Addis Ababa University

College of Business and Economics

Department of Public Administration and Development Management

The Challenges of Logistics Management for the Supply of Drugs and Medical Equipment in Public government Hospitals, The case of Addis Ababa City Administration.

By

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By Selehaddin Abdella

This thesis submitted to the Department of Public Administration and Development Management of Addis Ababa University in partial fulfillment of the requirements for the Degree of Masters

Advisor Elias Birhanu (PHD)

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DECLARATION

I hereby declare that this thesis titled **The Challenges of Logistics Management for the Supply of Drugs and Medical Equipment in Public government Hospitals, The case of Addis Ababa City Administration.** Submitted to Addis Ababa university school of business and economics for the award of the degree of master of science is a record of original and independent research work done by me under the supervision and guidance of **Elias Birhanu (PHD)** it has not been submitted for the award of any other degree or diploma or fellowship or any other similar title to any candidate of this or any other university/institution. And that all sources of materials used for the study are accordingly acknowledged.

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This is to certify that, the thesis prepared by Selehaddin Abdella Abrar entitled the challenges of logistics management for the supply of drugs and medical equipment in government public hospitals in the case of Addis Ababa city administration which is submitted in partial fulfilment of the requirement for the Degree of Master in Public Management and policy (MPMP), complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

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Internal Examiner

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ACRONYMS AND ABBREVIATIONS

ATC	Anatomical Therapeutic Chemical
ARV	Antiretroviral
EDL	Essential drug list
SM	Supply Management
WHO	World Health Organization
FMOH	Federal Ministry of Health
EPSA	Ethiopian Pharmaceutical Supply Agency
SCMS	Supply Chain Management System
PLMU	Pharmaceuticals Logistics Management Unit
SCM	Supply Chain Management
LMIS	Logistics Management Information System
HAI	Health Action International
MSH	Management Science For Health
HSCM	Health Supply Chain Management
KEMSA	Kenya Medical Supplies Agency
ECSA	East and Central and Southern Africa
RPF	Regional Pharmaceutical Forum
HSDP	Health Sector Development Program
BPR	Business Process Reengineering
DACA	Drug Administration and Control Authority
FMHACA and	Food, Medicine and Health Care Administration Control Authority

GOV	Government of Ethiopia (GOE)
GTP	Growth and Transformation Plan
PSA	Pharmaceutical Supply Agency
HSTP	Health System Transformation Plan
PPP	Public Private Partnership
IPLS	Integrated Pharmaceutical Logistics System
HCs	Health Centers
RDF	Revolving Drug Fund
LSU	Logistics Sub-Unit
LMU	Logistics Management Unit
HSDP	Health Service Development Program
SOM	School of medicine
SPH	School of public heath
CHS	College of Health science
SOP	School of Pharmacy
AAU	Addis Ababa University
LC	Letter of Credit

ABSTRACT

In this research, the researcher tries to identify the challenges that occur in the logistics process when medicines and medical equipment are supplied to the public government hospitals of Addis Ababa city Administration. The outcomes of the research show the impact of these challenges on how highly affect the socio-economic structure of the society. The study was tried to show how each party and mechanisms create a delay on the supply of medicines and medical equipment to the public hospitals of the city. As we know, most of Addis Ababa public hospitals are referral and we can say these hospitals are not serving the cities' residents only, but it serves directly or indirectly for the society who comes from all parts of the country. A large number of patients, who are troubled with their health, come to these hospitals daily, weekly, and Monthly to get health facilities because of poor health facility in their location and area. Addis Ababa public hospitals have benefit more than the health centre, they are also centre for research and education in the area. A lot of researcher struggling to get solutions to public health problems, For example, if we see TikurAnbessa hospital, the College of Health Sciences (CHS), which is part of Addis Ababa University (AAU), is a professional health sciences college, established in 2009/10 by the reorganization of previously separate institutions of health under one umbrella. So, identification and searching solutions for the logistics problems of this public hospital, therefore it, maximizes the capacity of the public hospitals' research and development which are basic to solve the society health problems.

In this research, the researcher tries to identify the bottlenecks of the logistics system for the supply of medicines and medical equipment. To identify these problems the researcher targets 11 public hospitals to collect data by preparing 31 open and closed-ended questionnaires from hospitals logistics department or from the authorized party who follow up the flow of supplies into the hospitals. The researcher also focuses to collect data from key informants of concerned institutions and different partners, who engaged in the logistics system as a source of supplies like the transporter of marine and inland, quality control authority, supervisor of import and export items and other concerned parties. In this research deep interview was made to collect data from different government parties who can affect directly the delivery time of the shipment of the medication items. The data collected from the interview shows that totally 31 days will waste because of unnecessary bureaucracy that are emerged from shipping lines, customs office, bank process and quality control office,

The outcomes of the research show that, there are a lot of logistics problems that are frequently facing the public hospitals of Addis Ababa city Administration. Transportation problems are highly affecting the logistics system because of a shortage of proper transportation system, Poor handling system of purchased items, the bureaucracy of government offices, the payment system of public hospitals when they buy from Ethiopian pharmaceutical and supply Agency(EPSA),war ehouse problems, poor packaging of local medicine manufacturers, high price when a purchase is made from private importers are amongthe major challenges of the public hospital's logistics system that this research findings shows.

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

In the past, logistics was considered as a custodial activity. Storekeepers were the custodians of supplies stored in small storerooms and large warehouses. Consequently, the science (and art) of logistics, and the people who make the health logistics system work, were not considered as an important part of family planning, HIV and AIDS, or vaccination programs to name only a few. Fortunately, as time passed, more and more program managers have come to understand how important logistics is to a program's success (USAID,2011).The term logistics in ancient times was frequently used in connection with the art of moving anis and supplies of food and armaments to the war front. Its use can be traced back to the seventeenth century in the French army (Kotler, 2001). Logistics operations have always been accompanying life in human societies, although the scope of the term "logistics" as such would change overtime. It is most probably of Greek origin, which is indicated by the meanings of words such as: logos- "counting" or 'reason', logistike – ' the art of calculation', logismos- 'calculation', 'calculus', reflection. (Andrezej Szymonik, 2012)

For the past 15 years, the logistics function has gained a strategic place in the management of hospitals (Volland et al, 2017). Nowadays, we are also witnessing several strategic decisions related to logistics such as the outsourcing of certain activities in the hospital supply chain (purchasing and supply management, sterilization, stock management or intra and inter-site transport, etc.). Hospital managers have also implemented various tools and methods of lean management allowing a continuous improvement approach. Therefore, significant results were achieved in reducing errors; improving process quality and reducing wait times (Mazzocato etal. 2010).

In the case of public hospitals logistics management system, against the background of the complexity of the hospital system, the variability and unpredictability of the patients profile and the high demand for care (Wieser 2011; Bourlakis et al., 2011), logistics is considered as an effective solution in the organization of working time to care staff by offering them the

opportunity to concentrate on their core activities and improve patients care conditions (Landry and Beaulieu, 2001). The management of logistics activities goes beyond traditional physical flows, and it considers other flows such as patients throughout the care chain. Patients' management incorporates several multi disciplinary and interdependent medical and administrative steps that require controlled interconnection and synchronization to avoid problems with wait times, misuse of medical resources etc.

Logistics management deals with the planning and control of material flows and related information in organization, both in the public and private sectors. Generally speaking, its mission is to get the right materials to the right place at the right time, while optimizing a given performance measure (e.g. minimizing total operating costs) and satisfying a given set of constraints (e.g. a budget constraint). Logistics is one of the most important activities in modern societies. It is constructed on subsystems which in turn contain a collection of interrelated components.

The relationship between the subsystems and components takes the form of coordination and exchange of materials and information. The system aims to supply customers efficiently with their required products. Each subsystem controls the size of the flow of materials through the system via storage, transportation and various stages of handling and value-adding. The logistics systems do not only consist of flows of materials, components and products which are processed and distributed to customers, but also include supply chain flows of spare parts and returns the flow of defective and used products and packaging (Jonsson,2008). Supply chain management in public sector health systems has received increasing attention in recent years, as both a priority and a challenge for many countries since governments find themselves stressed with and increasing number of products, programs and patients to manage.

Due to major increases in funding and donor support for a multiplicity of health programs, supply chain managers may be responsible for a larger number and volume of products, but with limited additional resources to expand their capacity to manage, store, and distribute these products. Often, staff already working in this area receives extra pressure to build up the internal capacity to meet the service delivery targets. However, many countries, faced with this type of challenge, recognize that these functions, that were once auxiliary to their primary function of

service delivery to patients, could tie up a significant portion of their budgets should they scale up appropriately (USAID, 2010).

Logistics is defined as planning, implementing and controlling the physical flows of materials and finished goods from point of origin to the point of use to meet customer's need at a profit (Kotler, 2001). The logistics management activities typically include inbound, outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply-demand planning and management of third-party logistics service providers. The American council of logistics management also defines logistics as the process of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption to conform to customers' requirements. Supply chain, therefore, involves movement of materials from suppliers to the final consumer of the product. Logistics has been viewed as an important part of supply chain management since it deals with the design and implementation of the movement of products and information in the supply chain. **Drew** and **Smith**, 1995 argue that "with a firm's supply chain management, logistics is the work required to move and geographically position inventory". As such, logistics is a subset of and occurs within the broader frame work of a supply chain.

Logistics is tire process that creates value by the timing and positioning inventory. Logistics is the combination of a firm's order management, inventory, transportation, warehousing, materials handling, and packaging as integrated throughout a facility network.

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 as Mezid Mudzteba cited. (BPharm and Islam, 2007).

Poor availability of EDs is the key barrier to access to medicine especially in the 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 (REPORT OF 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 Africa and South-East Asia alone (WHO/HAI, 2008).

The World Health Organization defines access to quality medicine as a priority for citizens. It needs to be available at all times in adequate amounts, inappropriate dosage and quality and an affordable price for individuals and communities (WHO, 2008). To ensure that people have access to essential and quality medicines, a functioning and sustainable supply chain are necessary, which includes proper forecasting and supply planning, timely procurement, appropriate warehousing and effective transportation systems.

In line with this, the **FMOH** sets up semi -autonomous entities such as a National Level Medical Store, the equivalent Ethiopian Pharmaceuticals Supply Agency (**EPSA**), which is responsible for the forecasting, procurement, storage and distribution of medicine and medical supplies to health facilities across the country as cited by the ministry of health (Federal Negarit Gazette, 2007).

Regardless of this, developing countries where Ethiopia is one of them have several challenges to ensure an appropriate supply of medicine to government public hospitals and the customers. In Ethiopia, there were multiple parallel supply chain systems for different programs, lengthy processes in the supply chain systems, multiple players in the forecasting and procurement, storage and distributions, and management and decision making. Moreover, there were multiple duplications of efforts at national and regional levels of the health SCMS (FMOH, 2006).As a result, the FMOH with partners established PFSA(Pharmaceuticals Fund and supply agency) in 2007 and later renamed as EPSA (Ethiopian pharmaceuticals supply agency) to address these challenges and improve the efficiency of the supply chain management system of the public health sector. Government of Ethiopia and partners collaborated to strengthen pharmaceuticals fund supply agency (PFSA) since 2007 and PFSA has made improvements in its management capacity, infrastructure and storage and fleet management. Currently, EPSA manages integrated supply chain management system for human immune deficiency virus, tuberculosis and family planning products and regularly (bimonthly) resupplied over 1100 health facilities (Shewarega et

al., 2015).However, there are still complains and questions from different levels of the Ethiopian health system about the efficiency, responsiveness, capacity and management of EPSA.

In Ethiopia, majority of the common leading causes of morbidity (pneumonia, malaria, acute upper respiratory infections, helminthesasis 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, 2001). In this regard, the effort has been made to increase the accessibility of EDs (essential drugs) such as increasing budget allocation by government and adoption of the pull system, but researches showed that availability of EDs in public health facilities in various part of the country is still a challenge (Abiye et al.,2013).

Availability of EDs is the construct of the components of the pharmaceutical logistics system **(**selection**,** quantification**,** procurement and distribution**),** and a failure in one part of the system leads to the failure of the whole pharmaceutical management process (MSH, 2011) and it creates patients death and decreases the prevention capacity of the public and will expose for different types of illnesses and diseases.

