices. Whereas most respondents disagree or strongly disagree on the practice like regular compliance check of storage equipment and availability of strong measures to reduce pharmaceuticals wastage. Majority of respondents agree with pharmaceuticals storage management practices at EPSA Nekemte branch with aggregate mean 3.53.
- From pharmaceuticals distribution management practice perspectives most of the respondents agree or strongly agree only on availability of enough vehicles to meet demand for delivery of pharmaceuticals. The practice of delivery of pharmaceuticals within recommended timeline got equal vote for both positive and negative responses. While majority of the respondents disagree or strongly disagree with practices of fitting transport

vehicles with functional temperature and humidity monitoring devices and availability of sufficient special vehicles for transportation of cold chain items. Respondents were not sure or neutral with pharmaceuticals distribution management practices at EPSA Nekemte branch with mean score of 2.87.

- Regarding pharmaceuticals supply chain management challenges related to human resource management majority of the respondents agree or strongly agree that challenges like insufficient salary payment for professionals working on pharmaceuticals SCM; low leadership commitment to motivate professionals who perform best; lack/shortage of adequate skills and experiences of professionals working on pharmaceutical SCM; insufficient compensation for professionals overworked and high turnover (attrition rate) of staff working on pharmaceutical SCM exists at EPSA Nekemte branch. Respondents commented that no/insufficient induction training/orientation is provided to newly hired staffs and leadership skills of staffs at each level of management is poor at EPSA Nekemte branch. Whereas most of the respondents disagree or strongly disagree with human resource related challenges such as low awareness and understanding of top management regarding pharmaceutical SCM and high work overload on the available staff. Human resource challenge related to insufficiency of number of staff working on pharmaceutical SCM got equal score for both positive and negative response. Respondents were not sure or neutral regarding human resource challenges of pharmaceuticals supply chain management at EPSA Nekemte branch with mean 3.33.
- Inadequate budget allocation by the government to avail all essential pharmaceuticals and inefficient utilization of the allocated budget for essential pharmaceuticals availability were the financial resource challenges that majority of the respondents at EPSA Nekemte branch agree or strongly agree with. Respondents also commented they believe there is shortage of foreign currency to avail imported pharmaceuticals timely and in sufficient quantity. However, most of the respondents disagree or strongly disagree with the challenge of poor understanding of pharmaceutical SCM costs during budget planning. Respondents were not sure or neutral regarding financial resource challenges of pharmaceuticals supply chain management at EPSA Nekemte branch with mean 3.12.
- Most of the respondents disagree or strongly disagree with existence of all the challenges related to infrastructure in pharmaceuticals supply chain management at EPSA Nekemte

branch including information/data/ is not available for decisions making; warehouse & inventory management activities are non-automated; inadequate storage capacity to handle all required pharmaceuticals; lack of adequate& standardized racks/shelves for pharmaceuticals storage and lack of adequate vehicles for timely delivery of pharmaceuticals. Respondents disagree with infrastructure challenges of pharmaceuticals supply chain management at EPSA Nekemte branch with mean score 1.89. The only challenge added by respondents' comment was poor culture of using available data for decision making.

5.2 Conclusion

The following conclusions are given based on perceived evaluation of respondents' attitude regarding pharmaceuticals supply chain management practices and challenges at EPSA Nekemte branch.

- Pharmaceuticals supply chain management practices related to inventory management that are properly practiced at EPSA Nekemte branch include: conducting physical inventory of pharmaceuticals at least once per year; the proper use of stock keeping logistics forms like bin cards and stock cards; availability and well documentation of pharmaceuticals procurement list and implementation of electronic inventory management system for proper management of stock. Prevention of frequent stock out and high wastage of pharmaceuticals are not/less practiced at EPSA Nekemte branch. Conducting physical inventory at least once a year is the highly practiced attribute while maintaining pharmaceuticals wastage rate within acceptable range is the least practiced attribute of inventory management practices.
- Availability of special storage area for cold chain items; availability of enough storage space to store pharmaceuticals within the branch; full functionality of storage equipment/material handling equipment/; implementation of SOP to ensure proper storage of pharmaceuticals are well practices at EPSA Nekemte branch from perspectives of pharmaceuticals storage management. Practice like regular compliance check of storage equipment and availability of strong measures to reduce pharmaceuticals wastage are not/less practiced. Availability of special storage area for cold chain items is best practiced

while availing measures to reduce pharmaceuticals wastage is least practiced attribute of storage management practices.

