ASSESSMENT OF HEALTH LOGISTICS MANAGEMENT PRACTICE IN FEDERAL HOSPITALS OF ADDIS ABABA, ETHIOPIA.

BY

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ATHESIS SUBMITTED TO SCHOOL OF COMMERCE, DEPARTMENT OF LOGISTIC AND SUPPLY CHAIN MANAGEMENT, ADDIS ABABA UNIVERSITY, IN PARTIAL FULFILMENT OF THE REQUIRMENT FOR MASTER OF ART IN LOGISTIC AND SUPPLY CHAIN MANAGEMENT (MA)

AUG, 2021

ADDIS ABABA, ETHIOPIA

Addis Ababa University School of Commerce Logistics & Supply Chain Management Department

Assessment of health logistics management practice: In Case of Five Federal Hospitals of Addis Ababa

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Declaration

I do hereby declare that, this study on "Assessment of health logistics management practice in federal hospitals of Addis Ababa, Ethiopia." is my original work and has not been presented for a degree in any other university, and all sources used for the study have been duly acknowledged.

Name	**Signature**	**Date**

Acknowledgements

All thanks to Almighty GOD, Jesus Christ who does all things well in his time and a sole reason for my existence.

To my advisor, Dr Busha Temesgen for his guidance and support in conducting this study.

To my wife, I am pleased to acknowledge my wife, Dr kalkidan Fekede for supporting me and putting up with me during the course of my studies. Especially for this, thesis thank you for motivating me from starting to end and for believing in me that I am strong enough to do this as well as doing all the support to empower me, your strong words are great support for me.

I further wish to express my gratitude to my friend and leader Yonas Asheir,Tsegaw Shewakena and Natan Demeke for their real support giving their valuable time ,energy and knowledge to help me to finish this thesis. Without them accomplishment of this work could not be realized.

I would like to thank my friend and brother Daniel Taye for giving me direction on how to do this thesis. And I would also like to say thanks for my colleague and friend Bethelhem Girma for her real support and immense patience while I was doing this research paper.

To the store managers, pharmacy heads DSM officer and Medical director taking time from their busy schedules to provide data and pointing me in the right directions

Lastly, I offer my regards to all of those who supported me in any respect during my MA program.

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List of Abbreviations

DSM	Drug Supply Management
HCMIS	Health Commodity Management Information System
FEFO	First To Expire, First Out
FMOH	Federal Ministry Of Health
EDL	Essential drug list
DTC	Drug therapeutics committee
MSH	Management science for Health
MCH	Maternal and child health pharmacy
IFRR	Internal facilities Request and resupply
SOP	standard operating procedures
ICs	Inventory Control System
IPLS	Integrated Pharmaceutical Logistic System
LMIS	Logistic Management Information System
FMHACA	Food medicine health administration and control Authority
WHO	World health organization
EPSA	Ethiopian Pharmaceutical supply agency (the new name)
PFSA	Pharmaceutical Fund And Supply Agency(old name)
RRF	Report And Requisition Format
USAID	United states Agency For International Development
OPD	Outpatient department

Abstract

Health logistic management system is a subset of organizations total medicine use practices systems. The objective of this study is to assess health logistic management practice of the federal hospitals of Addis Ababa. Purposive sampling technique was used to study the problem in five federal hospitals of Addis Ababa and all DSM officers, store managers, pharmacy heads and medical Directors are included in the study. Institutional-based descriptive cross-sectional study design was applied using both qualitative and quantitative approach.The data was collected through structural observation checklist and structured interview to gather information on pharmaceutical logistic management practice of the federal hospitals of Addis Ababa.The collected data was manually checked for completeness and consistencies before being entered into the computer. The quantitative data was entered and analyzed by using SPSS version 20 and MS-Excel 2007. The qualitative data was analyzed thematically. Descriptive statistics was used to compute frequencies results .Results was presented using tables and graphs. The qualitative portions of the study were summarized in narrative format. The result shows the logistic system performance, the Inventory management, the logistic management information system and storage condition is poor resulting for poor pharmaceutical logistic management practice of the federal hospitals of Addis Ababa. The federal hospital has poor pharmaceutical logistic management practice and hence higher officials of the hospitals should support and supervise their respective facilities pharmaceutical logistic practice.

Key words: pharmaceuticals, health logistics, Availability, Federal hospitals

Chapter One

1. Introduction

1.1 Background of the study

A quality health service requires the availability of safe, effective, affordable and qualified drugs and medical supplies in adequate quantity at all times with appropriate dose and dosage forms. However, health logistic management supply is a very complex process that requires a strong organizational structure, and integrated supply chain. It involves a number of interrelated logistics functions accompanied by appropriate support functions in a supply chain and governed by stringent policy and legal framework. These functions can be kept effective and integrated well if quality information moves up and downstream of a supply chain. Thus, a properly managed health logistic management should be established in each health supply chain facilities (Pinna, Carrus and Marras, 2015).

Health logistic management system is a subset of organizations total medicine use practices systems. It involves records and reports used to gather, analyse, and validate data from all levels of the logistics system that can be used to make logistics decisions and manage the supply chain. In this context, health logistic management system deals about medicines, medical supplies and medical equipment's. According to the Ethiopian food and drug administration proclamation 661/09 medicines, medical supplies and equipment's are defined as "pharmaceuticals" therefore hear onwards health logistics and pharmaceuticals logistic can be used interchangeably. Health logistic management practices are important parts of every logistics system. The records are intended to gather & record vital logistics data at each level of the health care system. The data are then combined to form logistics reports, which are used for critical decision-making about resupply quantities, forecasting, and procurement decisions (Tiye and Gudeta, 2018).

Based on the actions taken on supplies in the logistics system (i.e., storing, moving and using the supplies), three basic types of logistics records are used to monitor and track the status of the products in the pipeline. It includes stock keeping records, transaction records, and consumption records. Stock keeping records hold information about products in a storage e.g. bin-cards and stock-cards whereas the transaction records keep information about products being moved e.g. report & resupply forms (RRFs), internal facility & resupply forms (IFRRs), different vouchers

& etc. The consumption records maintain information about products being consumed at the health facility e.g. patient registration book (Tiye and Gudeta, 2018).

Health Logistics management practices is an essential component of supply chain management, with responsibilities that include rational quantification, selection, procurement, distribution transportation and patient use of medicine by providing timely, safe, and reliable services. The essential mission of Health logistics and supply chain management is an efficiently plan, organize, and coordinate the movement of pharmaceutical products from a point of origin to a point of patient use. Analysing and aligning health logistic management goals with a patient-first approach enable healthcare organizations to reduce costs while improving patient outcomes (Pinna, Carrus and Marras, 2015).

Health is one of the crucial elements for the development of a country (Hansen *et al.*, 2015). As countries continue to expand health programs and strengthen the supply chains that support them, there is an increased need for user-friendly tools and software packages to support the timely and accurate collection and reporting of logistics management information (USAID | DELIVER PROJECT, 2016).

The pharmaceutical supply Chain management system of the Ethiopia had several problems including non-availability, unaffordability, poor storage and stock management and irrational use. For overcoming the stated problems above Ministry of health in collaboration with Ethiopian pharmaceutical supply agency (EPSA) and other stake holder develop system called integrated pharmaceutical logistic system (IPLS). 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. To be successful, the system must fulfil the six rights of supply chain management by ensuring the right products, in the right quantity, of the right quality, at the right place, at the right time and for the right cost (PFSA, 2015).

Quality health care requires safe, effective, affordable and qualifies pharmaceutical products in adequate quantity, price, dose and dosage forms at all times. However, managing pharmaceutical products is a very complex process that requires strong organizational structure and integrated supply chain system institutionally (Tiye and Gudeta, 2018).

Logistic management information system (LMIS) is used to maintain pharmaceutical product availability and improves services seeking of the community, enhances quality of health care, increase health care professional's satisfaction and morale. Moreover, LMIS involves records and reports used to gather, analyse and validate data from all level of the logistic system that can be used to make logistics decisions and manage the pharmaceutical supply chain system at the health care level (Tiye and Gudeta, 2018).

Bin card and stock card are used to records health care commodities information in storage and IFRR (Internal facilities Request and resupply forms), RRF (Report and resupply form) and different vouchers are types of transactional record documents that is used to record health commodities being moved. Patient registration book is type of consumption records that is used to maintain information about health commodities being consumed at health facilities (Tiye and Gudeta, 2018).

These records are collectively referred to as inventory or stock records. Stock records are sources of basic and primary information for inventory management in that they contain all pharmaceutical transaction of individual units. It provides inventory receipts, issue, losses, order and balances. This stock record information is important for compiling and generating performance reports, distribution plan and quantification. Thus, applying of effective health commodity record is mandatory, not an option (Bayked, 2019).

In Ethiopia, studies on health logistic management practices system are very limited at public federal hospital and even most of them are simply surveys reporting a description practices across the health facilities. Therefore, the aim of this study was to assess the health logistic management practice of health professionals at federal public hospitals.

1.2 Statement of the problem

Pharmaceuticals represent a large portion of the costs in the healthcare system. They account for 20–60% of health spending in developing and transitional countries (Cameron *et al.*, 2009). More than that, shortages of essential medicines, and spending on unnecessary or low-quality medicines also have a high cost - wasted resources and preventable illness and death (Aldeen *et al.*, 2014). Poor availability of vital and essential drugs is the key barrier to access to medicine especially in public sector where generic medicines availability is less than 60% across WHO regions, ranging from 32% in the Eastern Mediterranean Region to 58% in the European Region

(WHO, 2011). In the poorest countries of Africa and Asia, as much as 50% of the population lacks such access. While some 10 million lives a year could be saved by improving access to essential medicines and vaccines – 4 million in In Ethiopia, majority of the common leading causes of morbidity (pneumonia, malaria, acute upper respiratory infections, helminithiasis, acute febrile illness, and diarrhea) and mortality (pneumonia, tuberculosis, malaria, neonatal sepsis and meningitis) can be substantially reduced if carefully selected, low-cost pharmaceuticals are available and appropriately used (FMOH, 2012).