Some even argued that the previous system was better and tried to hinder the integrations of the supply chain for some programs e.g. malaria product management was taken back to the old 5 layers 4 management system. Recently, FMOH created pharmaceuticals logistics management unit (PLMU) in the FMOH under the state minister of operation section to handle some logistics issues and liaison with EPSA. In this study the researcher will identify problems regarding, planning, purchasing, transportation, warehousing and government bureaucracy in government medical logistics system. In Ethiopia most of the previous researches that are studied in medication logistics, focuses in some specific parts of logistics system. Moreover, these researches have been seen different health centers that have different capacity and management system at the same level throughout the research process. This study is different from the previous researches; because of it focuses only in public government hospitals logistics system most of them have the same character, level of capacity and management system. In addition to these, most of the previous research had been focusing in specific operational logistics part or a

single government office to search for logistics challenges in medicine logistics, in contrary to that, in this research, major actors of medication logistics are deeply participated.

Logistics by its nature is a combination of different parties. If we couldn't access and deal with all these parties one by one, the exact problems might be hidden .This research is very helpful to identify logistics operational challenges easily because most of the actors in the medical logistics system have participated. The result of the study will benefit government public hospitals, FMOH, EPSA, regional health bureaus and stakeholders to,

(1) Understand the challenges of the public health supply chain,
(2) Get information about the progress made so far and see the possible future direction of the public health supply chain management,
(3) Identify and follow up areas that need more attention and collaboration in the public health supply chain management system, and
(4) Identify the best and efficient ways of a logistics system for the provision of medicines and medical equipment for public hospitals of Addis Ababa city Administration.

1.3. Research Questions

1. What are the main challenges that occur frequently in public hospitals medicines and medical equipment supply chain systems?
2. What is/are the effects of this /these challenges on the public?
3. What measures have been taken to avoid or minimize these challenges?
4. What measures should be taken by public hospitals logistics officers and stakeholders to improve accessibility of medicines in public hospitals?

1.4. Objectives of the Research

1.4.1. General Objectives

The main objective of this research is to identify and assess the challenges and bottlenecks in the supply chain system in which medicines and medical equipment can flow to the public hospitals of Addis Ababa city Administration.

1.4.2. Specific Objectives

1. To assess the availability of efficient and appropriate supply chain system for medicines and medical equipment in public government hospitals of Addis Ababa city.
2. To assess the performance of different parties in the supply chain of medication.
3. To assess the availability of appropriate transportation system.
4. To assess the availability of appropriate warehousing system.
5. To assess the availability and implementation of purchase guide lines in public hospitals

1.5. Scope of the Study

1.5.1. Addis Ababa

Addis Ababa is the capital city of Ethiopia. It is also the largest city in the country by population, with a total population of 3,384,569 according to the 2007 census. However, it is believed that this number was inaccurate when recorded and underestimated the city's population. The city has through recent years seen a robust annual growth rate, and population counts as of 2017 are growing closer to 4 million. The most recent census was scheduled for the 2018 to 2019 fiscal year, as security concerns between 2017 and 2018 delayed it. Addis Ababa is a chartered city and as such, is considered both a city and a state. It is the largest city in the world located in landlocked country *www.worldpopulationreview.com (02/12/2019).*

1.5.2. Addis Ababa Size

This capital city holds 527 square kilometers of area in Ethiopia. The population density is estim ated to be near 5,165 individuals per square kilometer available *www.worldpopulationreview.co m (02/12/2019).*

1.5.3. Addis Ababa History

It is thought that the land that is the current site of Addis Ababa was first occupied and made a settlement in the early to mid-15th century, although the city as it is known today was not founded until 1886. It's interesting to note that evidence of humans living in the area up to 100,000 years ago has been discovered.

Today, the city's government is headed by the mayor and the city council. The city is considered to be one of the safest I Ethiopia. In terms of the economy, Addis Ababa is very diverse trade and commerce are the most popular industries, followed by manufacturing and production, home making, and civil administration. Tourism is growing industry in the area as more shopping centers, restaurants and attractions are built *www.worldpopulationreview.com (02/12/2019).*

1.5.4. Addis Ababa City Population Growth

Population in the near future is expected to grow to exceed 6.5 million residents. The annual growth rate of the city has been estimated in recent years to be 3.8%. In prior years, growth has been as much as 8%. *www.worldpopulationreview.com (02/12/2019).*

As we have seen above the city is very large and influential in terms of economical, political and social factors in East Africa. The researcher selects the city for this thesis with regard of these factors. This research have focused on the government public hospitals of the city administration focusing on planning, purchasing, transportation, warehousing and processes in the logistics system. The researcher selects these hospitals in the city because of, large group of people from the city and rural areas come to these hospitals for better medical services, low service price and most of them are referral hospitals.

1.6. Significance of the Study

The aim of this study would determine the factors influencing the effectiveness of logistics management in the government public hospitals of Addis Ababa city administration. The particular objectives that have been analyzed including determining the factors influencing the effectiveness of logistics management in the government public hospitals and try to establish the best ways to minimize challenges of logistics management in the area. The descriptive design was adopted with respondents considered for the sample. A total of 30 questionnaires had administered for the research. This helps the researcher to produce tables, graphs and the necessary measure of variance for effective interpretation. The research findings in this in this research will answer the questions that, logistics management effectiveness, as a result, inbound logistics performance management, information quality, how usable, how reliable, how the challenges affect the logistics system and availability of appropriate warehousing system for

medicines and equipment. The study would have a great importance to Addis Ababa city government public hospitals and health offices. It will assist in identifying areas of improvement in logistics management process. The study suggests that future researchers do the same using other factors not only the logistics management factors , but from other corresponding factors that influence the effectiveness of the logistics management systems.

1.7. Limitations of the Study

The big challenge in this research was a lot in type and number. But I will mention some of the problems that had high impact on the research. Among them, COVID 19 was a big problem for the researcher. Staffs in hospital and other government offices were on leave because of the virus. Even after the officers return back to the office, the researcher was afraid to enter the hospital premises, as a result of, the media and health minister were warned not to come to the hospital for normal and easy treatment or reason. The key informants, hospital storekeeper and logistics officers also refused to make an interview and to fill the questionnaires assuming, they may possess the virus during communication.

The other problem was most of the public government hospitals have not organized the logistics department and the storekeeper or the purchasing department was act as a logistics officer and they have no logistics idea and there was a misunderstanding with the researcher.

Six government offices were selected as a source of data for the research. Among them, 3 offices are located in Modjo dry port premises and there was a must to go to Modjo dry port 5 times totally because of the officers were not available in their workplace at the day of appointment. It creates burdens on the researcher. Some officers also limited the time minute to the interview and it blocks the researcher to make the research in wide.

Because of work load, there was a problem to carry out an interview with national bank of Ethiopia key informants, but they are cooperated the researcher by giving secondary data that have articles about the allocation of the hard currency for organizations and institutions. This blocks the researcher from collecting data from key informants.

The researcher also was tried to make an interview with private pharmaceutical importers and manufacturers, unfortunately they refused to cooperate. The reason for that was they afraid to loss their business information.

CHAPTER TWO

2. LITERATURE REVIEW

The goal of a health logistics system is much larger than simply making sure a product gets where it needs to go. Ultimately, the goal of every public health logistics system is to help ensure that every customer has commodity security. Commodity security exists when every person can obtain and use quality and essential health supplies, security-financing, policies and commitment are also necessary. Effective supply chains not only help ensure commodity security, they also help determine the success or failure of any public health program. Both in business and the public sector , decision-makers increasingly direct their attention to improving supply chains, because logistics improvements brings important, quantifiable benefits. Well-functioning supply chains benefit whenever he or she needs them. A properly functioning supply chain is a critical part of ensuring commodity public health programs in important ways by:

- Increasing program impact
- Enhancing the quality of care
- Improving cost effectiveness and efficiency

Logistics increases program impact

If a logistics system provides a reliable supply of commodities, more people are likely to use health services. Customers feel more confident about the health program when they have a constant supply of commodities it motivates them to seek and use services. Notice that, as the availability of a mix of contraceptive methods improves, the contraceptive prevalence rate (CPR) for the public sector increases. When a choice of contraceptive methods is available in health facilities, more women use contraception. When more women use contraception, it impacts several key public health indicators: maternal mortality, infant mortality, and total fertility rates all decrease (USAID, 2011).

Logistics enhances the quality of care

Well-supplied health programs can provide superior service, while poorly supplied programs cannot. Likewise, well-supplied health workers can use their training and expertise fully, directly improving the quality of care for clients. Customers are not the only ones who benefit from the consistent availability of commodities. An effective logistics system helps provide adequate, appropriate supplies to health providers, increasing their professional satisfaction, motivation, and morale. Motivated staffs are more likely to deliver a higher quality of service.

Logistics improves cost efficiency and effectiveness

An effective supply chain contributes to improved cost-effectiveness in all parts of a program, and it can stretch limited resources. Strengthening and maintaining the logistics system is an investment that pays off in three ways. (1) It reduces losses due to overstock, waste, expiry, damage, pilferage, and inefficiency ;(2) It protects other major program investments; and (3) It maximizes the potential for cost recovery.

A chain's reach extends only as far as its links stay connected. Its strength depends on the strength of each link: no chain is stronger than its weakest link. Similarly, suppliers, manufacturers, retailers and consumers rely on one another as they supply and consumer goods and services. My supplier maybe your customer, so that what one of us does affects all of us.

If my supplier makes a mistake, it may affect my customer, and if my customer makes a mistake, it may affect my supplier. As the core analogy in supply chain management implies, we are linked to one another in a chain (DAVID, STEPHEN AND JOE, 2003).

The term supply chain management (SCM) confuses some people. Does it refer to a managerial process? Is it connected with materials management or purchasing? Is it just another name for integrated logistics? Just what is supply chain management? The definition may vary, but for clarity, we use the following:

It is the process of planning, organizing and controlling the flow of materials and services from suppliers to end-users /customers. This integrated approach incorporates suppliers, supply management, integrated logistics, and operations.

Integrated logistics

It is defined as the process of anticipating customer needs and wants; acquiring the capital, materials, people, technologies and information necessary to meet those needs and wants; optimizing the goods – or service-producing network to fulfill customer requests, and utilizing the network to fulfill customer requests in a timely way. It consists of inbound logistics, conversion operations, and outbound logistics. Inbound logistics is the movement of products into a firm. Conversion operations involve the movement of products within a plant and /or warehouse facility. Outbound logistics is the movement of product out of the plant to the customer (DAVID, STEPHEN AND JOE, 2003).

The pharmaceutical logistics system is the planning, organizing, and controlling the flow of medical equipment and drugs from suppliers to the health centre and pharmacies. The pharmaceutical logistics system of a country is affected by the political, economic and social aspects of the country (MSH, 2011). This section discusses pharmaceutical logistics studies carried out in Sub-Saharan countries and looks also at the literature that guided this study.

2.1 Selection, Forecasting and Procurement

The choice of essential medicines depends on many factors, such as the pattern of prevalent diseases, treatment facilities, the training and experience of available personnel, financial resources, and environmental factor (MSH, 2011).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 EDLas Mezid Mudzteba cited (MOHSW, 2008). Effective procurement is an important step in the

pharmaceutical logistics system. An effective procurement process seeks to ensure the availability of the right pharmaceuticals, in the right quantities, at reasonable prices and recognized standards of quality (MSH, 2011). It is dependent on the routine availability of logistics data (e.g., rate of consumption and stock levels) and the capacity to select products and to forecast and quantify needs (Raja et al., 2006). In Tanzania, only 25% of the health facilities surveyed conducted quantification on annual bases, and the majority of them did not provide training on quantification to the staff (MOHSW, 2008).

There are numerous mechanisms by which health facilities manage their in-house procurement of pharmaceuticals ranging from open tender to direct procurement. They may procure pharmaceuticals by schedule or as needs arise. All these mechanisms have their own advantage and disadvantage in different situations. For example, a survey of health facilities in Tanzania revealed that the main method of procurement used by the facilities was direct procurement. The main supplier being the medical stores department, a semi-autonomous unit under the Tanzania ministry of health. The medical stores department on the other hand procures EDs through international competitive biddings (MOHSW, 2008). Public health facilities in Tanzania have also a possibility of procuring EDs from the private sector. It was reported that only 33% of the health facilities purchased EDs exclusively from the medical stores department. The rest 67% purchased from the private wholesalers as well, mostly by direct and there were no official guidelines that guide the health facilities on how and when they are to procure from the private sector (MOHSW, 2008).

2.2. Availability of Essential drugs

Essential drugs or medicines have been defined by WHO

"As *those satisfy the priority health care needs of the population they are selected because of their public health relevance, evidence on efficacy and safety, and comparative cost effectiveness. Essential drugs are intended to be available within the context of functioning health systems at all times in adequate amounts, in appropriate dosage forms with assured quality and adequate information and at a price which the individual and the community can afford*" (WHO, 2002).