- Pharmaceuticals supply chain management practices from distribution management practice perspectives that are properly practiced at EPSA Nekemte branch include: availability of enough vehicles to meet demand for delivery of pharmaceuticals and delivery of pharmaceuticals within recommended timeline. Practices of fitting transport vehicles with functional temperature and humidity monitoring devices and availability of sufficient special vehicles for transportation of cold chain do not exist at EPSA Nekemte branch. Availability of enough vehicles for delivery of pharmaceuticals was best distribution management practice while the weakest practice is availing sufficient special vehicles for transportation of cold chain items.
- Pharmaceuticals supply chain management challenges related to human resource management like insufficient salary payment for professionals working on pharmaceuticals SCM; low leadership commitment to motivate professionals who perform best; lack/shortage of adequate skills and experiences of professionals working on pharmaceutical SCM; insufficient compensation for professionals overworked and high turnover (attrition rate) of staff working on pharmaceutical SCM exists at EPSA Nekemte branch. Human resource related challenges such as low awareness and understanding of top management regarding pharmaceutical SCM and high work overload on the available staff are not challenges of EPSA Nekemte branch. Low leadership commitment to motivate best performers was the major human resource challenge while low awareness & understanding of top management regarding pharmaceutical SCM was the least.
- Financial resource related challenges at EPSA Nekemte branch in pharmaceuticals supply chain management include inadequate budget allocation by the government to avail all essential pharmaceuticals and inefficient utilization of the allocated budget for essential pharmaceuticals availability. At EPSA Nekemte branch there is no challenge related to poor understanding of pharmaceutical SCM costs during budget planning.
- All Infrastructure related challenges in pharmaceuticals supply chain management do not apply to EPSA Nekemte branch. Infrastructure related problems like unavailability of information/data/ for decisions making; non-automation of warehouse and inventory management activities; inadequate storage capacity to handle all required pharmaceuticals;

lack of adequate& standardized racks/shelves for pharmaceuticals storage and lack of adequate vehicles for timely delivery of pharmaceuticals do not challenge pharmaceuticals SCM at EPSA Nekemte branch.

Finally, EPSA Nekemte branch can best perform using its existing pharmaceuticals SCM practices and infrastructures to solve pharmaceuticals availability and wastage problems, if few of its challenges related to human and financial resources are solved.

5.3 Recommendations

Considering the findings of this study, recommendations that help to improve pharmaceutical supply chain management practices and solve the challenges were made as follows.

- ✓ EPSA Nekemte branch will be benefited, if it keeps up its best practices in pharmaceuticals inventory management; storage management; and distribution management aspects.
- ✓ EPSA Nekemte branch will be benefited from implementation of pharmaceuticals warehouse management practice like regular compliance check of storage equipment /material handling equipment/.
- ✓ It needs EPSA Nekemte branch to fit transport vehicles with temperature and humidity monitoring devices to keep safety and quality of pharmaceuticals during delivery to health facilities.
- ✓ EPSA Nekemte branch needs more special vehicles for transportation of cold chain items.
- ✓ It will better, if the management of EPSA Nekemte branch strive to solve pharmaceuticals supply chain management challenges related to human resource management including insufficient salary payment for professionals working on pharmaceuticals SCM; low leadership commitment to motivate professionals who perform best; lack/shortage of adequate skills and experiences of professionals working on pharmaceutical SCM; insufficient compensation for professionals overworked and high turnover (attrition rate) of staff working on pharmaceutical SCM.
- ✓ The management of EPSA Nekemte branch is also better to work closely with relevant government body to solve financial resource related challenges like inadequate budget allocation by the government to avail all essential pharmaceuticals and inefficient utilization of the allocated budget for essential pharmaceuticals availability.