Pharmaceutical logistic and supply management activities include quantification, procurement, inventory management, transportation and fleet management and data collection and report. Such activities are done by DSM (Drug and medical supply manger) officer, store personnel and department head. Health supply chain includes the logistics activities plus the coordination and collaboration of staff, department head and related functions. Moreover, Head of nursing departments are responsible persons for any types of health care supply transaction related to department wise consumption (Desale *et al.*, 2013). However, there is an observed problem of over stock, under stock and stock out of health care supply at the health facilities. Such types of problems becoming difficult for store manager to calculate the actual consumption, order and resupply of the health commodities of the departments at the institution levels. This leads the DSM team of the institutions to forecast and quantify the health commodities inappropriately. As per the FMOH assessment results there is inconsistent and poor utilization of IFRR and bin cards at the facility level (Kefale and Shebo, 2019). Thus, it can hamper an effective health commodities management at the institution levels. Therefore, this study attempts to assess the real practice of the store managers The DSM and department heads towards health logistics management system at Federal hospital of Addis Ababa, Ethiopia

1.3 Research Question

1. What **inventory management practices** are there in the Federal hospitals of Addis Ababa for pharmaceutical logistics system?

2. Which **Logistic management information system** is used for the pharmaceutical logistics management of the Federal hospitals of Addis Ababa?

3 Which **storage conditions** are fulfilled for the pharmaceutical logistic management of the Federal hospitals of Addis Ababa?

4. Which of the **logistics system performance**: The order fill rate, line fill rate, wastage rate and availability of vital and essential pharmaceuticals are met for the Federal hospitals of Addis Ababa?

1.4 Research Objective

1.4.1 General objective

The objective of this study is to Assess Health logistics management practice of the Federal hospitals of Addis Ababa.

1.4.2 Specific objectives

To assess the inventory management practice of the Federal hospitals of Addis Ababa

To assess the Logistics management information system of the Federal hospitals of Addis Ababa

To assess the storage condition of the Federal hospitals of Addis Ababa for the pharmaceutical logistics management

To assess the logistics system performance of the Federal hospitals of Addis Ababa in terms of Order fill rate, line filtrate, wastage rate and availability of vital and essential pharmaceuticals.

1.5 Significance of the study

An effective pharmaceutical logistics management practices should be implemented for good medical supply management cycles and decision-making process institutionally. Cognizant of these facts, the government of Ethiopia has designed and implemented a pharmaceutical logistics management system since 2009. Thus, identifying the real practice of the hospitals pharmaceutical logistics management members towards the utilization of health logistics management system that is the integrated pharmaceuticals logistic system (IPLS) is critical to take corrective action and improve the process at the institution levels. By identifying inefficiencies in the healthcare supply chain, we are able to design solutions to increase efficiency, drive down cost, and improve positive patient outcomes

1.6 Scope of the study

This study focused on the logistics management practice of federal public hospitals of Addis Ababa. Addressing all Pharmacy professionals those who are store managers, department logistic officer, department heads and medical director only.

1.7 Limitation of the study

The study was cross sectional study in nature and assesse the practice at specific time and study didn't examine the impact of Health logistic practices. One limitation of this research is lack of adequate literatures which is conducted in this area of study. Since the research study was conducted only in Addis Ababa; it would not be generalized to others. The other it didn't include all the components of supply chain management done at higher level like selection, quantification and procurement, the study mainly focused on supply chain components implemented in the hospital level like inventory management, storage and LMIS. Therefore future research should be conducted on large scale by considering more hospitals and health centers and EPSA overall the country

1.8 Definition of Terms

DSM: drug supply manager: is a professional who is responsible for the management of supply chain in pharmaceutical logistic (Kapoor, 2018) **(Kapoor et al., 2018)**.

Over stock: stocks found in the store more than the needed quantity. (Kapoor et al., 2018)

Inventory control: also refer to as stock control it is managing all aspects of companies inventories: purchasing, shipping, receiving, tracking, warehousing or storage and recording by one integrated system (Salim, Handojo and Setiabudi, 2020).

Pharmaceuticals: any drugs, medical supplies, medical equipment's and laboratory reagents used for health care services (Tan, 2002).

Federal public Hospitals: - Hospitals that is governed by Federal minister of health (Yadesa and Zeberga, 2018).

IFRR: internal facility resupply form is a report format used for resupplying of medication and other supply to individual dispensaries (Pharmacy) periodically on one week two week or monthly base from the main store (Yadesa and Zeberga, 2018).

RRF: report and resupply form: is a report format used for request of drug and supplies to main supplier Ethiopian pharmaceutical supply agency for the health facilities periodically on two-month base.

RDF pharmaceuticals: Revolving drug fund: These are pharmaceutical that the facilities buy for their organization from their own budget

Program pharmaceuticals: These are pharmaceuticals used for programmatic management of disease supplied to facilities without cost.

1.9 Organization of the study

This study is organized in the following five major chapters. Chapter 1 presents general introduction to the thesis which begins with providing back ground information on the overall concept of Health (Pharmaceutical) logistic management followed by describing other components of the chapter such as statement of the problem, research question, objectives, significance, scope and limitation of the study. Chapter 2 presents a review of relevant literature related to the subject matter pharmaceutical logistic including different empirical studies. Chapter 3 presents the methodology used in conducting the research. Chapter 4 presents the result (findings) and discussions part of the research work based on the analysis done. Finally, chapter 5 presents the summary, conclusion and recommendations of the research work and future research forward.

Chapter two
2. Literature Review

2.1 Theoretical literature

From delivering prescriptions to providing patients transportation to and from the doctor, innovation in healthcare logistics facilitates the evolution of a new kind of value-based supply chain. The healthcare supply chain's goals must be re-examined in order to fit a new patient-centred model of care delivery, adapting to the individual needs of agencies along the way. This will help improve patient outcomes while also strengthening long-term supply chain goals between partners by utilizing a holistic approach to supply chain management that centre both patients and clinicians (Tiye and Gudeta, 2018).

Some of the biggest challenges in healthcare logistics include waste management, storage and inventory management, device maintenance and sanitation, and shipping. And it can be difficult to build alternative solutions when you're dealing with a lack of efficient storage space, increasing labour costs, and frustrating manual procedures that need to be carried out by clinicians (Tiye and Gudeta, 2018).

The Ethiopian pharmaceutical supply Chain management system earlier to 2007 GC had several problems including non-availability, unaffordability, poor storage and stock management and irrational use. To overcome those problems in an efficient and effective manner the mandated agency EPSA had developed a system called integrated pharmaceuticals logistics system (IPLS) and till know it is under implementation (PFSA, 2015). The system, IPLS has three basic logistics functions:

2.1.1 Logistics Management Information System (LMIS)

The purpose of a Logistics Management Information System (LMIS) is to collect, organize, and report information to other levels in the system in order to make decisions.

The primary function of the LMIS is to support the management of essential pharmaceuticals.

There are three essential data items are required to run a logistics system and, therefore, must be captured by the LMIS. These are:-

Stock on Hand: Quantities of usable stock available at a particular point in time.

Consumption Data: The quantity of pharmaceuticals used during the reporting period.

Losses/Adjustments: Losses are the quantities of products removed from your stock for anything other than in the provision of services to patients or issuing to another facility (e.g. expiry, lost, theft, or damage) and are recorded as negative (-) numbers. Adjustments are quantities of a product received from any source other than PFSA, or issued to anyone other than your health facility. An adjustment may also be a correction due to an error in mathematics. An adjustment may be a negative (-) or positive (+) number.

There are different LMIS tools used for recording and reporting purpose and those are Bin card, Stock record card, Internal Facility Report and Resupply Form, Health Post Monthly Report and Re-supply Form and Report & Requisition Form and those tools are expected to be filled manually which is time taking and prone to error and that is why the HCMIS is introduced to overcome those challenges and to produce real time data (Yaba, 2014).

2.1.2 Inventory Control System (ICS)

In pharmacy operations, inventory is referred to as the stock of pharmaceutical products retained to meet future demand. Specifically, the system aims at reducing procurement and carrying costs, while maintaining an effective stock of products to satisfy customer and prescriber demands (Ali, 2011).

An efficient inventory control system would help the optimize use of resources and eventually help to improve patient care, by ensuring the availability of essential stocks and preventing stock-outs (Gones, 2016).

The purpose of an inventory control system is to inform personnel when and how much of a pharmaceutical to order and to maintain an appropriate stock level to meet the needs of patients. A well designed and well operated inventory control system helps to prevent shortages, oversupply, and expiry of pharmaceuticals (Yaba, 2014).

The goals of inventory management are to protect stored items from loss, damage, theft, or wastage, and to manage the reliable movement of supplies from source to user in the least expensive way (Wanjau, 2012). The inventory control system for the IPLS is a Forced Ordering Maximum/Minimum inventory control system. This means that all facilities are required to report on a fixed schedule (monthly at health posts, every other month at health centers and

hospitals) for all products. In addition, all products are re-supplied each time a report is completed.