A well-organized pharmaceutical logistics system ensures the continuous availability of that is required for patients care. At the same time, an effective pharmaceutical logistics system should be able to respond to sudden increases in drug demand, ensuring that adequate supplies are available to deal with any emergencies that arise (FMOH, 2010b). Stock availability is the ultimate measure of the other components of the logistics system and it also gives an idea of the overall effectiveness and efficiency of the system, from forecasting and procurement to distribution, storage and inventory management (Jhone, 2004).

2.3 Storage Condition of Essential Drugs

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

2.4 Cold Chain Logistics for Pharmaceuticals

Pharmaceutical logistics involves many cold chain products such as vaccines and biological agents. Cold chain products require temperature controls within a specific temperature range, usually at 2-8˚C. Certain biological products need to be stored, handled and transported in freezer environments, in which case temperatures need to be maintained well below 0˚C. It is critical for the distributers or 3PLs as well as the pharmaceutical companies to ensure that cold chain products are received, stored, handled and transported under strict protocols to the healthcare professionals/organizations(TAN YAN WENG, THOMAS SIM, 2016)

2.5. Pharmaceutical Logistics Management Information System

Pharmaceutical logistics data is collected, processed and reported through LMIS, increasing the likelihood of an adequate supply of EDs. An effective LMIS might be manual or computerized collecting essential data about stock status and consumption. It ensures accountability, a reduction in supply imbalances (stock outs and over stocks), and efficient, cost-effective pharmaceuticals logistics. Because a pharmaceutical logistics system cannot function effectively without timely, accurate LMIS data, the LMIS is an essential tool. It provides for health officers responsibility for pharmaceutical logistics with information they need to react or more important information they need to anticipate the customer demand. (SHAW,2003)

2.6. Lead Time

The normal approximation of lead time demand distribution indicates that both actions reduce inventories for cycle service levels above 50%. The normal approximation also indicates that reducing lead time variability tends to have a greater impact than reducing lead times, especially when lead-time variability is large. There is a service-level threshold greater than 50% below which reorder points increase with a decrease in lead time variability. Thus, for a firm operating just below this threshold, reducing lead times decreases reorder points, whereas reducing lead time variability increases reorder points. For firms operating at these service levels, decreasing lead time is the right level if they want to cut inventories, not reducing lead time variability.

Several studies have focused on the trajectory of intra-site patients by proposing innovative practices to optimize their circulation and ensure the safety of their stay in care units or medical-technical services (Shen et al. 2007). Inter-hospital shifting of patients also requires efficient logistics between the partner network (hospital, laboratory, blood transfusion centre, etc.) as they generate significant costs and there is a potential danger of information loss or medical complication. Finally, the research related to patients' flows studied the issue of administrative practice in terms of treatment and monitoring of medical data of patients throughout the care process.

Hospital flows have also benefited from the technological progress of information systems and the emergence of new IT equipment with high added value (Radio Frequency Identification,

Enterprise resource Planning, mobile application, etc.). Health organizations have tried to seize the opportunity offered by ICTs to move towards new management based on the control of financial, administrative and medical aspects. Existing research has investigated solutions to optimize the processing of financial information for cost control (PATEL et al. 2000; ASH, BERG, and COIERA 2004; GARG and AGARWAL 2014). Other studies have analyzed the circulation of physical flows by focusing on other issues related, for example, to the traceability of blood flows, the elimination of waste or the management of pharmaceutical flows (CHAERUL ,TANAKA, and SHEKDAR 2007; NARAYANA, PATI, and VRAT 2014; BENTAHAR, BENZIDIA, and FABBRI 2016).

Information flows are a source of improvement of the medical practices of patient's flows. Tools such as the electronic patient record play a key role in recording the data by providing detailed information about the history of the patients file. They also constitute a communication medium between the services of the organization and support the information sharing between the partner institutions (laboratory, hospital, blood transfusion centre, etc.). Internal external integration is therefore challenging for hospitals.

The desire to industrialize the health sector by applying lean logistic practices and methods requires sufficient adaptation time and feedback from stakeholders to be able to concretely evaluate its contributions (Mazzocato et al., 2010). To date, very few health establishments have been able to generalize these practices across their entire processes. Two of the obstacles to the full implementation of industrialization are linked to bureaucratization and the top management commitment. Logistics culture is not sufficiently anchored in the strategic vision of hospitals (Benzidia et al., 2016). Also, an efficient logistic approach is based on the qualification and skills of major actors (purchasers, logistics managers, nurses, etc.). Hospitals should strengthen this aspect by setting up an awareness campaign and a recruitment policy adapted to the requirements of logistics practices, prioritizing three major axes: technological, organizational and interpersonal relations.

We have highlighted several challenges that hospitals have to meet in the next few years. The articles proposed in this special issue contribute to this knowledge creation in healthcare logistics. The case studies conducted around the world offer a deeper understanding of logistics

issues on SCM practices such as SC integration, lean management, distribution network design and performance in this specific context.

In their article, Miroslava A. Rakovska and Stilyna V. Stratieva propose and empirical SCM configuration in healthcare based on different characteristics of Hospital supply chain management (HSCM). Following a cluster analysis of 63 Bulgarian hospitals SCM practices, they develop taxonomy of healthcare supply chain practices. Three groups of the hospital have been identified according to their internal and external SC integration; leading hospitals, which have advanced internal integration practices; developing hospitals, which are initiating external integration and underdeveloped hospitals, whose SC practices are very poor. Their results identify the dimensions and measures of the concept of HSCM and indicate patterns of HSCM by investigating how these patterns influence hospital performance. They also propose valuable information for decision-makers about what practices to implement with internal and external SC patterns to improve performance. (https://www.tandfonline.com/ (27/11/2019)

2.7. Ethical Considerations

In this research, participants of the study were asked for consent before participating in the study. During the consent process, they were provided with information regarding the purpose of the study, why and how they are selected to be involved in the study, and what will expect from them. Participants were also assured about the confidentiality of the information obtained in the course of the study not use personal identifiers and will analyze the data in aggregates. Concerning the in-depth interviews, interviewee was informed the name of the interviewees and the health centre in which they work will not appear in data analysis, and interviewees was assured that the information will only to be handled by the researcher and that it will not be discussed with the health centre administrators or other participants of the study.

CHAPTER THREE

3. METHODOLOGY OF THE STUDY

This chapter defines the research design and methodology of the study**,** research design and approach, sources of data, sample size, and sampling technique, data collection instruments and data analysis are will be discussed below.

3.1. Research design and Methodology

The study applied qualitative and quantitative research method and used quantitative method to analyze and interpret the findings that have to be mentioned in terms of quantity like numbers and percentages. A qualitative and quantitative approach are in which the researcher primarily have used for developing knowledge like cause and effect thinking, reduction to specific variables and questions, observation, and the test of theories. It employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data. Qualitative research approach is a means for exploring and understanding typically used to answer questions for phenomena (Jhon W. Creswell , 2008). In this research qualitative aspect was implemented to collect data using interview from key informants of different parties and institutions whose contributions for the improvement of the logistics system are very high. The data are collected in this method using unstructured, structured and semi structured interviews to understand the challenges of the logistics system of the public hospitals.

3.2. Research Design approach

Answers how chosen methods applied to answer the research question. Research design is a specific framework for the research explaining how selected a specific method for the research. In this research the researcher was utilized both quantitative and qualitative research methods through the facility-based cross-sectional descriptive study design.

This survey research is based on cross-sectional design and collects quantitative and qualitative data by semi-structured interviews and questionnaires. The researcher focuses on the challenges of medical supply chains in public hospitals of Addis Ababa city Administration. The researcher tries to capture examples and the thoughts of experts and experience of other countries.

Therefore, the researcher was used multiple sources of evidence and qualitative and quantitative methods are applied to generate a wide and detailed examination of the reasons behind a challenging supply of medicines and equipment in public hospitals.

3.3. Sources of Data

Where do data come from? It was the first question in the researcher mind before starting the research. Data was collected from all the relevant sources to find answers to the research problems, tested the hypothesis and evaluated the results. In this research the researcher was collected data from the primary and Secondary Source of hospitals, EPSA, Ethiopian customs commission Modjo branch office, Ethiopian shipping and logistics service enterprise, Ethiopian food and drug control authority, National bank of Ethiopia and other concerned parties.

3.4. Data Collection

Primary and secondary sources are used to collect data. Challenges and background information are researched with published literature which takes into consideration, peer-reviewed articles, case studies and project reports. Secondary data is used to analyze and evaluate the challenges of essential medicine supply chains in Addis Ababa city public hospitals.

A comprehensive list of the references can be found in the bibliography. As a qualitative method, primary information is collected by semi structured interviews with concerned government institutions key informants and supply chain experts of Ethiopian pharmaceutical supply agency.
Questionnaires were also applied to collect data from logistics officer or concerned parties of the public government hospitals.

3.5. Target Population

A target population is a certain group of the population that share similar characteristics and is identified as the intended activators or audiences for a product, promoters or researchers (CRESSWELL, 2008). It is a portion of the whole universe of people selected as the objective.
For this research 11 government public hospitals are targeted. Other government parties, whose activities have high impact on the logistics system of public hospitals supplies also have targeted.

3.6 Sampling

This study was used purposive sampling technique to select the respondents. Questionnaires were used to collect data from 1 key and relevant personnel in the department of logistics of each public governmental hospital. The researcher found that the main source of medical supply to the hospitals was central medical stores of Ethiopian pharmaceutical supply agency (EPSA) most of hospitals are dependent on it.

3.7. Data analysis

The data analyzed using thematic analyses methods. The data collected through in-depth interviews and questionnaires reviews are examined and organized in themes. Thematic analyses were used to organize the patterns across data sets to associate to the specific research question. The findings have organized to the specific objectives themes. The analyses are done by summarizing the thoughts, narrative, transcripts of interviews, and direct quotations of interviewees. Moreover, the data collected using the data collections have substantiated the narratives. The quantitative data would be analyzed using Microsoft excel and the data have presented inappropriate manner in tabular, charts and/or narrative formats.

CHAPTER FOUR

4. DATA PRESENTATION, ANALYSIS AND INTERPRETATION

All (n=11) public hospitals were included in this study. The distribution heads worked on average for 1.6 years in distribution head position whereas the store keepers worked on average for 1.8 years on store keeper position. Some hospitals don't have logistics officer and the person who assigned as storekeeper or distribution head assumed as a logistics officer.

Planning, Selection and Procurement

As shown in the table 1, most 11 (100%) of the hospitals had their own guide line for the purchase of drug and equipment, 11 (100%) of the hospitals have their own EDL, of which 6 (54%) of them have national hospital EDL, 8 (72%) of them have documented policy or guide line for procurement of NPDs, 3 (27%) of them are currently importing medicines and medical equipments, about availability of foreign currency none of them had replied yes response, for the purchase of medicines and medical equipments from local manufacturers, only 2 (18%) of the respondent responded yes. From this data analysis, we can show that, hospitals have very less access to purchase even some medicines and medical equipment either from local manufacturer or importing from outside the country. The researcher finding it as a challenge in public hospitals logistics management system because it limits the source of supply for the hospitals and violates the rule of accessibility according to WHO, 2008 report.

Table 1: Planning, Selection and procurement practice in PH, Addis Ababa, 2020

Practices	Responses	Frequency(yes)
Documented plan or guideline for drug and equipment procurement	11	11(100%)
The hospital have its own ED list	11	11(100%)
Essential drug list availability	11	11(100%)
National Hospital ED list Availability	11	6(54.54%
Is there documented policy or guideline for procurement of NPDs	11	8(72.72%)
Importing medicines and medical equipments	11	3(27.27%)
Availability of foreign currency	11	0
Purchase of drugs and equipments from local manufacturer	11	2(18.18%)

As shown below 50% of the hospitals are annually revising the EDs list and 10% in 2 years, 20% after 5 years and 20% had never updated. This finding shows that, there is a very high gap with WHO, 2016 standard the organization sets the ED list has to revise every two years (WHW,2016). But the finding shows that only 10% of the hospitals are revising their essential drug list within 2 years which is the same as WHO standard

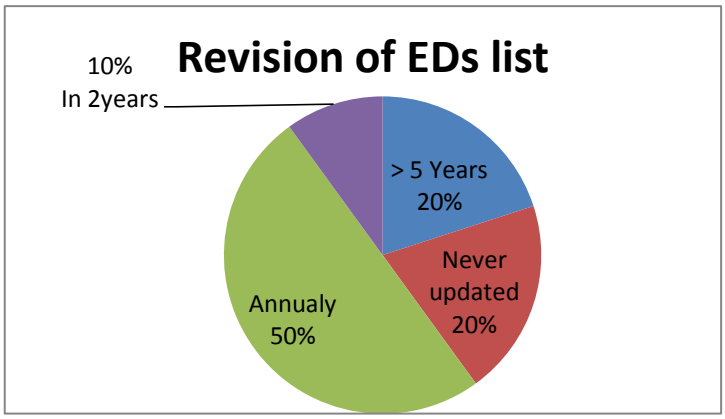

Fig1. The period of revision of EDL

Regarding the criteria for drug and equipment purchase, 63.63% is used as a criterion is a pattern of prevalent disease, and for equipment, 95% of them used as the criteria durability of previous equipment and they had decided to purchase the equipment the same brand, capacity and technology with the previous one. From 40-70% of medical devices and equipment in low and middle income countries are broken, unused or unfit for the purpose, this will followed by waste of resources (HEALTH, GLOBAL, 2017). According to WHO the strategic objectives of pharmaceutical procurement are procure the most cost effective drugs in the right quantities, select reliable suppliers of high-quality products, ensure timely delivery and achieve the lowest total cost (WHO, 1999) but the research findings are different from WHO standard.