- ✓ Improving culture of using available data helps EPSA Nekemte branch to use its strong Infrastructure for better decision making.

5.4 Suggestion for Future Research

Future research may attempt to collect data on each of the key pharmaceuticals SCM practices to determine the relationship each of the practices with organizational performance. This provides vital insight into which practices appear to be most significant to creating and improving organizational value.

The other point not well covered by this study were the remaining pharmaceuticals SCM Challenges that may affect the SCM Practices and performance. So, the researcher suggests for future studies to incorporate other internal and external factors that may affect the SCM practices, and relationship to their operational performances.

REFERENCES

Aarti D., Dhawal Modi. (2010). Inventory Management Delivering Profits Through Stock Management.

Abdel Fattah. (2008). The Impact of Service Quality Dimensions on Customer Satisfaction: A Field Study of Arab Bank in Irbid City, Jordan. European Journal of Business and Management.

Adams.J., Khan,H., Raeside,R. and White,D. (2007). *Research Methods for Graduate. Business & Social Science Students*. California, Sage.

Admaw Anley, (2010). Impact of Supply Chain Management Practices on Competitive Positioning of Ethiopian Textile Firms. Unpublished Master's Thesis, University of South Africa.

Allan, W. (2013). *Analysis of challenges of medical supply chains in sub-Saharan Africa regarding inventory management and transport and distribution.* University of Westminster London Westminster Business School.

Asamoah D., Abor P. and Opare M. (2011). An examination of pharmaceutical supply chain for artemisinin-based combination therapies in Ghana. Management Research Review, 34(7), Pp790-809.

Belay Mengistu, (2011). Challenges of Supply Chain Management and Their Relationship with the Competitive Position of Cement Industries in Ethiopia. Unpublished Master's Thesis, University of South Africa.

Bhawalkar, M. and Taddese,A. (2014). *Guide to Tracking Pharmaceutical Expenditures in a Health System*. Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington.

Britannica, T. Editors of Encyclopaedia (9 May 2018). pharmaceutical. Encyclopedia Britannica. https://www.britannica.com/technology/pharmaceutical.

Creswell J. W. (2009). *Research Design, Qualitative, Quantitative, and Mixed Methods Approaches.* Third. Thousand Oaks, California: SAGE Publication Inc.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika 16, Pp297–334.

CSCMP (Council of Supply Chain Management Professionals). (2021). CSCMP Supply Chain Management Definitions. To access the definitions, go to http://cscmp.org/aboutcscmp/definitions.asp Online. Accessed on 20-05-2021

Deliver Project (2006). The Logistics Handbook: A Practical Guide for Supply Chain Managers in Family Planning and Health Programs

Dereje Asfaw (2012). Impact of Supply Chain Management Practices on the organizational Performance of basic metal and engineering industries in Ethiopia. Unpublished Master's Thesis, University of South Africa.

Emelia, D., Meshach, A., Aikins,I. and Duah,P.. (2014). An assessment of health commodities management practices in health care delivery; A supply chain perspective. The case of selected hospitals in ashanti region-ghana. *European Journal of Business and Social Sciences*, Vol. 3, No. 8, Pp 78 – 103 online URL: http://www.ejbss.com/recent.aspx-/ISSN: 2235 -767X. Online. Accessed on 25 Sept. 2021.

Ethiopian Pharmaceuticals Supply Agency, (2016). *Comprehensive manual for quantification pharmaceuticals in Ethiopia*. Addis Ababa.

Ghauri, P. and Kjell, G. (2005). *Research method in business studies*. Harlow: Pearson Education Limited.

Guansekeran, A., Patel, C. and Tirtiroglu, E., (2001), Performance measures and metrics in a supply chain environment. International Journal of Operations and Production Management, 21, Pp71–87.

Heizer J. and Render B. (2011). Operation Management, Global Edition, 10th ed. New Jersey, USA, Prentice Hall Inc.