2.1.3 storage of pharmaceuticals

Pharmaceuticals have a shelf life which is specified by the manufacturer. When pharmaceuticals reach the end of their shelf, it has expired and should not be distributed to patients. Some health products have short shelf lives. Because of these short shelf lives, it is important that proper storage procedures are followed, so that the shelf life is protected. Always follow FEFO. FEFO means "first-to-expire, first-out". Always distribute products that will expire before other products. Do not follow "first-in, first-out". To apply FEFO, Store Managers and Health Facility In-Charges should: 1. Write the expiry dates on the outside of cartons. 2. Place the cartons or products so that the first to expire are stacked in front of or on top of products that will expire later. 3. Distribute products from front to back or top to bottom so that products that expire sooner will be issued first (PFSA, 2015).

A well-organized store will keep items safe, help simplify the facility's work and reduces time wastage in trying to find needed items. Health facility pharmacy store improvement is one of the IPLS related pharmaceuticals management initiatives which includes having a well-organized and well spacious store room that contains all the required storage facilities and adhering to the good pharmaceutical storage guidelines & pactices.

2.2 Empirical review

In a 2019 Cardinal Health survey, 42% of respondents said supply chain work takes too much time away from patient care and 45% of front-line providers say that manual supply chain tasks have a "very" or "somewhat" negative impact on patient care. By rethinking the supply chain to make it work for clinicians, we can develop logistics services to reduce clinician burnout while enabling caregivers to spend more time interacting directly with patients (Cardinal Health, 2018).

In health facilities found in Sub-Saharan countries where resources are scarce, wise selection of medicines most relevant to the health facility is indispensable. Spending the available scarce fund in duplicative and unnecessary drugs may lead to the stock-out of other essential medicines. For example, a study done in Tanzania showed that from 27 surveyed health facilities only 38% of them had EDL out of which only 52% of facilities procured medicines within the EDL (Ministry of Health and Social Welfare, 2008).

The WHO recommends the selection of drugs to be based on a list of common conditions and complaints and the treatments of choice for these conditions and complaints as defined in standard treatment guidelines. In other words, EDL should constitute the drugs included in the standard treatment guidelines for a particular level of health care. EDL simplifies systems of procurement by guiding the procurement and supply of medicines in the public sector. Moreover, it leads to better supply of drugs, to more rational prescribing, and consequently to lower costs, to better quality of care, and to better health outcomes (WHO, 2003).

The research done on Integrated pharmaceutical logistics system implementation in wollega zone Oromia region, Ethiopia showed that there is still gap with the standard set by ministry of health and the result indicated that availability of blank bin cards, internal facility request and resupply form (IFRR) and request and resupply form (RRF) were 100%, 83% and 100%, respectively at hospitals. At health centers the availability of blank bin cards, IFRR and RRF were 100%, 82% and 94%, respectively. However, availability of the recording and reporting formats decline as we move down the supply chain (Alemu *et al.*, 2021).

Pharmaceutical logistics system typically includes a number of activities such as selection, forecasting, procurement, inventory management, and serving customers that supports the six rights; the right goods in the right quantities and in the right condition delivered to the right place at the right time and at the right cost (Pardon and Tien, 2012).

Researches done in Sub-Saharan countries showed that availability of EDs has been improved, but still far from the WHO recommended target of 100%. In Ghana, the availability of key EDs selected for the country in public health facilities was 80%; and length of stock out duration 29.9 days. In Tanzania, Uganda and Kenya, all of them East African countries, the availability of key EDs was 88.9%, 45.7% and 82.6%, respectively (Hamel *et al.*, 2011). Though the availability of EDs seems high in the health facilities of Tanzania, the same facilities also presented a considerable number of stock out days. Some medicines were out of stock for 4 months with the median number of stock-out 135.6 (Ministry of Health and Social Welfare, 2008). In Uganda, the length of stock-out duration in public health facility pharmacy was 72.9 days. A cross sectional study conducted in health centres of Western Ethiopia showed that only 55.6% of the assessed drugs were available (Abiye, Tesfaye and Hawaze, 2013).

According to the national survey conducted by PFSA in 2015, the availability of blank bin cards, IFRRs, and RRFs are high at hospitals (above 90 percent) and health centers (close to 80

percent). However, the availability of the recording and reporting formats decline when moving down the supply chain. The availability of bin cards which are the fundamental logistics records that captures essential inventory data was 40 percent at the health post level. In addition, the study stated that the accuracy of balances on bin cards by facility level showed at hospitals, accurate balances ranged from 29 percent to 71 percent per different items with an average of 49 percent. The survey result also showed that there is a variation in use of RRF by phase of IPLS implementation (phase I, II, and III). For Example, The RRF use was high (97 percent) among phases I and II facilities, both in hospitals and health centers. This was not the case for phase III health centers, where only 54 percent used the RRF (Shewarega *et al.*, 2019).

Another study done on Logistics Management Information System Performance of Program Medicines in Public Health Facilities of East Gojjam Zone, Northwest Ethiopia showed that out of 640 bin card records, 495 (77.3%) were updated while 408 (63.8%) of recorded data were accurate ranged from 40 to 100% at hospitals and 20–86.6% at health centers. Where anti-retroviral, FP/MCH, anti-tuberculosis, and anti-malaria drug products accounted for 62.1%, 71.9%, 55.6%, and 73.3%, respectively (Figure 2). Whereas 494 (77.2%) of the total bin card records were near accurate to (10%) tolerable rate (Tiye and Gudeta, 2018).

Qualitative and quantitative baseline survey was conducted in Ghana Laboratory Logistics System showed that 60% of the facilities were fully stocked on the day of the visit, 83.3% the facility store follow first-to-expire, first-out (FEFO) principles and Expired products were typically separated from usable supplies (Addo *et al.*, 2006).

Studies conducted in Botswana to assess the status of supply chain system showed that the current laboratory system is the consistent interruption of testing services resulting from unplanned 15 activities, reagents stock outs and expiries, excessive emergency order situations that interrupts the supply plan and lack of documented procedures was also identified, the occurrences of stockouts is an important indicator of poor inventory management, stock outs of reagents and supplies translate into the inability of a laboratory to perform tests (Sarah Andersson, 2009).

Improving availability of transportation and automated transportation management is important for improving pharmaceutical logistics in health centers and hospitals. But, in practice there is a common problem of transportation in health institutions for example the study conducted on Integrated pharmaceutical logistics system implementation in wollega zones showed that in most

health facilities only 75% of the hospitals and 68% of health centers program commodities are usually delivered to their stores via delivery from a higher level, while the majority of the health posts (72%) usually collect their products from the supplying health center. As expected, in the case of RDF commodities, facilities themselves (95% of hospitals and 80% of health centers) collect from the suppliers primarily from PFSA (Alemu *et al.*, 2021).

A study conducted in Lesotho showed that only 17 % of Hospitals had SOP for medicine supply management system and only 53 % of facilities had stock record cards to keep stock record of 17 reagents. And none of the facilities had a practice of separating damaged or expired items from usable ones which is one of a sign of poor storage management. In addition the study showed that there is poor management and supervision in logistics management issues. Most facilities were found to have over 80 percent of basic ARVs in stock, although inventory management continues to be a problem. This situation is due largely to a lack of or insufficient supervision which, in turn, is caused by low staffing levels. Logistics is a serious problem in the laboratory services, with no logistics management information system (LMIS) in place and few of the laboratories using stock cards. The placing of orders was found to be erratic and inconsistent and less than 50 percent of the laboratories sent stock reports to the district or central levels. The laboratories were generally well-stocked and had service contracts with suppliers, but infrastructure can be improved (Desale *et al.*, 2013).

2.3 Conceptual frame work

The conceptual framework of this study is based on the relationship between dependent and independent variables. The study attempts to assess the relationship between Pharmaceutical logistic management and inventory control management, ware house management, transportation and distribution and logistics system performance in Federal hospitals of Addis Ababa.

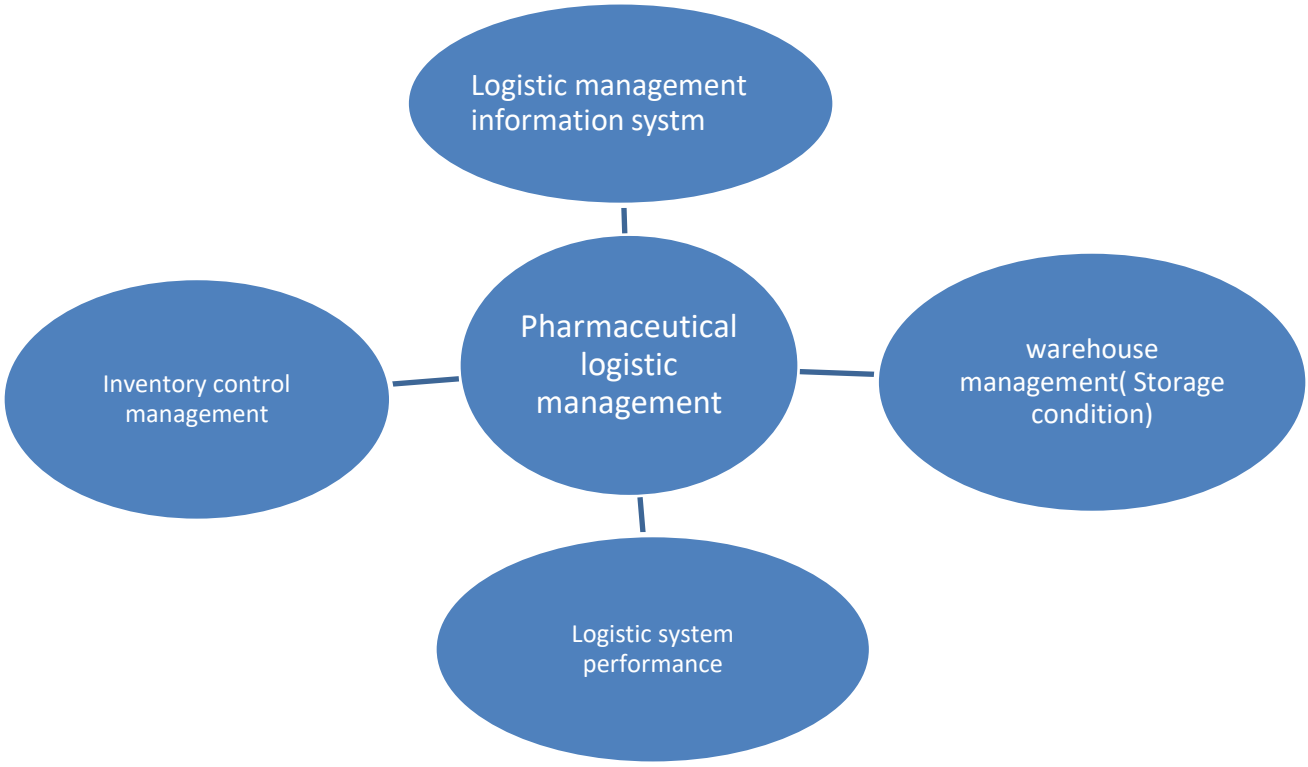

Figure 2.1 Conceptual frame work of health logistics management practice (DELIVER/JSI., 2017)