Table 2: Criterion for drugs and equipment purchase

Practices	Responses	Frequency
Pattern of prevalent disease	11	7(63.63%)
Efficiency and Safety	11	1(9.09%)
Cost of the drugs	11	3(27.27%)*
Preference for well-known drugs	11	1(9.09%)
Durability of previous equipment	11(For equipment)	3(27.27%)*

**More than one ways of criteria for drug and equipment purchase.*

Regarding main challenges of planning to purchase drug and equipment the findings from the research shows that 90% responds emergency purchase is the main challenges for drug and equipment purchase planning and 10% responds emergency purchase and epidemic diseases are the main challenges for purchase planning of drugs and equipment. This implies the hospitals purchasing system is don't follow the standard guide lines for purchasing or giving less attention for planning and poor ICT system implementation for communication with the concerned parties in the hospitals and weak financial management system.

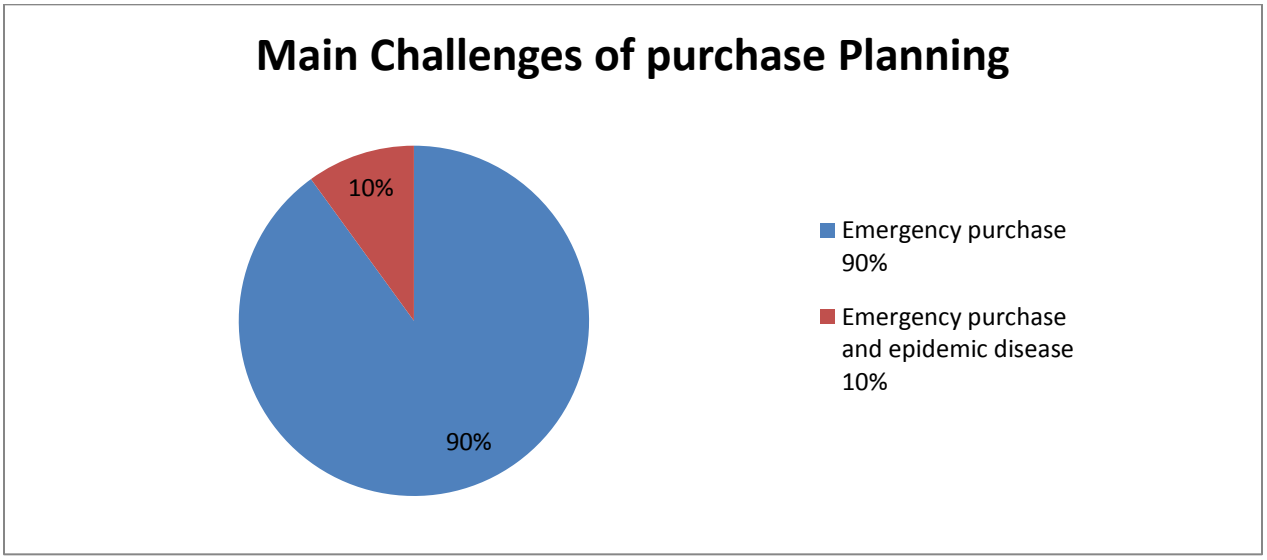

Fig. 2 main challenges of purchase planning

About the availability of national hospital essential drugs list in each hospital, 60% said they have national hospital essential drugs list, 40% responses shows that they do not have national

hospital essential drug list. From this finding we can understand most of hospitals have national hospital essential drug list, but 40% of them still they don't have the national hospital essential drug list. According to the researcher, this might be, they don't understand the usefulness of the list and at the same time they are not activate the guideline of the hospital purchasing procedure.

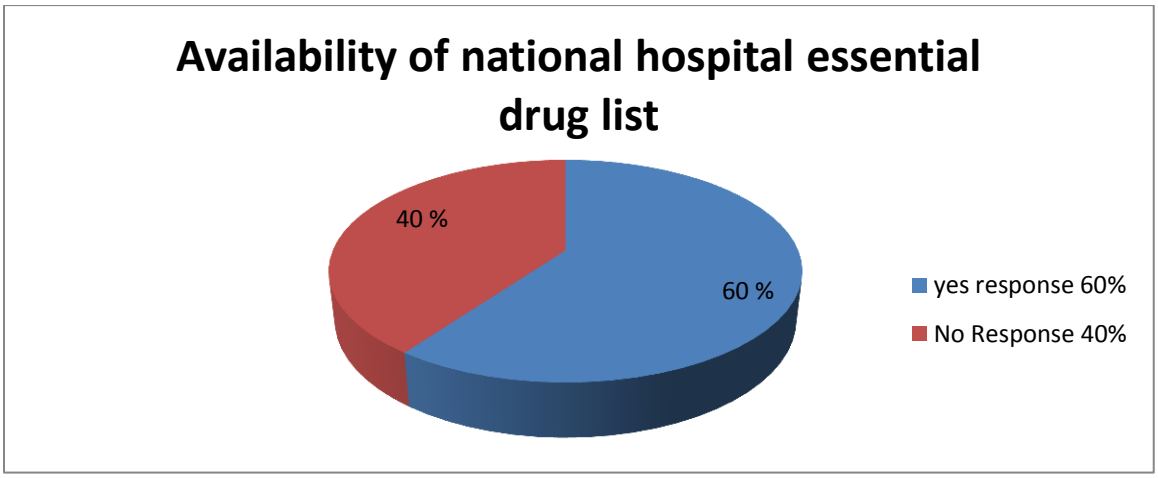

Fig. 3 Availability of hospital essential drug list

For the questions of availability of documented policy or guideline for procurement of none planned drugs (NPDs) all hospitals responses was yes. This implies the hospitals purchasing system is planned to use the NPDs list during procurement. This is very important to assure the accessibility of NPDs if the purchasing plan is activated.

Regarding the type of purchasing analysis that the hospitals used 40% is using the ABC analysis, 35% of them are using VAN analysis and 25% of them are using the mix of the two. This implies the procurement department focuses in the purchasing process which items are more important to the patients. But the ABC analysis basically deals with the value of the product rather the than the necessity. VAN analysis deals with the range of acceptable prices (HEDLEY REES , 2011). The finding shows the purchasing analysis is pressured by financial constraint. The chart below shows the finding in detail.

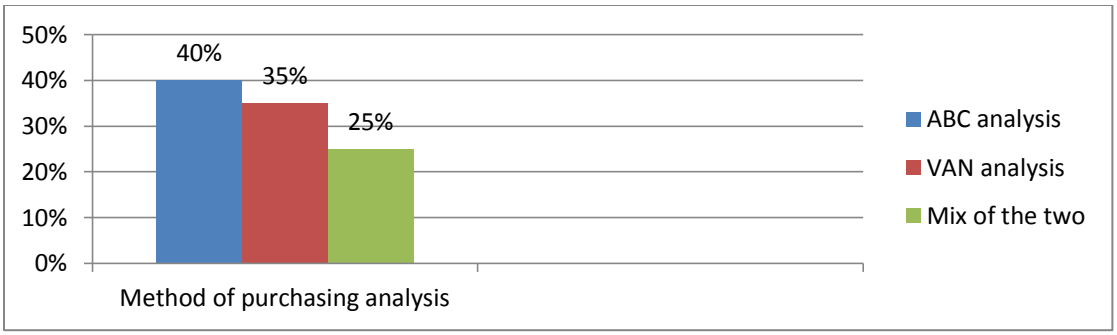

Fig.4 Method of purchasing analysis

For the question, if there are documented policy or guideline for procurement of NPDs all health facilities logistics officers answered yes. Regarding the applicability, the result shows that all facilities have guidelines or policies for the purchase of NPDs, but 63% of the facilities' policy or guidelines are inactive or does not work, only 27% of the facilities 'purchasing policies or guidelines are active and 9% of the facilities are partially active. This implies the hospitals NPDs procurement or guideline implementation lacks follow up and the management team and health officers don’t control the activation of the guideline. The table below shows that, the responses of the public hospitals about the availability and applicability of the policy or guidelines for the purchase of NPDs drugs.

Table 3: Shows the result of the availability and applicability of the guidelines or policies for the purchase of NPDs drugs in the facility.

NO	HEALTH FACILITIES	AVAILABILITY OF GUIDE LINES OR POLICIES IN THE FACILITY	CURRENT STATUS OF THE POLICY OR GUIDE LINE
1	HOSPITAL 1	YES	INACTIVE
2	HOSPITAL 2	YES	INACTIVE
3	HOSPITAL 3	YES	INACTIVE
4	HOSPITAL 4	YES	ACTIVE
5	HOSPITAL 5	YES	INACTIVE
6	HOSPITAL 6	YES	INACTIVE
7	HOSPITAL 7	YES	PARTIALY ACTIVE
8	HOSPITAL 8	YES	INACTIVE
9	HOSPITAL 9	YES	INACTIVE
10	HOSPITAL 10	YES	ACTIVE
11	HOSPITAL 11	YES	ACTIVE

For the question who determines the hospital's resupply quantities of drugs, 60% of them are responded medical directors, 20% logistics officer, 20% had responded storekeepers. The chart below shows the details of the responses. This implies the responsibility for resupply quantity lies on the medical directors. The researcher assumption in this case is, it may create ordering gap and misunderstanding between the medical directors and store keepers if they are not actively utilizes the ICT system between them. The main task of the medical director is to smoothly manage the hospital operation and the main task of the storekeeper is to manage the inventory and to order stock out items in appropriate time. Accordingly, it is easy to give the resupply quantity for storekeeper than the medical director.

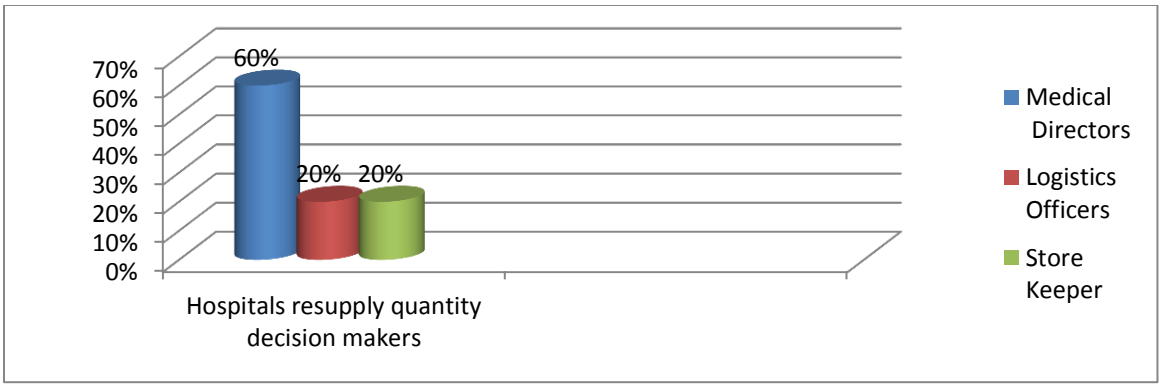

Fig .5 Hospitals resupply quantity decision maker

Regarding the quantification method of the reorder quantity, 27.27 % of the hospitals are using morbidity and consumption method, 18.18 % of them are using formula method 9.09 % are using guess method,18.18 % of them are using morbidity method, 18.18 % are using consumption method and 9.09 % of them don't have clearly identified resupply quantification method. This implies most of the hospitals are trying to follow the right path for reorder quantity because they are focusing the demand of the patient and the situation. But the researcher assumes it is better to consider the safety (reserve) stock level to decide the reorder quantity (JOHN SNOW , 2000).