Jaberidoost,M., Nikfar,S.,Abdollahiasl,A. and Dinarvand,R. (2013). Pharmaceutical supply chain risks: a systematic review. *DARU Journal of Pharmaceutical Sciences* 21:P69 http://www.darujps.com/content/21/1/69. Online. Accessed on 20 Sept. 2021.

John Snow Inc. (2017). The Supply Chain Managers Handbook: A Practical Guide to the Management of Health Commodities. Arlington, Va.: John Snow Inc.

John Snow Inc. /DELIVER (2004). The Logistics Handbook: A Practical Guide for Supply Chain Managers in Family Planning and Health Programs. Arlington, Va.: John Snow Inc. /Deliver, For the U.S. Agency For International Development (USAID).

John, M.,Jonathan, A., Devid, A.(2015). *Optimizing drug supply chain in hospital pharmacy department.* An empirical evidence from a developing country, ISSN 2162-4860, Vol.5 No.2. ULR:http://dx.doi.org/10.5296/ber.v5i2.7789. Online. Accessed on 20 Sept. 2021.

Kapoor, D., Vyas, R.B. and Dadarwal, D. (2018). An overview on pharmaceutical supply chain: a next step towards good manufacturing practice. Drug designing & intellectual properties. *International journal*, ISSN: 2637-4706.

Kendall, M. G., & Gibbons, J. D. (1990). Rank correlation methods. New York, NY: Oxford University Press.

Kidane Assefa, (2012). Relationship Marketing in the Hotel Industry: The nexus between concepts and practices -A case of Ghion Hetel, Addis Ababa Branch, Ethiopia. Unpublished MA Project. Addis Ababa University.

Kizito, E. K, & James, K. K. (2013). The impact of procurement operations on health care delivery: A case study of malawi's public healthcare delivery system. *Global journal of management and business research administration and management,* Volume 13 Issue 3Version 1.0, ISSN: 0975-5853.

Kolikam, M.B., Joshi, H.D. and Kamathi ,V.G.(2015). Assessment of Public Pharmaceutical Supply Management System at Rural Primary Health Centers in Udupi District, Karnataka. *Indian Journal of Pharmacy Practice*,Vol 8, Issue 4,Pp148-164.

Lapointe, J. (2017). *Most common supply chain challenges*. https://revcycleintelligence.com/news/3-most-common-healthcare-supply-chain.Online. Accessed on 30 July 2021.

Legendre, P., (2005). Species associations: the Kendall coefficient of concordance revisited. Journal of Agricultural, Biological and Environmental Statistics, 10, Pp226–245

Management sciences for health, MSH (2012). *Managing access to medicines and health technologies*. Arlington.

Managing Science for Health (2012). Handbook of Pharmaceutical Management, Pp18-20

Ministry of Health of Ghana (2009). WHO Pharmaceutical Situation Assessment – Level Ii: Health Facilities Survey in Ghana.

Mesfin Berhane, (2007). Model Development of Supply Chain Management System: A case study of Mesfin Industrial Engineering PLC. Unpublished Master's Thesis, Addis Ababa University.

Msimangira K.A. (2003). Purchasing and supply chain management practices in Botswana. Supply Chain Management: An International Journal, 8(1), Pp7 – 11.

Mugenda, O., & Mugenda, A. (2003). Research Methods: Qualitative and Quantitative Approaches. Nairobi. Africa Center for Technology Studies.

Nazila, Y.,and Ahmad, A. (2015). Information Flow in the Pharmaceutical Supply Chain. *Iranian Journal of Pharmaceutical Research,* 14 (4), Pp1299-1303

PFSA (Pharmaceutical Fund and Supply Agency), (2012). Standard Operating Procedures Manual for the Pharmaceuticals Logistics Systems in Health Facilities of Ethiopia, PFSA, Ethiopia.

Power D. (2005). SCM integration and implementation: a literature review. Supply Chain Management, An International Journal, 10 (4), Pp52 – 263.

Sanncheze-Rodriguez C. (2009). Effect of strategic purchasing on supplier development and performance: a structural model, Journal of Business and Industrial Marketing, Vol. 24, No. 3, Pp161-172,

Saybal, K.S. and Ajeya, J. (2018). Role of Information Technology on Supply Chain Management of Pharmaceutical Industry. *International journal of applied logistics*.Vol.8(2) https://dl.acm.org/journal/ijal. Online Accessed on 24 Jan 2021.