Chapter Three

3. Research Methodology

3.1 Description of Study Area and Period

This study was conducted between October 2020 to August 2021 in All Federal hospitals found in Addis Ababa. These federal hospitals are ALERT center, Amanuel mental health specialized, Black lion, St. Paul's and St. Peter's TB specialized. Black lion hospital was the first and the only one referral hospital in Ethiopia now it is a center of specialty, sub specialty health services and is now the main teaching hospital for both clinical and preclinical training's of most disciplines. It is administered under higher education and innovation minister. St. Paul hospital is engaging in health care and training to its students through its different biomedical and clinical departments; it is also a teaching hospital. ALERT is the highest level of referral hospital for leprosy complication in and also a WHO recognized international training center. St. Peter's TB specialized is established for initially TB screening and treatment center in addition to that currently it is also providing other health services; Amanuel mental health hospital is specialized in delivering mental health services

3.2 Study design

Descriptive cross-sectional study design was applied using both qualitative and quantitative approach.

3.3 Study Population and Sample size

The target population was constitute all Federal hospital in Addis Ababa and all health professionals involved in logistics management of health commodities in those facilities. Those hospitals DSM members like store manager, DSM officer, pharmacy head was included and also medical director of the hospitals was included in the interview part.

3.4 Sampling Techniques

Purposive sampling technique was used to study the problem in five federal hospitals of Addis Ababa and all DSM officers, store managers, pharmacy heads and medical Directors are included in the study because they know the nature of the problem.

3.5 Inclusion and Exclusion Criteria

All pharmacy professional directly involved in pharmaceutical logistic management that's The DSM team, heads of the pharmacy department and Medical director was included for this study.

3.6 Data collection procedures and instruments

The data was collected through structural observation checklist and structured interview to gather information on pharmaceutical logistic management practice of the federal hospitals of Addis Ababa. The structural observation checklist tools are adapted from IPLS Integrated pharmaceutical logistic system which is developed by EPSA to reduce national pharmaceutical wastage and improve distribution of pharmaceuticals to service delivery points (PFSA, 2015). The principal investigator (PI) collected the majority of the information used as input for the study. A research assistant assisted the PI with collecting information from hospitals pharmacy stores. The research assistants have had half day training on the survey tool before being involved in the data collection.

3.7 Data Quality Assurance

This study was conducted for fulfilment of master degree graduation requirements. All of the study process and procedure followed rule and regulation of research requirements regulation through evaluation committee of Addis Ababa University School of commerce and commented by my Advisor

3.8 Data processing, analysis, interpretation and presentation

The collected data was manually checked for completeness and consistencies before being entered into the computer. The quantitative data was entered and analyzed by using SPSS version 20 and MS-Excell 2007. The qualitative data was analyzed thematically. Descriptive statistics was used to compute frequencies results. Results was presented using tables and graphs. The qualitative portions of the study were summarized in narrative format.

3.9 Ethical consideration

After approval of the proposal, ethical clearance was obtained from Ethics Review Board of school of commerce. Then, formal support letter requesting permission to conduct the study was written by Logistic and Supply chain Department to federal hospitals of Addis Ababa

During the consent process, they had provided with information regarding the purpose of the study, why and how they were selected to be involved in the study, and what was expected from

them and that they can withdraw from the study at any time. Participants also assured about confidentiality of the information obtained in the course of the study by not using personal and Facility identifiers, and analysing the data in aggregates. Instead Code was used to present findings of health facilities.

Chapter Four

4. Result and discussion

4.1 Result /findings of the study

In this part of the study data that were collected using Interview and observation are presented. The data were important to assess the logistic management practice of the federal hospitals located in Addis Ababa. The findings and results are helpful to forward recommendations. Interviews were used to collect data from key professional that have in depth knowledge and information about pharmaceutical logistic. In addition, documents such as recording and reporting were reviewed and observation at storage was done at the hospitals. The results are organized as follows:

4.1.1 Characteristics of study Health facilities and study participants

At each facility, study participants' number of years of experience in the hospital ranges from 4 years to 15 years. 50 % of them stayed in the hospital for more than 7 years. All were the responsible person for managing pharmaceuticals at the hospitals. There were a total of 323 pharmacy staffs under the pharmacy department of these hospitals among them 182 staffs had training on integrated pharmaceutical logistic system (IPLS) which accounts 56.35%.

Table 4.1 Percentage of Trained pharmacy staffs on Integrated Pharmaceutical Logistic System (IPLS) in Federal Hospitals found Addis Ababa, Ethiopia, June/2021

Federal hospitals	Total No of pharmacy staff	No trained staff of IPLS	% trained
H1	62	40	64.52
H2	42	25	59.52
H3	38	22	57.89
H4	95	55	57.89
H5	86	40	46.51
Total	323	182	**56.35**

4.1.2 Logistic system performance

The study result from an interview with pharmacy head and DSM managers indicated that all the Federal hospitals included in this study procure their pharmaceuticals directly from Ethiopian

pharmaceutical supply agency (EPSA). Unless they have got stock out stamp from EPSA or the products requested by hospitals are not in the EPSA list they can't go to other option of procurement for satisfying their need. 80 percent of the hospitals exercise open tender method to buy products either after they got stock out stamp or if the items are not in EPSA product list. 60 percent of the hospitals used request for quotation also known as "proforma" method for availing the pharmaceuticals. One of the hospitals (H4) has huge credit from EPSA which is yet not paid that's making the pharmacy logistic department to have poor communication with their main supplier

The study also assessed means of transportation used by facilities that collect their products. For program drugs, EPSA the sole and main supplier of the health institution in all over the country, transports the pharmaceuticals to all the federal hospitals by its own vehicle. But for RDF (budget) pharmaceuticals all of the hospital uses their own vehicle for transportation. 60 percent of the hospitals send their RRF (report Requisition form) for program drugs to EPSA manually while 40 percent of hospitals used both manual and Electronic Health commodity management reporting system (DAGU). 40 percent of the hospitals received their order after reporting the RRF within two weeks period for program Pharmaceuticals while 60 percent of the hospital received their order two weeks to a month period. For budget Pharmaceuticals, all of the hospitals managed to get their order with in a day they submit their request. But all of the hospitals couldn't get the entire amount they request in the same day due to shortage Pharmaceuticals at EPSA. Accordingly 60 percent of the hospitals' are obliged to visit EPSA four times per week while 40 percent of them visit three times per week.

60 percent of the hospitals had direct support and supervision from higher officials of the hospitals while the rest didn't get adequate support.

From recordings and documents the following data were obtained: in 80 percent of the hospitals order fil rate was less than 50% while 20 percent of the hospital has 60% order fill rate. In all of the hospitals line fill rate was less than 50% for the items they procure from their sole and main supplier EPSA

Table 4.2 percentages of order and line fill rate of in Federal hospitals found Addis Ababa, Ethiopia, June/2021

Hospitals	**No of orders in 3 month**	**No of order Filled**	**No of lines filled (80%)**	**Order fill rate**	**Line fill rate**
H1	494	240	207	**48.6%**	**41.9%**
H2	585	340	281	**58.1%**	**48%**
H3	562	250	225	**44.5%**	**40%**
H4	750	330	265	**44%**	**35.3%**
H5	710	321	294	**45.2%**	**41.4%**

The study also showed that all of the hospitals have facility specific drug list and had established Drug and therapeutics committee (DTC). 40 percent of them has functional DTC and perform ABC analysis at least once in a year.

As described in figure 1.availability of vital pharmaceuticals in federal hospitals of Addis Ababa is 65%. The highest availability of vital pharmaceuticals was observed in hospital 2(H2) whereas the lowest is in Hospital (H4).

As Described in Figure2 availability of Essential pharmaceuticals in federal hospitals of Addis Ababa is 62.3%. The highest availability of Essential pharmaceuticals was observed in hospital 2(H2) whereas the lowest is in Hospital (H4).

As shown in the figures below Hospital 5 had higher availability of vital and essential Medical supply compared to its medicine and reagents.