Table 4: Resupply quantification method

No.	Facilities	Resupply quantification Methods					
		Morbidity Method (18.18 %)	Consumption Method (18.18 %)	Morbidity and Consumption Method (27.27 %)	Guess (9.09%)	Formula (18.18 %)	No have clearly identified method (9.09 %)
1	Facility A			√			
2	Facility B			√			
3	Facility C			√			
4	Facility D		√				
5	Facility E		√				
6	Facility F	√					
7	Facility G					√	
8	Facility H	√					
9	Facility I						√
10	Facility J				√		
11	Facility K					√	

Regarding the procurement of drugs and equipment, the question was from where your hospital procures drugs and equipment, 65 % of them responded they are only using Ethiopian pharmaceutical supply agency (EPSA) as the major source of their purchase, 15% of them are purchasing from local suppliers in addition to (EPSA), 15% of them are using Importers as a secondary source of suppliers and the remaining 5% of them are import some drugs and equipment from abroad in terms of assist and by opening L/c. This implies there is a limited source of supply and financial constraint for public hospitals. To purchase from private importers, the price is very high the patient's affordability for high price is very low in government public hospitals. To import from foreign companies there is very less access for hard currency and the hospital logistics department lacks personnel to manage the import process.

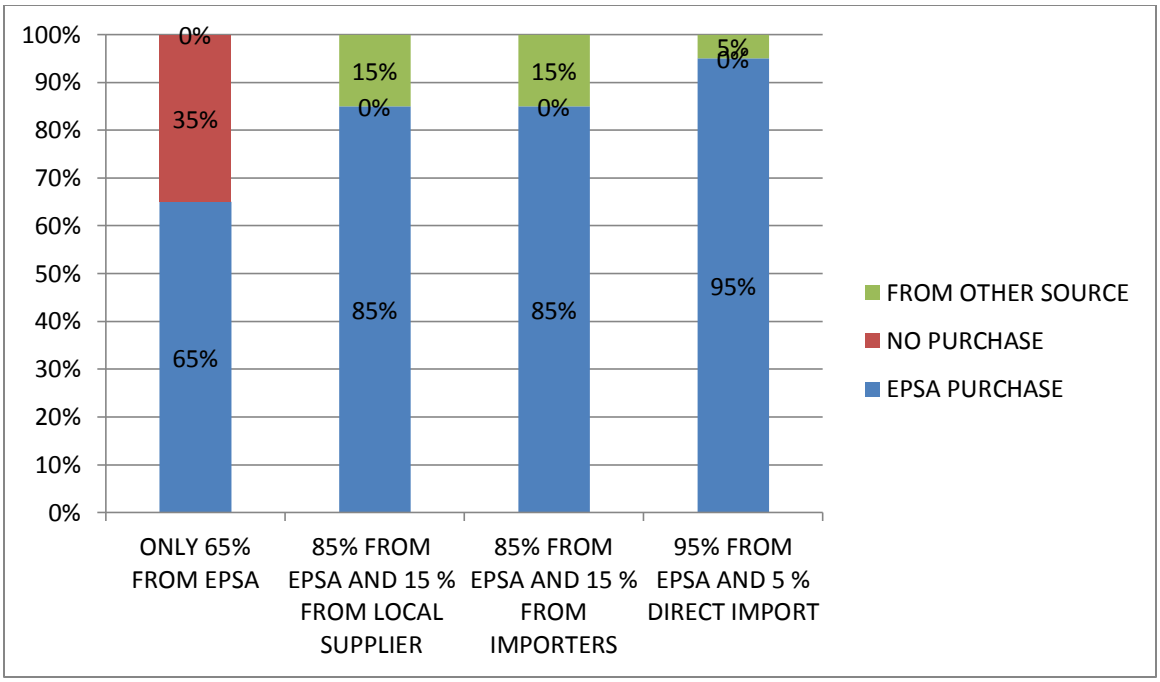

Fig 6 sources of purchase

Regarding the procurement pattern 65% of the hospitals are performing purchase of drugs bi-monthly, 10% quarterly, 5% Monthly, 10% every four-month, 5% semi-annually, and 5% annually. This shows that most hospitals procurement pattern to purchase medicines is 2 month. It is reasonable time to reorder the finished items. The other implication is, there is high stock out in the hospital and the purchasing frequency is very high because of purchase repetition. In addition to that application of forecasting and planning is very low.

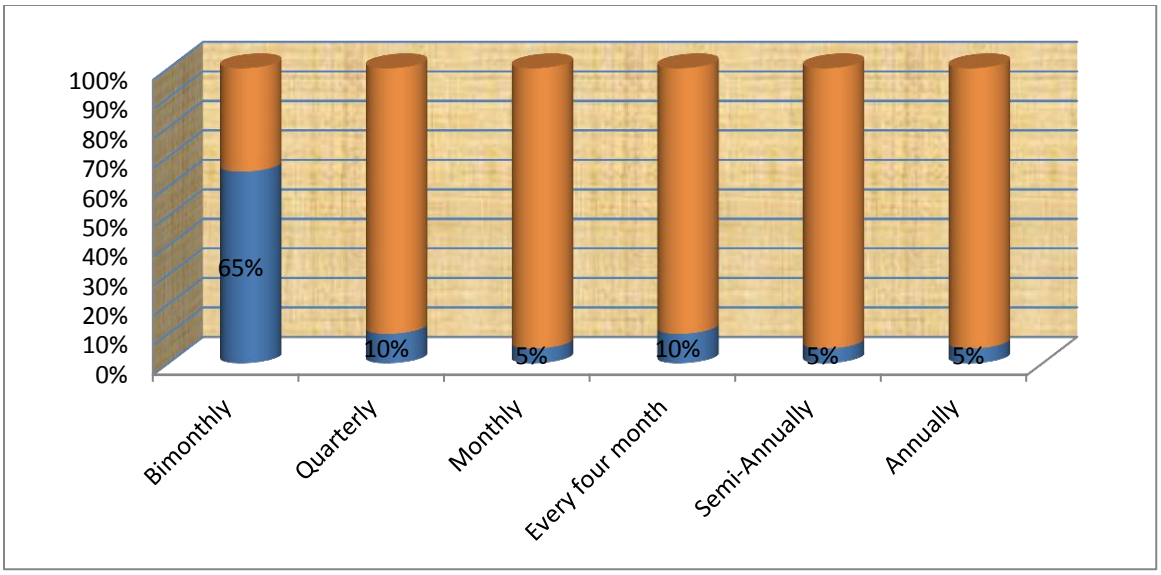

Fig. 7 Procurement pattern of public hospitals.

For the question if your hospital purchase is from the local market from whom your purchase is performed? 65% responded their purchase is only from EPSA which means they will not to search other sources. 35% of them are looking for other sources in addition to EPSA. This implies most of hospitals are dependent on EPSA, implying there is a limited source of supply and if this source fails to supply the hospitals demand, the operation of the hospitals also will fail. If EPSA face stock out for different types of medicines, hospitals will be forced to buy with high price from importers and local suppliers. The PIE chart below shows the responses in detail.

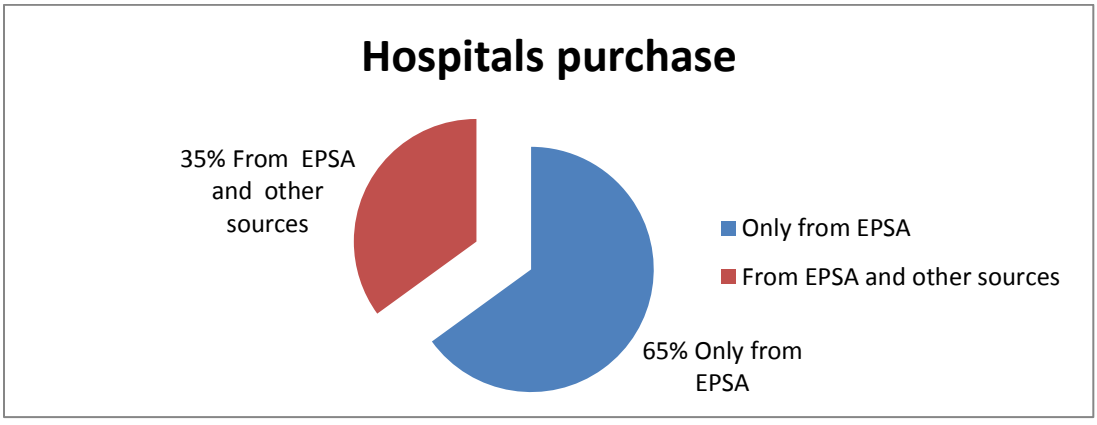

Fig 8 Local purchase

For the question of what are the main challenges your hospital faces when it procures from private suppliers, the 95% of the respondents responded high price, 5% of the respondent responded delay in delivery. This implies, if hospital's purchase is from private suppliers, then they have to pay high price with respect to their customer affordability. This shows private importers will to gain more profit.

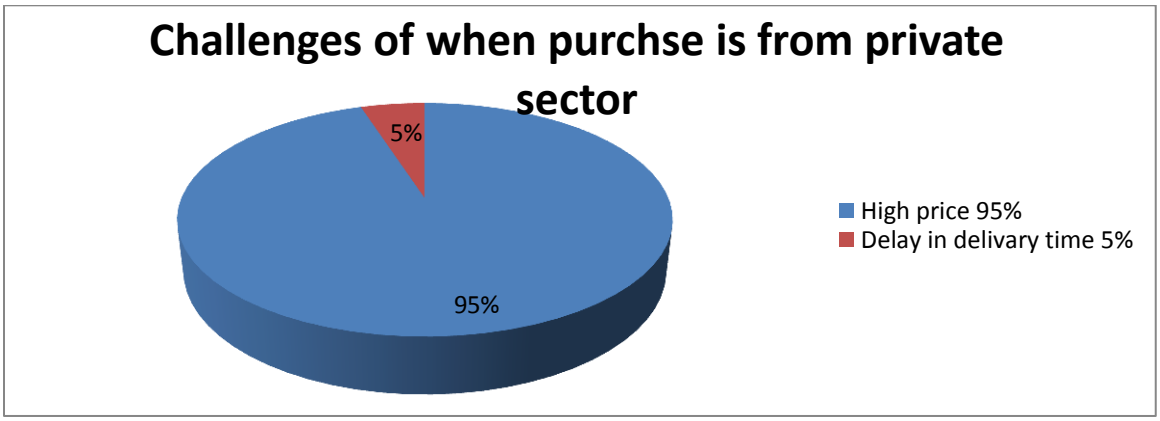

Fig 9 challenges when purchase is from private sector

For the question who is responsible for transporting drugs and equipment when the purchase is from private suppliers? For this question, 65% of the respondent responded private suppliers deliver the purchase, 20% of them responded the hospital collects from the supplier premises at the time of purchase and 15% of them responded both suppliers deliver and hospital collects based on the condition of the purchase. This implies private suppliers after sales service is good with respect to transportation. As a result, majority of hospitals are using supplier's vehicle to transport their purchased medicines.