Shetty,A.D. (2015).Growth And Challenges Of Logistics Management In Healthcare Industry – An Indian Scenario. *Proceedings of International Conference on Management Finance Economics July 11-12, 2015, ISBN:9788193137307.*

Simichi-Levi. D., Kaminiski P. and Simichi-Levi E. (2008). Designing and Managing the Supply Chain, Concepts, strategies and case studies, 3rd ed. Boston, USA, McGraw-Hill Irwin's publisher.

Su, S.I., Chou, A., Hsu, T. and Ho, T. (2009), "A follow-up study of hospital ordering pattern, its impact on order fulfillment performance and collaboration opportunities", Technical Report, SC Lab, Soochow University, Taipei.

Sutton J. and Kellow N. (2010). An Enterprise Map of Ethiopia. London UK, International growth center.

Tan, KC. (2001). A framework of Supply Chain Management Literature. European Journal of Purchasing and Supply Management, 7(1), Pp39-48.

UNCTAD (United Nations Conference on Trade and Development). (2020). Ethiopia Science, Technology, and Innovation Policy Review. UN, Geneva, and New York.

USAID | DELIVER PROJECT, Task Order 1 (2011). *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities.* Second Edition. Arlington

USAID|DELIVER PROJECT, Task Order 4. (2013). *Human resource capacity development in public health supply chain management*: assessment guide and tool.

Voordijk H. (1999). Obstacles and preconditions for logistics and manufacturing improvements in Africa - a case study. International Journal of Operations & Production Management, 19(3), Pp293-307.

Vujicic,M., Weber,S.,Nikolic,I.,Atun, R. and Kumar,R. (2011). *GAVI, the Global Fund and World Bank support for human resources for health in developing countries.*

World Bank, (2009). Ethiopia Improving Health Systems, Public Sector Health Care Supply Chain Strategic Network Analysis and Design, Driving Service improvements through supply chain excellence, The World Bank, Ethiopia.

World Health Organization, WHO (2012). *Millennium Development Goals*. Available From: http://www.who.int/mediacentre/factsheets/fs290/en/. Online. Accessed on 25 May 2021

APPENDICES

Appendix 1: Kendall's W Test Statistics

Table 1: Kendall's W Test Statistics for Inventory Management Practices

Test Statistics

N	60
Kendall's W[a]	.909
Chi-Square	381.927
df	7
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

Table 2: Kendall's W Test Statistics for Storage Management Practices

Test Statistics

N	60
Kendall's W[a]	.748
Chi-Square	224.460
df	5
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

Table 3: Kendall's W Test Statistics for Distribution Management Practices

Test Statistics

N	60
Kendall's W[a]	.687
Chi-Square	164.963
df	4
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

Table 4: Kendall's W Test Statistics for Human Resource Challenges

Test Statistics

N	60
Kendall's W[a]	.733
Chi-Square	307.947
df	7
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

Table 5: Kendall's W Test Statistics for Financial Resource Challenges

Test Statistics

N	60
Kendall's W[a]	.758
Chi-Square	90.936
df	2
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

Table 6: Kendall's W Test Statistics for Infrastructure Challenges

Test Statistics

N	60
Kendall's W[a]	.200
Chi-Square	47.926
df	4
Asymp. Sig.	.000

a. Kendall's Coefficient of Concordance

Appendix 2: Questionnaire

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

QUESTIONNAIRE:

This questionnaire is designed to collect information from Ethiopian Pharmaceuticals Supply Agency (EPSA) particularly in Nekemte Town at Nekemte Branch. You are kindly requested to complete this questionnaire sincerely and honestly.

Are you willing to participate in the study? 1. Yes 2. No

Please fill in the questions by checking in (√) the correct answer.

Please answer all questions

All the data collected will be used only for the purpose of the study.