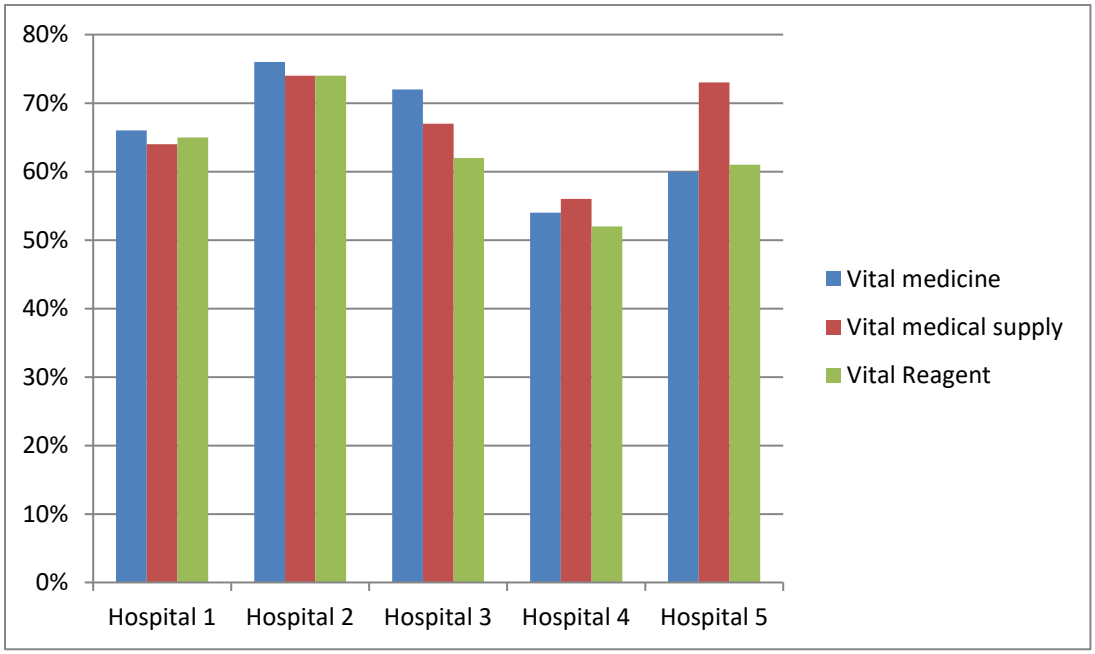

Figure 4.1 percentage of Vital pharmaceutical availability in Federal hospitals found Addis Ababa, Ethiopia, June/2021

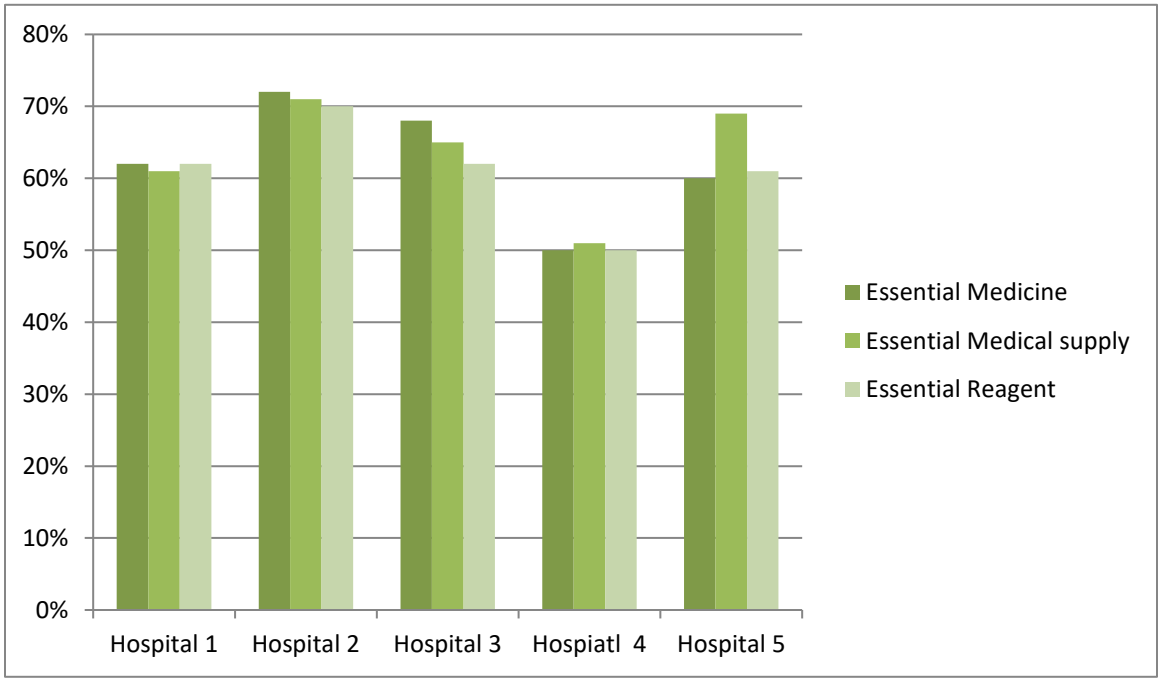

Figure 4.2 percentages of Essential pharmaceuticals in Federal hospitals found Addis Ababa, Ethiopia, June/2021

The study result showed that data extracted from HCMIS and recording the wastage rate of the federal hospital is 3.34% the highest annual wastage rate was observed in hospital in Hospital 4(H4) while the lowest in Hospital 2(H2)

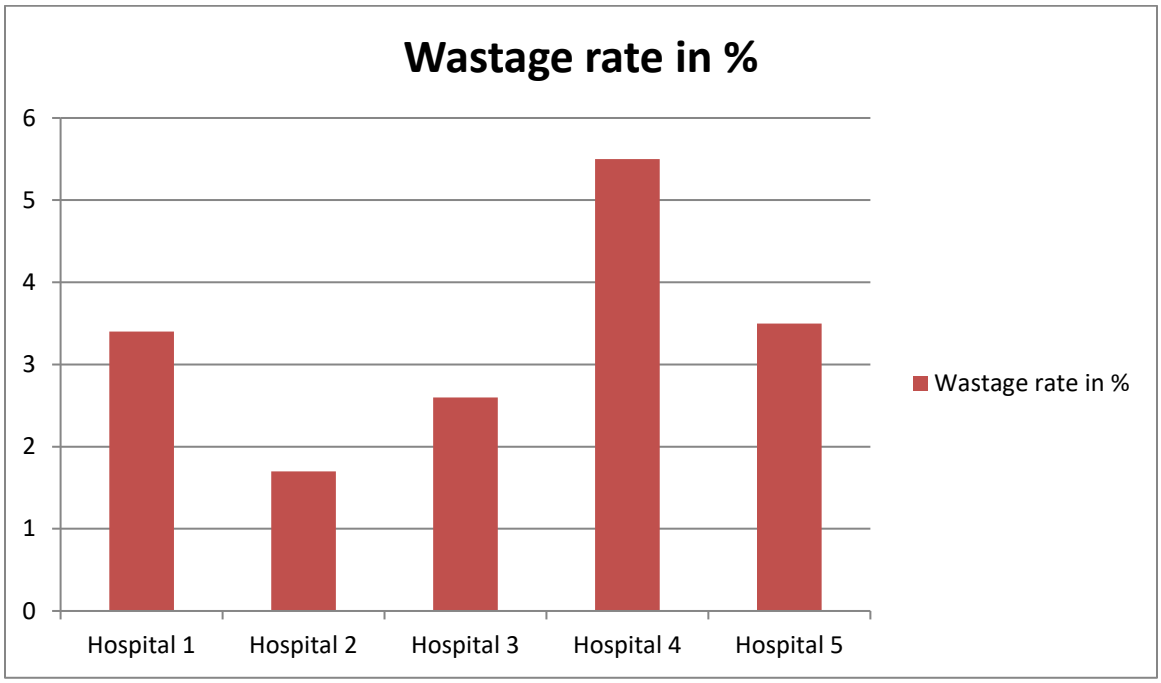

Figure 4.3 Wastage rate in Federal hospitals found Addis Ababa, Ethiopia, June/2021

4.1.3 Logistic management information system

The result indicated that availability of blank bin cards; standard operation procedure (SOP) for IPLS; internal facility request and resupply form (IFRR) and request and resupply form (RRF) were 100%, in all hospitals. The result shows that 40 percent of the hospitals did not fill IFRR forms appropriately at MCH and OPD pharmacies. In 80 % of the hospitals IFRR for inpatient pharmacies was filled appropriately while at emergency pharmacies IFRR is inaccurately filled in all hospitals. In 20percent of the hospitals, IFRR is filled inaccurately in all pharmacy dispensing units. Hospital 4 was observed to have used inappropriately filled IFRR in all pharmacy dispensing unit. The aggregate accuracy of the federal hospital IFRR is 45%

Table 4.3 percentage of Accuracy of IFRR in Federal hospitals found Addis Ababa, Ethiopia, June/2021

Pharmacy dispensing unit	**Accuracy of IFRR**					
	Hospital 1	**Hospital 2**	**Hospital 3**	**Hospital 4**	**Hospital 5**	**Total(Accuracy in Percent)**
MCH pharmacy	Yes	Yes	Yes	No	No	60%
OPD pharmacy	Yes	Yes	No	No	Yes	60%
Emergency Pharmacy	No	No	No	No	No	0%
IN patient pharmacy	Yes	Yes	Yes	No	Yes	80%
Total (Accuracy in Percent)	50%	75%	50%	0%	50%	

The result of the study revealed that 80 percent of the hospitals have an IFRR schedule time for dispensary out let to collect their pharmaceuticals from the main store but 40 percent of the hospital posts the IFRR schedule time where anyone can read and follow the schedule easily. All federal hospitals use RRF for both program and budget Pharmaceuticals for reporting/ ordering to EPSA. All the hospitals RRF is legal, timely and complete. But all of the hospital RRF is inaccurate

4.1.4 Inventory management

The study result revealed that Physical inventory of the store items has done 4 times per year in 60 percent of the federal hospitals while 40percent has done less than 4 times per year. 40 percent of the hospitals physical inventory has done every month at dispensary while 60 percent has done inventory every other month or quarterly.