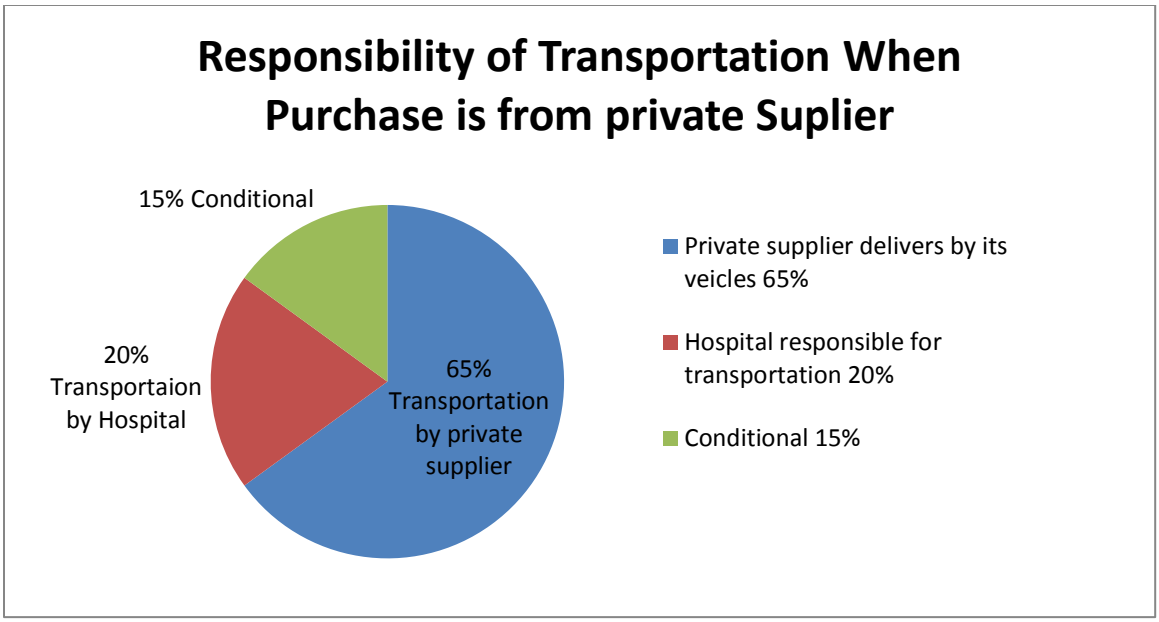

Fig 10 Responsibility of transportation when purchase is from private suppliers

Regarding the type of vehicles most often used for transporting drugs and equipment, 45.45% of the hospitals were responded that they have been using both hospitals' and suppliers' vehicles, 18.18% of them are using rented private transport service, 18.18% of them are responded only hospitals' vehicles and 18.18% of the respondent replied they are using only private suppliers' Vehicle. This implies there is shortage of vehicles in the hospitals for transportation of their purchased medicines either if they are purchased from private suppliers or from EPSA. Some of public hospitals are using rented vehicles; these vehicles may not fit to transport medicines because of easily perish ability of drugs when it puts inappropriate place or using transportation system unfit for medicines. Another implication from this finding is the raise of question the quality of the data collected from logistics officers of hospitals'. When we add 18.18% of who use hospitals' vehicles and 18.18% of who use private vehicles is equals to36.36 is less than 45.45% of using both private suppliers' and hospitals' vehicles.

Table 5: Type of vehicles for transporting drugs and equipments

No.	Hospitals	Hospital Ambulance	Hospital Vehicles	Public transport ation	Rented private vehicle	Supplier Vehicle	Hospital and Supplier Vehicles'	Other
1	Hospital 1						√	
2	Hospital 2						√	
3	Hospital 3				√			
4	Hospital 4						√	
5	Hospital 5		√					
6	Hospital 6		√					
7	Hospital 7						√	
8	Hospital 8				√			
9	Hospital 9						√	
10	Hospital 10					√		
11	Hospital 11					√		
	Total %age		18.18%	0%	18.18%	18.18%	45.45%	0%

For the question how many vehicles do you have for the transportation of drugs and medical equipment? 75% of the respondent responded 1-5 vehicles, 15% respondent responded 5-10 vehicles, 10% of the respondent responded 10-15 vehicles. This implies most of the hospitals have a small number of vehicles. When the researcher made informal interview with most of hospitals' key informant, they said that, the number of vehicles for transportation of medicines is not sufficient.

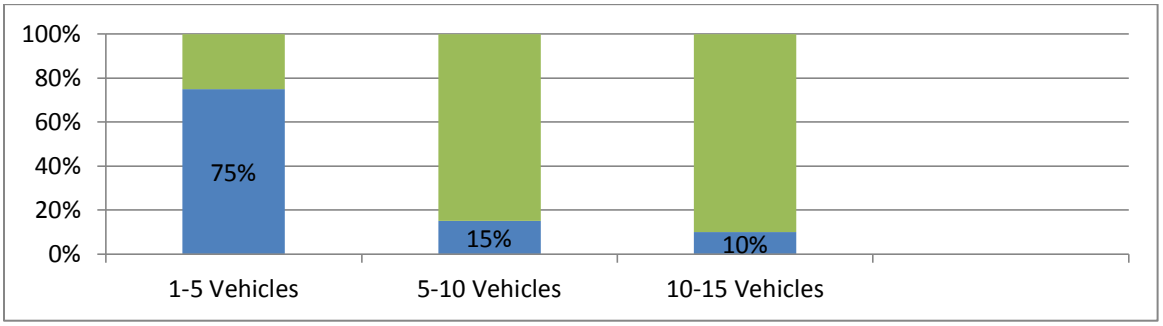

Fig.11 Availability of vehicles in the hospital for transportation of drugs and equipment

Regarding the time takes between ordering and receiving purchased items from private suppliers, 45% of the respondent responded that they will receive their order 1 to 2 weeks after ordering, 30 % of the respondent responded they will receive their order between 2 weeks and 1 month, 20%

of the respondent responded they will receive their order between 1 to 2 month and 5% of the respondent responded they will receive after 2 months of their order. This implies most of hospitals order receiving time is between 1 to 2weeks when they purchase from private suppliers. From the researcher informal interview, hospitals are looking for private suppliers for the medicines that are stock out from EPSA warehouses.

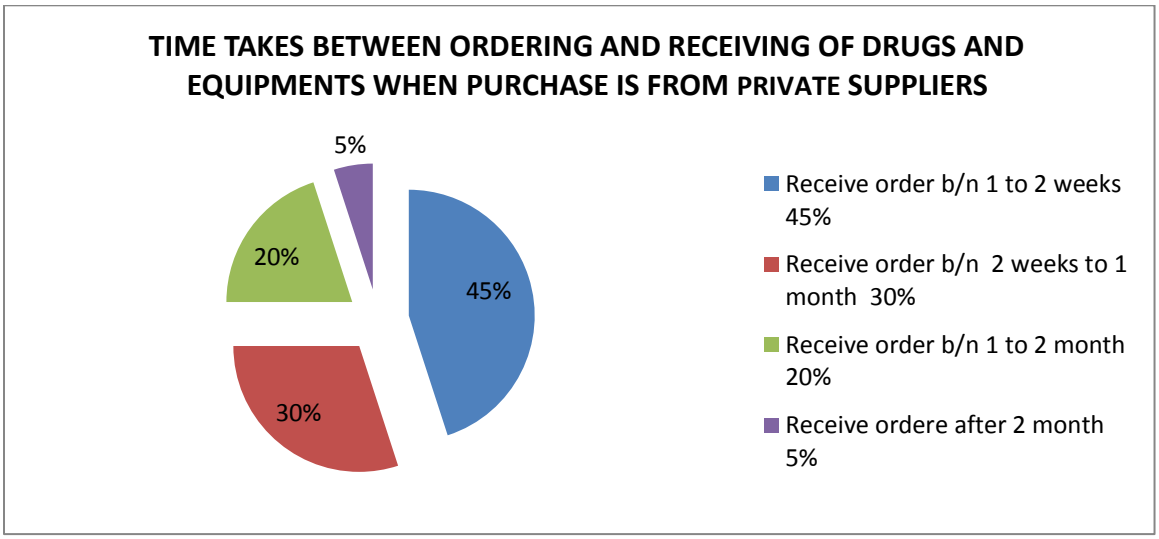

Fig 12 Time takes between ordering and receiving of the orders

For the question what are the main challenges, your hospital will face when it buys from EPSA (Ethiopian pharmaceutical supply agency)? For this question, 62.5% of the respondent responded quantity which means low quantity to receive from their order, 20.5% of the respondents responded delivery time, 10% of the respondent responded quality problem and 5.5% of the respondents responded transportation problem. This implies there is shortage of medicines in EPSA warehouse, because of different logistics problems and bureaucracy in the supply chain. From key informant interview the reasons for stock out are, hard currency problems, transportation problems, customs process problems and financial constraint in the hospital to settle the previous credit purchase.

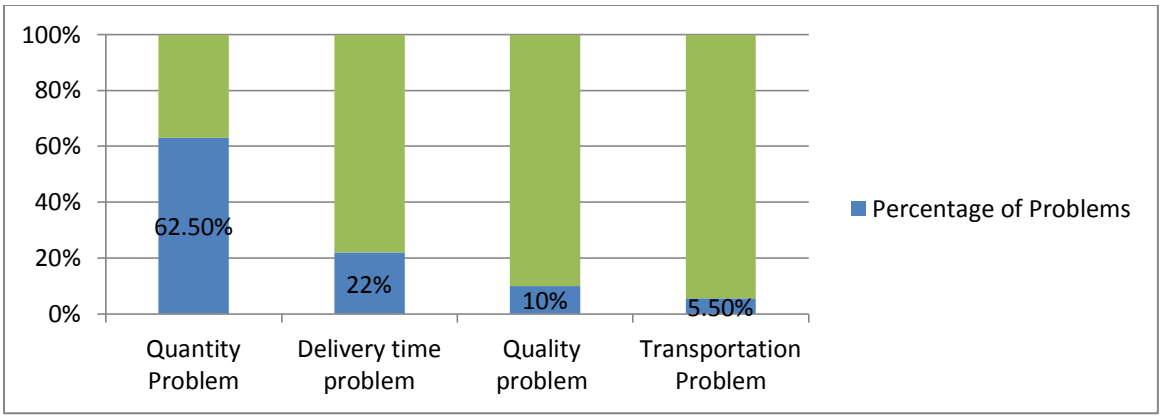

Fig 13 Frequent problems when purchase was form EPSA

Regarding the responsibility of transporting when hospitals purchase is from EPSA, 54.54% responded EPSA delivers their purchase, 27.27% responded they will collect the purchase from EPSA premise and 18.19% responded conditional which means if they rushed to collect the drugs they will take the responsibility to transport the drugs and if they do not rush, they will wait until EPSA delivers the purchase. This implies EPSA transportation facility have coverage of more than 54.54% of hospitals whose purchase is from EPSA regardless of other conditions. This shows hospitals do not have enough vehicles to transport their purchased medicines and forced to wait until EPSA transport and delivers by its vehicle.

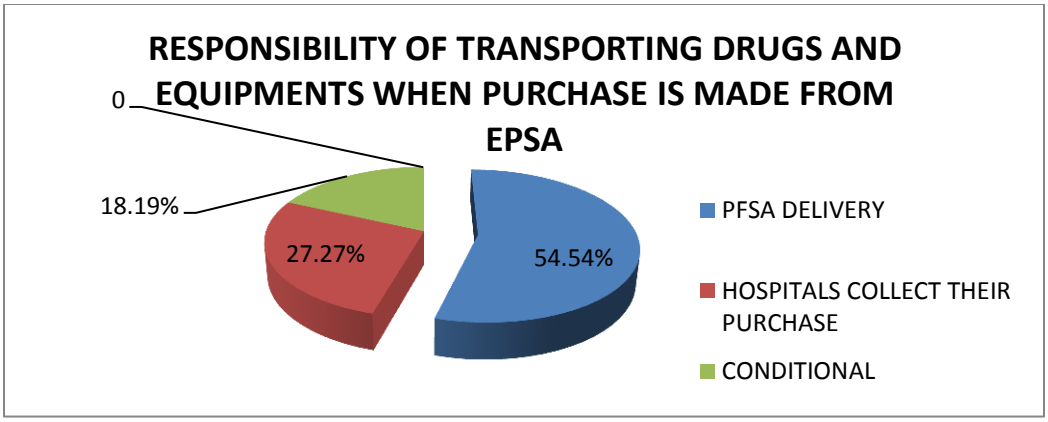

Fig 14 Responsibility for delivery of purchases from EPSA

For the question what type of cars is most often used for transporting drugs and equipment when your hospital purchases from EPSA? 45.45% of the respondent responded that they used EPSA's vehicle, 36.36% of the respondents responded that they used hospital's vehicle to transport their

Purchase, 18.19% of the respondent responded they will rent private vehicles to transport their purchase. This question was prepared by the researcher to triangulate whether hospitals have ambulances for transportation emergency drugs and medicines for some critically ill patients. This finding implies all hospitals do not have ambulances to transport emergency purchases of medicines and they are using normal transportation system for these emergency medicines.