PART I: Demographic Profile

1. Gender

(*Tick where appropriate)* ☐ Male ☐ Female

2. Age

(Tick where appropriate)

☐ 18-24 years ☐ 25-34 years ☐ 35-44 years ☐ 45-54 years ☐ Over 55 years

3. Education level

(Tick where appropriate)

☐ College/University Diploma ☐ Bachelor's Degree ☐ Master's Degree ☐ PHD

Other (Specify)……

4. How many years have you worked for the organization (on pharmaceuticals SCM)?

(Tick where appropriate)

☐ 1-5 years ☐ 6-10 years ☐ 11-15 years ☐ Over 16 years

5. Please indicate the level of management category you fall under.

(Tick where appropriate)

Management level: ☐ Top ☐ Middle ☐ Low

Instruction for part III & part III: Please indicate the degree to which you agree with the following statements regarding the practices and challenges of pharmaceutical supply chain in your institution. Indicate your choice by putting the check mark "X" on the appropriate cell where: Strongly Disagree, Disagree, Not sure, Agree, Strongly Agree

PART II: Pharmaceuticals Supply Chain Management Practices

6. Rate the following of pharmaceuticals supply chain management practices at EPSA Nekemte branch:

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
i. The Inventory Management Practices					
a. All available pharmaceuticals are listed in the procurement list of the agency					
b. The procurement list of the agency is appropriately documented					

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
c. Stock keeping logistics forms like bin cards, stock cards, are properly used					
d. Physical inventory is done at least ones per year					
e. Pharmaceuticals are not out of stock frequently (<5% stock out rate) with in the branch					
f. Pharmaceutical's wastage is within the acceptable annual wastage rate (2%)/ in the branch					
g. Electronic inventory management system is well implemented for proper management of stock					
h. Overall inventory management of pharmaceuticals of the organization is satisfactory					
ii. Storage Management Practices					
a. Storage space is enough to store pharmaceuticals within the branch					
b. Special storage area for cold chain items is available within the branch					
c. Storage equipment/material handling equipment/ are fully functional					
d. Storage equipment are regularly checked for compliance					
e. There are measures in place to reduce pharmaceuticals wastage					
f. Standard Operating Procedures (SOPs) are followed to ensure proper storage of pharmaceuticals.					
iii. Distribution Management Practices					
a. Enough vehicles are available to meet demand for delivery of pharmaceuticals					
b. There is/are sufficient special vehicles for transportation of cold chain items					
c. Transport vehicles are fitted with functional temperature and humidity monitoring devices					
d. Delivery is done within recommended timelines					
e. Overall distribution management practices are satisfactory					

7. Other comments you have regarding pharmaceutical supply chain management practices at EPSA Nekemte branch?

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PART III. Pharmaceuticals Supply Chain Management Challenges

8. Rate the following pharmaceuticals supply chain management challenges at EPSA Nekemte branch:

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
i. Human Resource Challenges					
a. Lack/shortage of adequate skills and experiences of professionals working on pharmaceutical SCM.					
b. Insufficient salary payment for professionals working on pharmaceutical SCM.					
c. Insufficient number of staff working on pharmaceutical SCM.					
d. High work overload on the available staff					
e. Insufficient compensation for professionals overworked					
f. High turnover (attrition rate) of staff working on pharmaceutical SCM					
g. Low awareness and understanding of top management regarding pharmaceutical SCM					
h. Low leadership commitment to motivate professionals who perform best					

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
ii. Financial Resources Challenges					
a. Inadequate budget allocation by the government to avail all essential pharmaceuticals					
b. Poor understanding of pharmaceutical SCM costs during budget planning					
c. Inefficient utilization of the allocated budget for essential pharmaceuticals availability					
iii. Infrastructure Challenges					
a. Inadequate storage capacity to handle all required pharmaceuticals					
b. Lack of adequate& standardized racks/shelves for pharmaceuticals storage					
c. Lack of adequate vehicles for timely delivery of pharmaceuticals					
d. Non automated warehouse & inventory management activities					
e. Information/data/ not available for decisions making					

9. Other comments you have regarding pharmaceuticals supply chain management challenges at EPSA Nekemte branch?

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Thank you for your cooperation!!