The result shows that Bin card update for randomly selected 20 items was 64 percent in federal hospitals of Addis Ababa.

Table 4.4 percentage of Bin card update in Federal hospitals found Addis Ababa, Ethiopia, June/2021

Hospitals	Bin card update for sample 20 items	% updated
H1	14	70
H2	17	85
H3	12	60
H4	09	45
H5	12	60
Total		**64**

The study result indicated that all the federal hospitals use electronic HCMIS for managing their pharmaceuticals and HCMIS update for received pharmaceuticals in Model 19 is 92 percent while 71 percent for issued items update.75 percent of items had equal amount in HCMIS and with the physical inventory.

Table 4.5 Percentage of HCMIS update in Federal hospitals found Addis Ababa, Ethiopia, June/2021

Hospitals	Update of HCMIS for sample 20items					
	Update received items	%	Update issued items	%	Physical count update	%
H1	18	90	14	70	16	80
H2	19	95	18	90	19	95
H3	20	100	17	85	15	75
H4	18	90	10	50	11	55
H5	17	85	12	60	14	70
Total		**92**		**71**		**75**

4.1.5 Storage

The study result from an interview with facility store managers indicated that 60 percent of the hospitals store managers didn't follow FEFO when they issue pharmaceuticals. All the hospitals store managers visually inspect when they receive the pharmaceuticals but not when they issue to the respective dispensary out let.

Four guide lines out of 14 are fulfilled by all the federal hospitals. The guide lines which states "Products are stacked at least 10 cm off the floor, at least 30 cm away from the walls and other stacks and no more than 2.5 meters high, Fire safety equipment is available, functional and accessible and The current space of the store room is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future)" is fulfilled only in 20 percent of the hospitals.

The guide line that states "Pharmaceuticals are stored organized and arranged in a manner that is accessible for first-expire – first-out (FEFO) stock rotation method" is fulfilled only in 40 percent of hospitals. The guide line which states that "There is Separate place for unusable pharmaceuticals from usable pharmaceuticals" is fulfilled in 60% of the hospitals.

Table 4.6 Storage condition in Federal hospitals found Addis Ababa, Ethiopia, June/2021

No	Description	Yes	No
1	Storeroom is maintained in good condition (clean & tidy, all trash removed, sturdy shelves, well organized boxes).	4(80%)	1(20%)
2	The hospital pharmacy store is dry well ventilated and out of direct sunlight for the pharmaceutical products	4(80%)	1(20%)
3	Fire safety equipment is available, functional and accessible	1(20%)	4(80%)
4	Pharmaceuticals are arranged properly and professionally in such a way that identification labels and expiry dates and/or manufacturing dates are visible.	2(40%)	3(60%)
5	Pharmaceuticals are stored, organized and arranged in a manner that is accessible for first-expire – first-out (FEFO) stock rotation method	2(40%)	3(60%)

6	Does the store have maintain cold storage, including a cold chain, as required	5(100%)	0(0%)
7	There is Separate place for unusable pharmaceuticals from usable pharmaceuticals	3(60%)	2(40%)
8	Storage area is visually free and protected from harmful insects and rodents (check the storage area for traces of bats and/or (dropping or insects))	5(100%)	0(0%)
9	Storage area is well secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel	5(100%)	0(0%)
10	The current space of the store room is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future)	1(20%)	4(80%)
11	There is temperature monitoring thermometer for the store room	4(80%)	1(20%)
12	There is temperature monitoring thermometer for the fridges	5(100%)	0(0%)
13	Products are stacked at least 10 cm off the floor, at least 30 cm away from the walls and other stacks and no more than 2.5 meters high.	1(20%)	4(80%)
14	Cartons and drugs are protected from water and humidity during all seasons	4(80%)	1(20%)

4.2 DISCUSION

4.2.1 Logistic system performance

In this study, from an interview with pharmacy head and DSM managers indicated that all the Federal hospitals procure their pharmaceuticals directly from Ethiopian pharmaceutical supply agency (EPSA) and for program drugs, EPSA the sole and main supplier of the health institution in all over the country, transports the pharmaceuticals to all the federal hospitals by its own vehicle. But for RDF (budget) pharmaceuticals all of the hospital uses their own vehicle for transportation. And all of the hospitals couldn't get the entire amount they request in the same day due to shortage Pharmaceuticals at EPSA. Accordingly 60 percent of the hospitals' are obliged to visit EPSA four times per week while 40 percent of them visit three times per week. The study done in East wollega zones Ethiopia on LMIS showed that in most health facilities 75% of the hospitals and 68% of health centers program commodities are usually delivered to their stores via delivery from a higher level, while the majority health posts (72%) usually collect their products from the supplying health center. For RDF commodities, facilities themselves (95% of hospitals and 80% of health centers) collect from the suppliers primarily from PFSA (Alemu *et al.*, 2021).

Ethiopian pharmaceutical supply agency manages both Program (donated and free) and revolving drug fund (purchased) Pharmaceuticals. Distribution of pharmaceuticals is mainly performed by Storage and distribution directorate and general service unit and the Central EPSA has different functional vans and heavy load Vehicles to distribute pharmaceuticals (PFSA, 2015).

By the proclamation 553/2007 public health institutions shall place order only to the EPSA for the supply pharmaceuticals they need.

The study result from an interview with pharmacy head and DSM managers indicated that 40 percent of the hospitals received their order after reporting the RRF within two weeks period for program Pharmaceuticals While 60 percent of the hospital received their order two weeks to a month period. For budget Pharmaceuticals, all of the hospitals managed to get their order with in a day they submit their request. But all of the hospitals couldn't get the entire amount they request in the same day due to shortage Pharmaceuticals at EPSA. Accordingly, 60 percent of the hospitals' are obliged to visit EPSA four times per week while 40 percent of them visit three

times per week. The study done in Black Lion Hospital the length of the resupply period for a normal order, it will take, approximately greater than two weeks between sending an order and receiving products form the main supply point which is PFSA hub (Dereje *et al.*, 2016). A similar study which was done In Zimbabwe public health facilities, the lead time for antiretroviral drugs (ARVs) and prevention of mother-to-child transmission (PMTCT) commodities was often less than one month (Jabulan *et al.*, 2006).

The result from this study shows that in 80 percent of the hospitals order fil rate was less than 50% while 20 percent of the hospital has 60% order fill rate. In all of the hospitals line fill rate was less than 50%. A similar study done in Ethiopia the case of four wollega zones the percentage of facilities resupplied with the quantity ordered was above 40%, both at the hospital- and health center–level (Alemu *et al.*, 2021). Another study done in black lion hospital showed that the two reasons for not having the exact type and amount of items requested by the hospital are absence of adequate stock at the resupplying PFSA hub and stock out of items during the resupply period at the resupplying PFSA hub (Dereje *et al.*, 2016). The study result found from this study founds to be too low as compared to the standard established by FMOH that states fill rate measures the supplier ability to fill orders in terms of item and quantity and it should be at least 80% and for health facilities it may be necessary to identify which items are causing the most problem and find another mechanisms for obtaining those items (Kefale and Shebo, 2019).

The study also showed that all of the hospitals have facility specific drug list and had established Drug and therapeutics committee (DTC). Only 40 percent of them have functional DTC. Functional DTC develops and implements interventions promoting the rational and cost effective use of pharmaceuticals. DTC functionality is an indicator of the ability of the health facility to avail pharmaceuticals and ensures their rational drug use.to have functional DTC it has to fulfill the nine criteria established by MOH which has to be above 75% (FMOH. 2019).

The study result revealed that availability of vital pharmaceuticals in federal hospitals of Addis Ababa is 65% and availability of Essential pharmaceuticals is 62.3%. An assessment of the pharmaceutical sector in Ethiopia by the FMOH/WHO in October 2010 found that, the national average for availability of key essential drugs in public health facilities was 70 % (FMOH/WHO, 2010). Vital pharmaceutical is potentially lifesaving, in the absence of this pharmaceutical; the patient may die, or may be hurt. It's very Crucial to provide the basic health services; without which it is impossible to deliver the basic services in a specific area. It is mandatory 24 hours of

a day, 7 days of a week, and or 12 months of a year. Essential Pharmaceuticals is effective against less severe but significant illness. In the absence of these items, it may be difficult to deliver the service; somehow one may deliver the service by using alternatives (SOP IPLS, 2015).in the present study, the availability of this crucial pharmaceuticals is very low which implies either the patient in those facility lost their life or obliged to buy from private pharmacy incurring very high costs which is unaffordable for most of Ethiopian peoples.

The study result also showed that data extracted from HCMIS and recording the wastage rate of the federal hospital is 3.34% which very high as compared to the standard set by FMOH which is less than 2%.this shows that the loss of the health facilities due to damage or expiry is very high this is because of many reasons that we are going to see in the following paragraphs.

4.2.2 Logistic management information system

Availability of standard logistics recording and reporting tools/formats and proper use of these tools have a substantial role in the implementation of effective and efficient logistics management information systems (Shewarega *et al.*, 2019). In the present study, the result indicated that availability of blank bin cards; standard operation procedure (SOP) for IPLS; internal facility request and resupply form (IFRR) and request and resupply form (RRF) were 100%, in all hospitals. This is in line with the study done in East Shewa zone on inventory management performance (Gurmu and Ibrahim, 2017) and the study conducted in Addis Ababa on logistics management information system of laboratory commodities in which the study facilities had the required logistics recording and reporting tools or formats and use them to capture essential logistics data (Desale *et al.*, 2013).