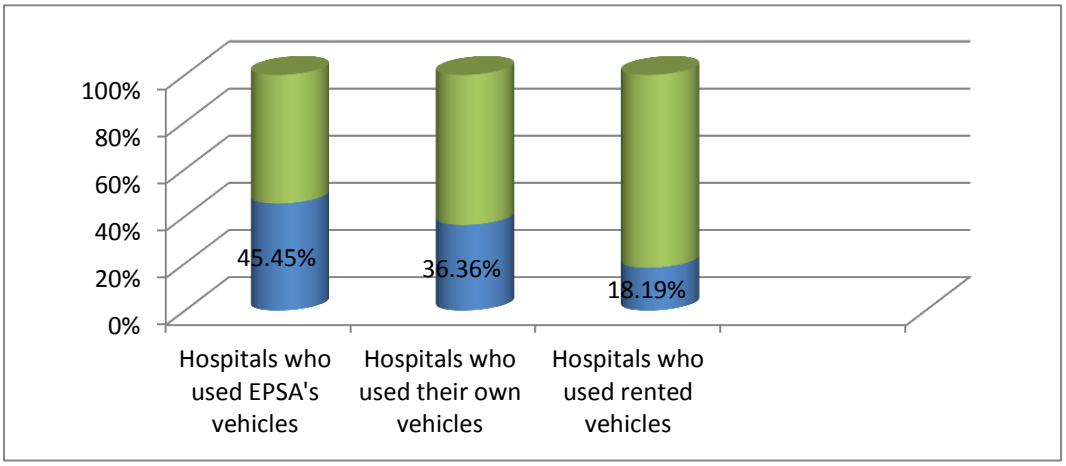

Fig 15 Type of vehicle using to transport purchased items

For the question, what type of cars is most often used for transporting drugs and equipment when your hospital purchases are from EPSA? 63% of the respondent responded they are using hospital's vehicle and supplier's vehicle to transport their purchase, 27% of the respondent responded they are using their own vehicles to transport their purchase and 10% of the respondent responded they are using both supplier vehicle and rented private vehicle to transport their purchase. This implies most of hospitals are using EPSA's vehicles and others will use rented vehicles. Hospitals that use their own vehicles and EPSA's vehicles are safer than hospitals that use private rented vehicles. Another implication is, regarding vehicle utilization respondents answer here, contradict with the previous responses which show 45.45% is using EPSA's vehicles.

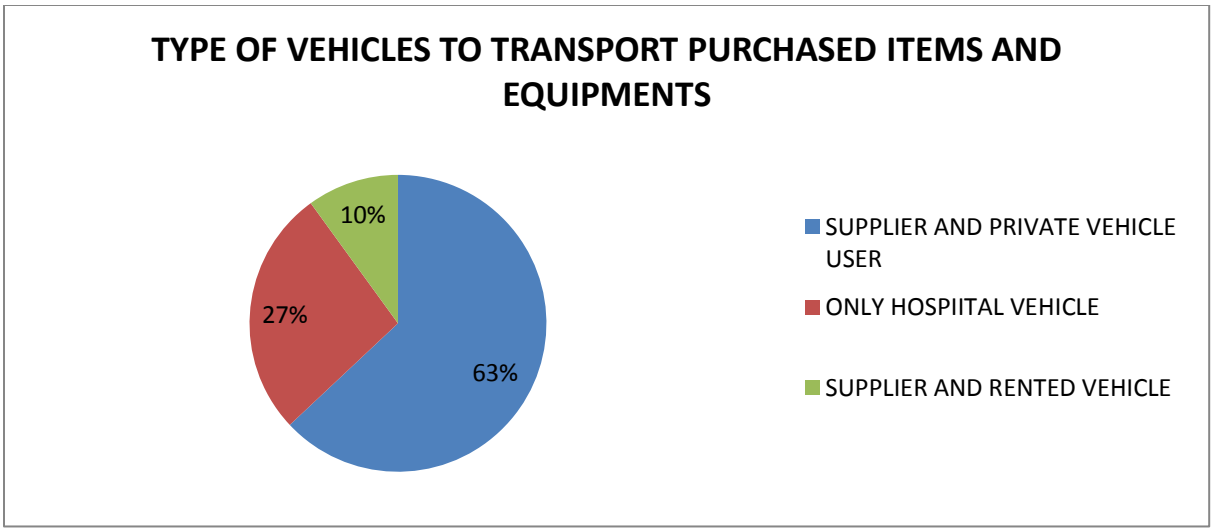

Fig 16 Types of vehicles using for transportation

For the question, the average time taking between ordering and receiving of orders when hospitals purchase is from EPSA, 57% of the respondent responded it takes less than 1 week, 27% of the respondent responded it takes 1-2 weeks, 9% of the respondent responded it takes 2 weeks to one month 7% of the respondent responded it takes 1 month to 2 month. This implies the delivery time of drugs by EPSA don't have standard and plan to deliver the purchased items because from the chart we can see there are different time of delivery for different hospitals.

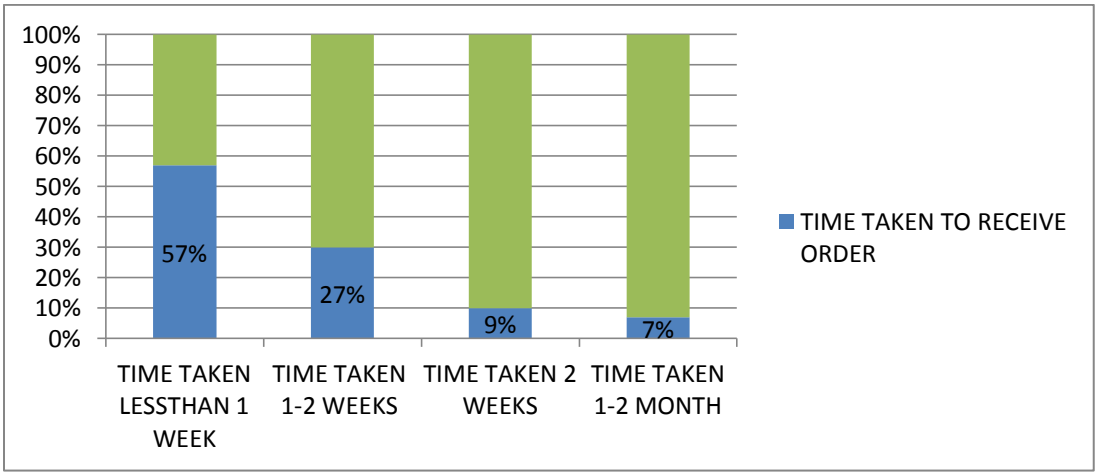

Fig 17 Time taken to receive order

For the question does your hospital imports medicines and medical equipment from outside the country? 65% of the respondent responded currently they are neither drugs nor equipment import from abroad, 25% of the respondent responded they are importing some types of drugs from outside the country in the name of donation and 10% of the respondent responded they are importing some types of medicines by opening L/c. This shows that most of hospitals do not have the access to import medicines and equipment. The implication is centralized distribution system of medicines in the city.

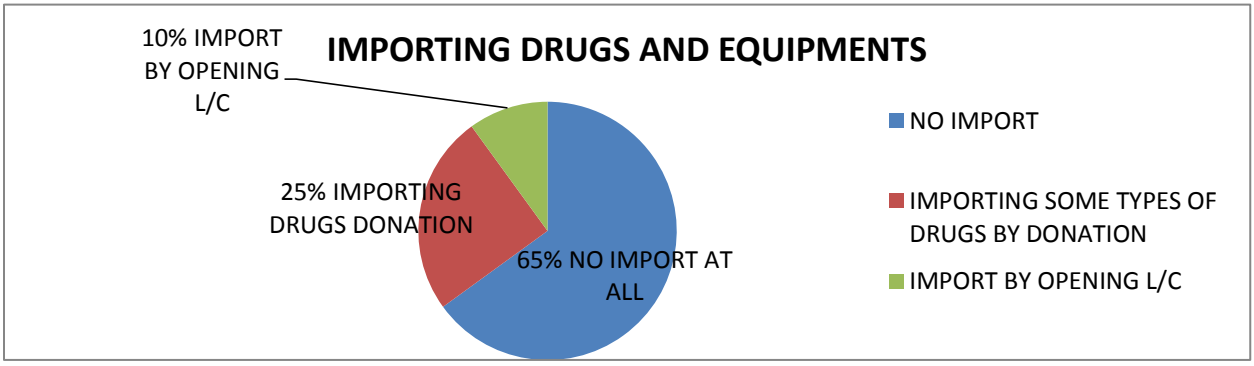

Fig.18 Importing drugs and equipments

For the question can you get foreign currency to import drugs and equipment as per your requisition? 90% of the respondent responded they are facing trouble to get foreign currency and 10% of the respondent responded they will get the currency after a long time wait. This implies there is a problem to get hard currency for medicine importation.

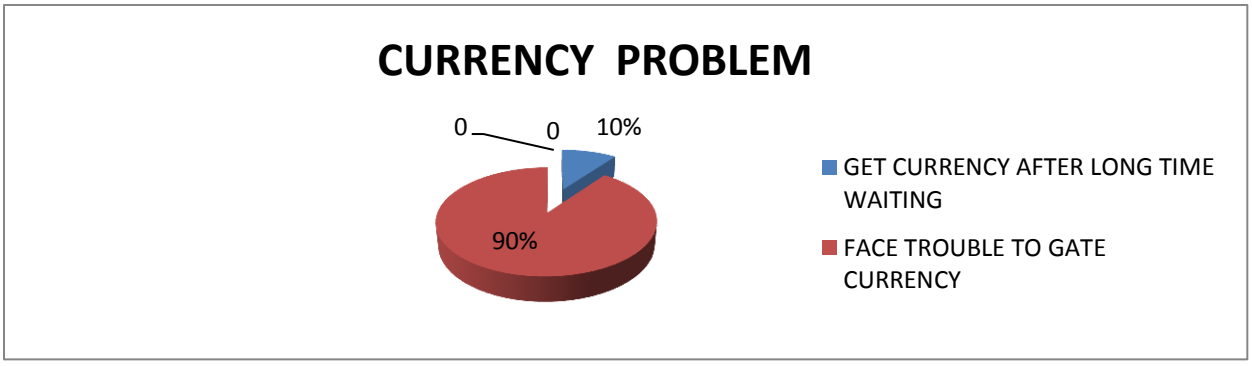

Fig 19 Currency problem

For the question what are the main challenge to get your order in the import process? 45% of the respondent responded the main challenge is a shortage of hard currency, 27% of the respondent responded the main challenge is a custom process, 18% of the respondent responded shipping line process, 10% of the respondent responded failure of custom brokers to process the shipment in reasonable time. The data collected shows that there are a lot of government bureaucracy that are tackling the import process of medicines and medical equipment with the shortage of curreny.

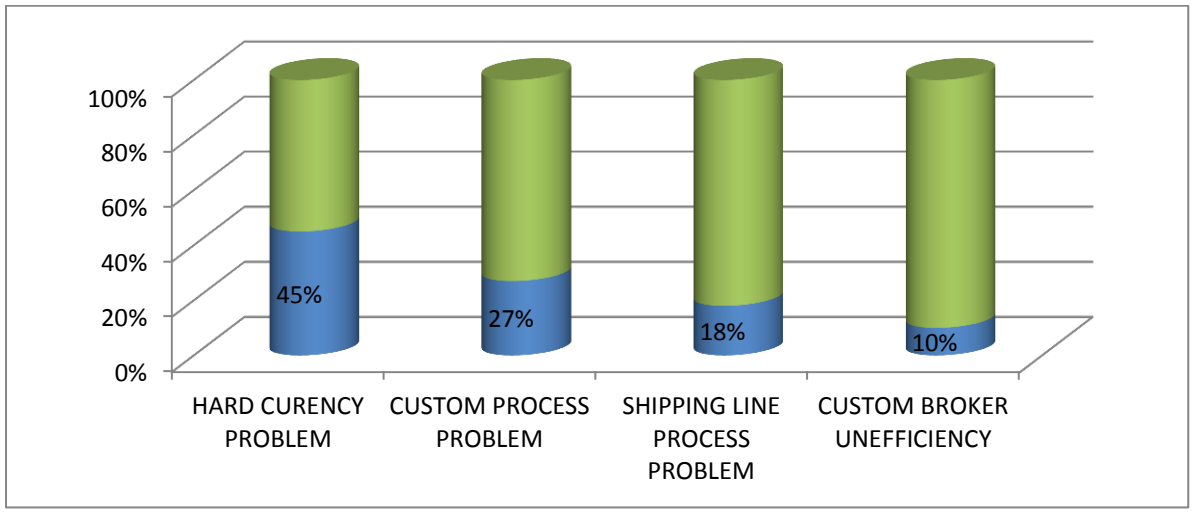

Fig. 20 The main challenge in import process

For the question does your hospital purchases drugs and equipment from local manufactures? 35% of the respondent responded "Yes" and 65% of the respondent responded "No" answer. This implies most of hospitals are not will to purchase from local manufacturers and, from key informant interview, the researcher recognized that there are shortage of production in local manufactures and quality problems.