Regarding data quality and accuracy of reports, it has substantial impacts on the quality of health care and also on government budgets for the maintenance of health care services. Therefore, every facility in a supply chain needs to improve its data quality and timely share it to maintain health care at an optimal level. The current study revealed that the accuracy of the federal hospital IFRR is 45%. All the hospitals RRF is legal, timely and complete. But all of the hospital RRF is inaccurate which is very low compared to the study done in East Wollega zone, Ethiopia on LMIS of the total sampled RRFs, 64.6% were accurate, 69.4% were timely reported and 97.8% of the reports were found to be complete. These show the facilities weak performance in recording their logistics data and reporting to the main store with in the facility and to EPSA for

resupply. This wrong logistic data brings for over stock of unnecessary items and then expired for higher wastage rate while those facilities are still in shortage of vital and essential pharmaceuticals (Tiye and Gudeta, 2018)**.**

4.2.3 Inventory management

The ultimate goal of inventory management is to balance the stock out and over stock of essential medicines which are the cause for decline in the quality of patient care, medicines wastage and financial loss. The inventory accuracy rate or logistic recording accuracy, this indicator is vitally important in the management of medicines which helps to produce reliable information for determination of appropriate quantity and types of medicines. With the failure of updating bin cards or logistic records the follow of information will be distorted and bullwhip effect will happen where the information arose from the health facilities would be magnified along the supply chain which finally results in over stock or under stock and expiration of medicines. The findings of this study indicated that among the bin-cards reviewed 36 percent was not correctly updated which is higher than the study conducted in South Sudan and Uganda health facilities where only 27 percent and 36 percent respectively were not accurate (Gurmu and Ibrahim, 2017).

The study result revealed that Physical inventory of the store items has done 4 times per year in 60 percent of the federal hospitals while 40percent has done less than 4 times per year. 40 percent of the hospitals physical inventory has done every month at dispensary while 60 percent has done inventory every other month or quarterly. Physical inventory used for IFRR and RRF reporting and to know if there is any discrepancy between the logistic records and to take measure early. Because of this APTS (Auditable pharmacy transaction and service) orders to have physical inventory every month for dispensaries and quarterly for the stores. But this study shows the facilities has done physical inventory below the standard which implies their reporting had error which makes the facilities to be over stocked of unnecessary item or understocked of vital and essential pharmaceuticals.

Electronic recording and reporting system enhances the logistics management information system (LMIS) performances through reducing errors & task burden, saving time, and improving reporting rates (Aldeen *et al.*, 2014). The study result indicated that all the federal hospitals use

electronic HCMIS for managing their pharmaceuticals and HCMIS update for received pharmaceuticals in Model 19 is 92 percent while 71 percent for issued items updated.75 percent of items had equal amount in HCMIS and with the physical inventory. This is better compared to the study done in wollega zone Ethiopia on LMIS majority of the facilities study area, particularly health centers (70% of health centers) were relying on paper-based activities, only 2/3 the hospitals were using automated recording systems (Tiye and Gudeta, 2018). Even though in this study all the facilities used electronic HCMIS they didn't use it properly in order for generating accurate reports for logistic and managerial decision.

4.2.4 Storage

The study of the result indicated that four guide lines out of 14 are fulfilled by all the federal hospitals. The guide lines which states "Products are stacked at least 10 cm off the floor, at least 30 cm away from the walls and other stacks and no more than 2.5 meters high, Fire safety equipment is available, functional and accessible and The current space of the store room is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future)" is fulfilled only in 20 percent of the hospitals.. The guide line that states "Pharmaceuticals are stored organized and arranged in a manner that is accessible for first-expire – first-out (FEFO) stock rotation method" is fulfilled only in 40 percent of hospitals.

The guide line which states that "There is Separate place for unusable pharmaceuticals from usable pharmaceuticals" is fulfilled in 60% of the hospitals. In Ghana 83.3% the facility store follows first-to-expire, first-out (FEFO) principles and Expired products were typically separated from usable supplies (Addo *et al.*, 2006). In South Sudan 35 % 53 of the health facilities maintained acceptable storage condition and practice. In Lesotho none of the facilities had a practice of separating damaged or expired items from usable ones which is one of a sign of poor storage management (Desale *et al.*, 2013).

In this study the aggregate for the storage guide line is less than 80%, which is a minimum requirement for having acceptable storage condition for Pharmaceuticals, the hospitals store is considered that it doesn't fulfil normal storage condition for pharmaceuticals storage as per the storage guideline. Poor storage condition will affect the quality of pharmaceuticals being stored i.e. if the recommended storage condition by the manufacturer is not kept drugs and supplies

may expire before the meant expiry date printed. Rooms that are too hot, stacks of carton that are too high, and other poor storage condition can cause damage or deterioration of the pharmaceutical product that would contribute for reduction of shelf life. A well-organized store will keep items safe, help simplify the facility's work and reduces time wastage in trying to find needed items. Health facility pharmacy store improvement is one of the IPLS related pharmaceuticals management initiatives which includes having a well-organized and well spacious store room that contains all the required storage facilities and adhering to the good pharmaceutical storage guidelines & practices (MSH,2015 & USAID ,2006).

The study result from an interview with facility store managers indicated that 60 percent of the hospitals store managers didn't follow FEFO when they issue pharmaceuticals due to the warehouse inefficiency for storing the medication as per the standard and the high work load

Chapter Five

5. Summary, Conclusions and Recommendations

5.1 Summary of findings

There were a total of 323 pharmacy staffs under the pharmacy department of these hospitals among them 182 staffs had training on integrated pharmaceutical logistic system (IPLS) which accounts 56.35%.

All the Federal hospitals procure their pharmaceuticals directly from Ethiopian pharmaceutical supply agency (EPSA). For program drugs, EPSA the sole and main supplier of the health institution in all over the country, transports the pharmaceuticals to all the federal hospitals by its own vehicle. But for RDF (budget) pharmaceuticals all of the hospital uses their own vehicle for transportation. For budget Pharmaceuticals, all of the hospitals managed to get their order with in a day they submit their request. But all of the hospitals couldn't get the entire amount they request in the same day due to shortage Pharmaceuticals at EPSA. Accordingly 60 percent of the hospitals' are obliged to visit EPSA four times per week while 40 percent of them visit three times per week. 60 percent of the hospitals had direct support and supervision from higher officials of the hospitals while the rest didn't get adequate support.

In 80 percent of the hospitals order fil rate was less than 50% while 20 percent of the hospital has 60% order fill rate. In all of the hospitals line fill rate was less than 50%. Availability of vital and essential pharmaceuticals in federal hospitals of Addis Ababa is 65% and 62.3% respectively. The wastage rate of the hospitals is 3.34% and only 40 percent of the facilities have functional DTC

The availability of blank bin cards; standard operation procedure (SOP) for IPLS; internal facility request and resupply form (IFRR) and request and resupply form (RRF) were 100%, in all hospitals and the aggregate accuracy of the federal hospital IFRR is 45%. All the hospitals RRF is legal, timely and complete. But all of the hospital RRF is inaccurate.

The result shows physical inventory of the store items has done 4 times per year in 60 percent of the federal hospitals while 40percent has done less than 4 times per year. 40 percent of the hospitals physical inventory has done every month at dispensary while 60 percent has done inventory every other month or quarterly.

The result shows that Bin card update for randomly selected 20 items was 64 percent in federal hospitals of Addis Ababa. And all the federal hospitals use electronic HCMIS for managing their pharmaceuticals and HCMIS update for received pharmaceuticals in Model 19 is 92 percent while 71 percent for issued items update.75 percent of items had equal amount in HCMIS and with the physical inventory.

The study result from an interview with facility store managers indicated that 60 percent of the hospitals store managers didn't follow FEFO when they issue pharmaceuticals. 4 guide lines about storage practice out of 14 are fulfilled by all the federal hospitals. The guide line that states "Pharmaceuticals are stored organized and arranged in a manner that is accessible for first-expire – first-out (FEFO) stock rotation method" is fulfilled only in 40 percent of hospitals. The guide line which states that "There is Separate place for unusable pharmaceuticals from usable pharmaceuticals" is fulfilled in 60% of the hospitals.

5.2 Conclusion

Based on the major findings presented above and the framework utilized to guide the study, the following conclusions may be drawn. The overall result of this study provides important information that can be used to measure and conclude on pharmaceutical logistic management practice of the Federal hospitals of Addis Ababa

- The result shows only 56.35% of the pharmacy professionals have taken training on IPLS which has an negative impact on pharmaceutical logistic practice of the facilities
- Only 60 percent of the hospitals had direct support and supervision from higher officials of the hospitals .which shows lesser concern the officials' yet large portion of the facilities budgets allocated for pharmaceutical logistic
- All the Federal hospitals procure their pharmaceuticals directly from Ethiopian pharmaceutical supply agency (EPSA). For program drugs, EPSA the sole and main supplier of the health institution in all over the country, transports the pharmaceuticals to all the federal hospitals by its own vehicle
- For RDF (budget) pharmaceuticals all of the hospital used their own vehicle for transportation. And all of the hospitals couldn't get the entire amount they request in the same day due to shortage Pharmaceuticals at EPSA. Accordingly 60 percent of the

hospitals' are obliged to visit EPSA four times per week while 40 percent of them visit three times per week which is very costly and time consuming for the facilities.

- In 80 percent of the hospitals order fil rate was less than 50% and in all of the hospitals line fill rate was less than 50% for the items they procure from their sole and main supplier EPSA. This implies the main supplier of the pharmaceuticals to the hospital EPSA which organized and supported by the government have little capacity to fulfil the facilities need.
- Only 40 percent of the facilities have functional DTC. Loss of Functional DTC in the facilities brings poor availability of pharmaceuticals, irrational drug use and wastage of pharmaceuticals and hence the wastage rate of the hospital is very high that's 3.34%.and for poor availability of vital and essential pharmaceutical in the hospitals that is 65% and 62.3% respectively.
- The availability of blank bin cards; standard operation procedure (SOP) for IPLS; internal facility request and resupply form (IFRR) and request and resupply form (RRF) were excellent but accuracy of IFRR and RRF was very poor which has negative impact on data quality and hence for over stock of non-essential pharmaceuticals and under stock of very crucial pharmaceuticals.
- Frequency of Physical inventory of the products is low compared to the standard of APTS. This creates an error on reports of IFRR and RRF which then be a reason for expiry of products and understock of pharmaceuticals.
- All the study facilities used electronics HCMIS for the management of pharmaceuticals which is very important since it enhances the logistics management information system (LMIS) performances through reducing errors & task burden, saving time, and improving reporting rates. But their appropriate use of the software in the study facilities is poor.
- 60 percent of the hospitals store managers didn't follow FEFO when they issue pharmaceuticals due to the inconvenience of the ware house and work load which implies pharmaceuticals which has long expiry would issue first while short expiry left in the stores which brings very high expiry rate for the facilities.
- Only 4 guide lines, about storage practice, out of 14 are fulfilled by all the federal hospitals. The guide line that states "Pharmaceuticals are stored organized and arranged in a manner that is accessible for first-expire – first-out (FEFO) stock rotation method" is

fulfilled only in 40 percent of hospitals. The guide line which states that "There is Separate place for unusable pharmaceuticals from usable pharmaceuticals" is fulfilled in 60% of the hospitals. The facilities had poor storage practice due to ware house problem and high work load the store managers had faced.

5.3 Recommendations

To address the gaps observed in Health logistic management practice of federal hospitals of Addis Ababa, the following recommendations are forwarded

- ✓ The ministry of Health should give Training on integrated pharmaceutical logistic system for all pharmacy professional of the federal hospital of Addis Ababa
- ✓ Higher officials of the hospitals should support and supervise their respective facilities pharmaceutical logistic practice
- ✓ EPSA, The main and sole supplier of pharmaceuticals to health facilities, should strength itself to avail all vital and essential pharmaceuticals. Since it's the main cause for vital and essential pharmaceuticals stock out and for repeatedly visit of EPSA that costs the facility with increased transport cost and time
- ✓ Those hospitals that don't have functional DTC should make their DTC functional soon in order for strengthening the pharmaceutical logistic system.
- ✓ IFRR use at all dispensing unit and RRF at stores should be strengthened and monitored by hospital management, EPSA and other partners supporting the supply chain system.
- ✓ The facilities should strength to a better level their electronic HCMIS use
- ✓ Top management of the Hospitals should give due attention to fulfilling storage guidelines and expansion on the pharmacy store should be done to avoid any gap with respect to the physical structure (e.g. space) of the store room and fulfillment of necessary storage conditions.
- ✓ Facilities should add the number professional who works as ware house manager since the high work load is the main reason for unprofessional work done there in the ware house.
- ✓ Further research should be conducted on pharmaceutical logistic management practice having incorporated the knowledge, attitude and satisfaction of the pharmacy professional since there are clues which shows dissatisfaction

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Annex I: Interview of key respondents using open-ended questions

My name is Sintayehu Tekleab**.** I am a student of Addis Ababa university school of commerce logistic supply chain management department master's program. I am doing this study for partial fulfilment of the graduation and to strengthen the Pharmaceuticals Supply Chain Management practices at the Federal hospitals of Addis Ababa. The objective of this study is to assess the health logistics management practice in Federal hospitals of Addis Ababa

I would like to thank you so much for your great cooperation in supporting me collecting data to this research. Using this questionnaire, I would like to ask the store manager/pharmacy head a series of questions about pharmaceutical logistic management practice at the Hospital.

Do you have any questions? May I begin the questions now?

The Respondent agrees to answer, Yes, you can begin your questions. Continue

The respondent does not agree, Ends.

First, ask the following questions in-charge or pharmacy head/store manage/DSM manager

Section I. Back ground characteristics of the respondents

No. of year and months you have worked at this Hospital: Years_____Months….

Are you responsible for managing Pharmaceuticals storage and distribution at this facility

: Yes ____ ☐ No:__☐___

Position: Pharmacy head.. ☐

DSM Officer ☐

Store Manager ☐

{If Pharmacy Head ask question No. 4 and 5}

How many staff the facility has under the Pharmacy unit? No. of pharmacy staff……

How many of them are trained in supply chain/IPLS: No. trained_____

Section II. Logistic system performance (for Pharmacy head and DSM Officer)

1. How do you procure pharmaceuticals and what is your frequent procurement method used by your facility

2. How do you transport the product ordered?

3. What is the mechanism that your hospital sends RRF report to EPSA?

4. On average, how many days will it takes between sending and Receiving order from EPSA?

5. How many emergency orders have you placed in the last three months and what type of formats have you used to place the order

Logistic system performance (For Medical director)

1. What mechanism do you use for controlling and monitoring the facility pharmaceutical logistic supply management?
2. In what way do you support the pharmaceutical logistic supply management?

Section II. Storage conditions (store manager)

What do you do when you receive pharmaceuticals?

What procedure do you follow for issue pharmaceuticals from store?

How and when you do inventory for your store products?

Annex II. Observational check list

On top of this, I would like to actually observe the logistic management practice of the facility with respect to inventory control, LMIS, logistic system performance and storage condition.

Section I. Logistic system performance

order fill rate of this facility(observe previous 3 consecutive month)

Line fill rate of this facility

Availability facility specific essential drug list facility? : Yes ____ No☐☐___

Availability of vital drugs Yes ☐ No: ☐

Availability of vital medicals supplies Yes ☐ No: ☐

Availability of vital laboratory reagents Yes ☐ No: ☐

Availability of essentials drugs Yes ☐ No: ☐

Availability of essentials medicals supplies Yes ☐ No: ☐

Availability of essentials laboratory reagents Yes ☐ No: ☐

wastage rate of the hospital?(HCMIS)

Functional Drug and therapeutics committee Yes☐ No ☐

Conducting ABC analysis at the facility Yes ☐ No: ☐

Section II. Logistic management information system

1. Are the following LMIS formats, Job Aids and SOPs are available at the facility?

a. Blink bin cards: 1. Yes ☐ 2. No ☐

b. Internal Facility Report & Requisition Form (IFRR): 1. Yes ☐ 2. No ☐

c. Facility Report & requisition Form (RRF): 1. Yes ☐ 2. No ☐

2. Standard Operation Procedure (SOP) for IPLS: 1. Yes ☐ 2. No ☐

3. Does the facility use IFRR for reporting/ordering at the dispensing units of

   a. Maternal and child pharmacy (MCH) pharmacy 1. Yes ☐ 2.No ☐

   b. OPD pharmacy 1. Ye ☐ 2.No ☐

   C. Inpatient Pharmacy 1. Ye ☐.2.No ☐

D. Emergency pharmacy 1. Yes ☐ 2.No ☐

4. Does the IFRR filled appropriately; see at least four schedules, for the above dispensary outlet? Yes ☐ No ☐

5. Does the facility have IFRR schedule time? 1. Yes ☐ 2.No ☐

6. Does the facility post the IFRR for dispensaries? 1. Yes ☐ .No ☐

7. Does the facility use RRF for budget and program pharmaceuticals for reporting/ordering to EPSA? 1. Yes ☐ 2.No ☐

8. If yes for Q 10 Does the RRF is

A. timely 1.yes ☐ 2.No ☐

B. legal 1.yes ☐ 2.No ☐

C. complete 1. Yes ☐ 2.No ☐

D. Accurate 1. Yes ☐ 2.No ☐

Section III. Inventory management

No of physical inventory at dispensaries and store?

Availability of Bin card updated (take 20 items randomly)

Availability of HCMIS (automation) for inventory control

If yes for no 5, HCMIS is updated for all transaction (take 20 items randomly and check with the model, Bin card and physical count)

Section IV. Storage conditions

This table is used as a check list to assess the storage condition of the Hospital which is used to store drugs. Place a check mark in the appropriate column based on visual inspection of the storage facility. Write any relevant observation noted in the comment's column.

N: B. to qualify as ''yes" for each criteria, the store room must meet the requirement as per described per each criteria.

1	Storeroom is maintained in good condition (clean & tidy, all trash removed, sturdy shelves, well organized boxes).	Yes	No	Comment
2	The hospital pharmacy store is dry well ventilated and out of			

	direct sunlight for the pharmaceutical products			
3	Fire safety equipment is available, functional and accessible			
4	Pharmaceuticals are arranged properly and professionally in such a way that identification labels and expiry dates and/or manufacturing dates are visible.			
5	Pharmaceuticals are stored, organized and arranged in a manner that is accessible for first-expire – first-out (FEFO) stock rotation method			
6	Does the store have maintain cold storage, including a cold chain, as required			
7	There is Separate place for unusable pharmaceuticals from usable pharmaceuticals			
8	Storage area is visually free and protected from harmful insects and rodents (check the storage area for traces of bats and/or (dropping or insects)			
9	Storage area is well secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel			
10	The current space of the store room is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future)			
11	There is temperature monitoring thermometer for the store room			
12	There is temperature monitoring thermometer for the fridges			
13	Products are stacked at least 10 cm off the floor, at least 30 cm away from the walls and other stacks and no more than 2.5 meters high.			
14	Cartons and drugs are protected from water and humidity during all seasons			