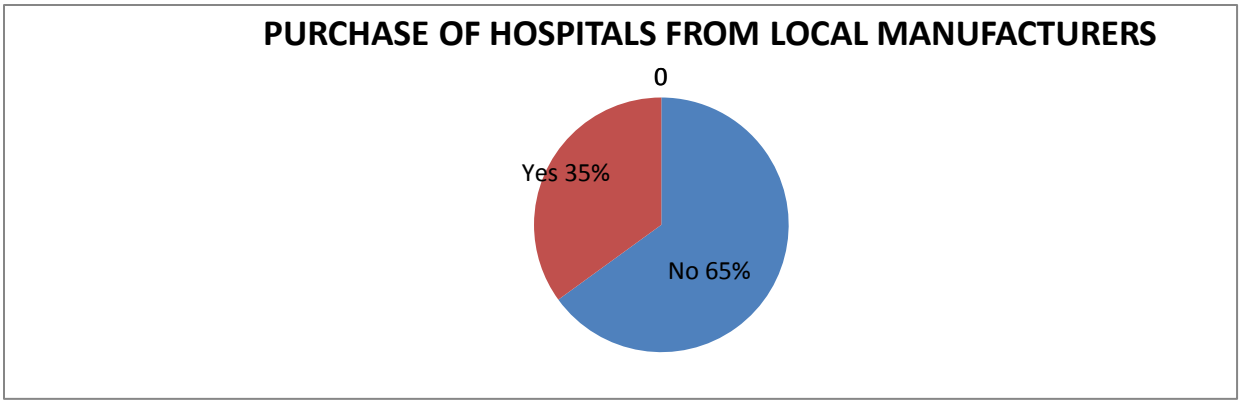

Fig 21 purchase of Hospitals from local market

For the question How many days does it take between ordering and receiving of items when your hospital purchase is from local manufacturers if Your answer is yes for the previous question? All respondent responded 1-5 days for this question. If your answer is yes for the previous question, what is the main challenge when your facility purchase supplies from local manufacturers? For this question, 45% of the respondent responded high price, 35% of the respondent responded low quality including packaging, 15% of the respondent responded slow delivery time and 5% of the respondent responded transportation problem. This implies local manufacturer's price is high and there are different types of quality problem.

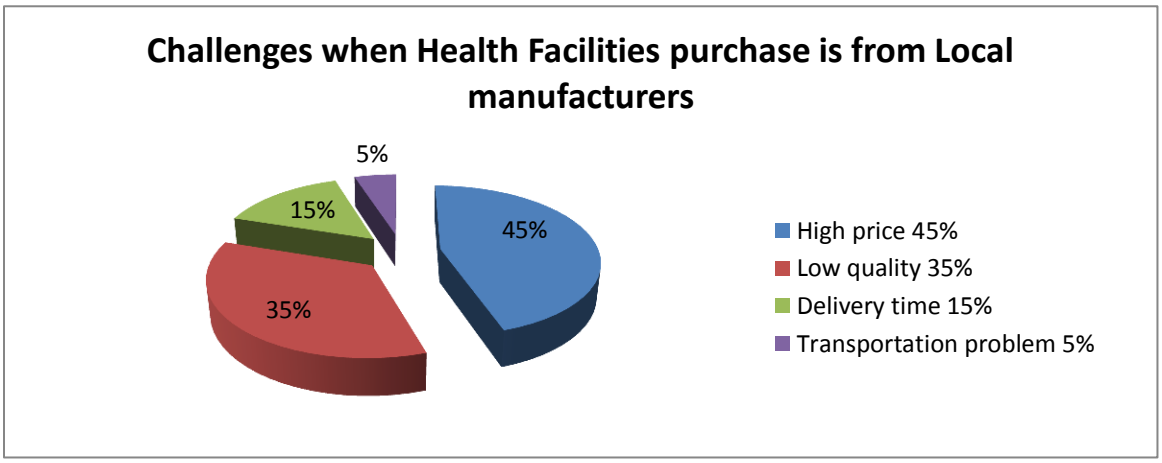

Fig 22 Challenges when Hospitals purchase from local manufacturer

For the question does your hospital have a proper warehouse to store drugs and equipment properly? 75% of the respondent responded "No have" answer, 15% respondent responded "yes but not enough", and 10% of the respondent responded "Yes" answer. The researcher also prepared the checklist (ANDREWGARNETT, 2014) (see page 77, annex 8) for medicine storage facilities to be filled by storekeepers and 68% of storage facilities were not available in public government hospitals storage and the responses on the chart shows there is no proper warehouse for drugs and equipment in the hospitals. The researcher also conducted informal interview with most of hospitals storekeepers and physically observed the warehousing system of the hospitals does not fit for medicines.

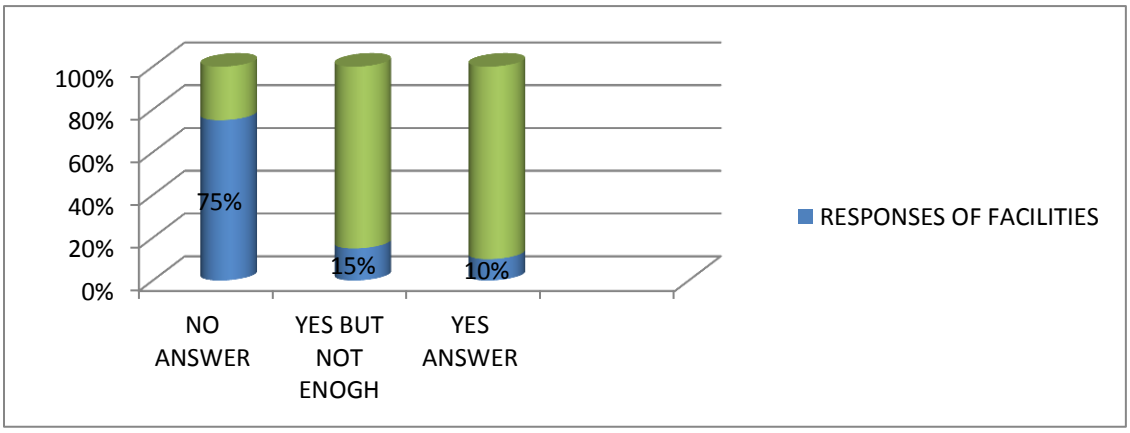

Fig 23 Availability of proper warehouse

The deep interview was also made with key informants of the institution that the researcher assumes the data collected from these institutions key informants is very crucial for this research. The interview was made with logistics and distribution operation manager of EPSA (Ethiopia pharmaceuticals supply agency), with Ethiopian shipping and logistics service enterprise, with Ethiopian customs commission Modjo branch office and with food and drug control authority, The interview is focused on the barriers and obstacles that create a delay on the shipments of EPSA and Government hospitals to receive their imported items in appropriate time. This interview focused on the barriers related to the purchasing process, shipment time, and availability of foreign currency, transportation and quality.

The interview with EPSA is as follows

Thank you for cooperation to make an interview, how and to what purpose is EPSA established? *Ethiopian Pharmaceuticals Supply Agency, EPSA, is a legal entity established under the law of the Federal Democratic Republic of Ethiopia Government to overcome the problems and assure uninterrupted supply of pharmaceuticals to the public at an affordable price.*

The Pharmaceuticals Fund and Supply Agency was established in September 2007 by Proclamation No. 553/2007 as part of Pharmaceutical Logistic Master Plan implementation with the following objectives:

i. *To enable public health institutions to supply quality assured essential pharmaceuticals at affordable prices in a sustainable manner to the public;*
ii. *To play a complementary role in developmental efforts for health service expansion and strengthening by ensuring an enhanced and sustainable supply of pharmaceuticals;*
iii. *To create enabling conditions for enhancing the accumulation of funds in its revolving and cost recovery process and thereby ensure the realization of the objectives (EPSA,2019)*

How are your institution purchases medicines, drugs and medical equipment?

"...we have two types of purchase, purchase by import from outside the country and from the local market when we say local market we have purchase from local manufactures and sometimes from Private importers when we decided to purchase from private suppliers we have bid process which is very fatigue and terrible…"

"…Terrible to mean it take a long time to make a bid process that means for every action in bidding it has a specific time until the important issues are settled by us or the bidders..."

"…In the case of international purchase usually, we are using L/C (letter of credit) purchase system after we call international bidding, in international bidding, after the bidding process we have to gate the hard currency first and then open L/C. In this system currently, we face a high shortage of the currency from the bank and we are troubled to purchase from outside the

country, currently most of public government hospitals are out of stock of different types of drugs and medical equipment because of hard currency shortage..."

"...With this condition, even after we received a green light from the bank to import the items, we are facing logistics problems in the import process..."

The key informant was described the problems as mentioned below;

"*...There is a lot of problems we are facing in import process the first one is marine transportation problem, in our country, if any importer imports goods from outside the country, it has to use marine transportation only by Ethiopian shipping and logistics service enterprise (ESLSE), so some times our shipment has to wait until ESLSE vessel arrives at the shipping port. It is not allowed to load in other shipping lines and it is for containerized shipment. For small and emergency shipment we use Air transportation...*"

About time to wait until the vessel arrived at shipping port the key informant replied;

"*…at normal condition it takes 10-15 days in the case of delay 15-45 days have to wait to load and gate the bill of loading…*"

"*…Secondly, after the shipping process and arrival of our shipment in Djibouti port, by different reasons, our shipment will not arrive at Modjo or Comet dry port at the time that the shipment has to arrive the destination…*".

About the time taking to load from Djibouti port to Modjo or Comet dry port the key informant mentioned that;

"*… at normal condition it takes 10 days after the vessel arrived at the port in most case it took 10 to 25 days…*"

"...the time takes to receive the document from the bank it takes 3 days at normal condition and most time 7days it takes…"

"…*Thirdly, Even the shipment arrived at Modjo or Comet dry port, the process in customs and dry port to release the containers is not easy. Sometimes custom brokers, custom officers and shipping line process to deliver the container are among the obstacles to be released the shipment at the appropriate time. System interruption both in customs and in ESLSE also among the big problems..."*

About the time it took to finalize the process and to load it on the truck from Modjo dry port, the key informant mentioned;

"…*At normal condition it takes 3 days, but in most cases because of different reasons it takes 4 up to 7 days*…"

How your enterprise distributes medicines and medical equipment to government hospitals?

"…*Our institution does not directly deliver medicines and medical equipment to public hospitals, instead of that, we established two branches EPSA Addis Ababa No. 1 and Addis*

Ababa No.2 these two branches are assigned to deliver medicines and medical equipment based on sub-cities..."

What is the main problem when your institution procures medical supplies from the local market?

"…*The main challenges when our institution purchases are from the local market are*

High price: - This occurs when our purchase is from local importers

Poor packaging and quality: - this occurs when our purchase is from local manufacturers

Can you define poor packaging and quality problem briefly*?*

"...Poor packaging means local manufacturers' drugs and equipment cover will easily loose, most of them don't use proper cover and also we have recognized misnamed package…"

Interview with EPSA Addis Ababa No.2

How and to whom your branch is distributing drugs and medical supplies to the public hospitals?

"…Our branch is assigned to distribute supplies to government public hospitals, who located in Bole, Yeka, Gulele and Arada sub-city. The base to distribute is "Route system" it means it is programmed and each facility or hospitals have its own Route. The branch has the responsibility to provide drugs and equipment based on each facility route…"

Please define in short the process of selling the items and problems during the supply to hospitals?

"…First, each facility has engaged in a binding contract with our branch. There are two types of transaction cash and credit transaction. Most time we are using ICT system to receive orders from hospitals but the system doesn't work properly. If the transaction is credit, the facility has to settle the credit transaction before putting another order. Otherwise, we are not obliged to supply the next order…"

What is the main challenge your institution faces during the supply of medical items to government hospitals?

"The main challenges we are facing during the supply process is credit sales, transportation problem, stock out, transportation and packaging problem. Most of the public hospitals are credit buyers if they do not pay their credit in specified time it is difficult to us to serve them to the next orders because we do not have idle cash to buy other supplies. In our branch, we have only 6 old delivery cars and they are also old and most of them do not fit for the transportation of drugs and medicines. As I told you earlier, we have not enough stock in our warehouse so we are not able to fulfill the demand of government hospitals and other health centers. Sometimes we face misnamed packages of local products."

How do you assess your branch warehousing system?

"Our branch warehousing system does not fit for warehousing medicines and medical equipment. Our office and warehouse are rented and basically built for warehousing normal

merchandise goods and there is lack of spaces, shelves, refrigerators and man free loading unloading equipment and the warehouse does not fit to store medicines and medical equipment, these problems act as bottlenecks for our logistics operations."

What is your suggestion to improve your logistics performance to public hospitals of Addis Ababa city administration?

"Logistics is a combined operation performed by different partners in an operation to make the logistics system efficient and effective all partners have to accomplish its responsibility within a reasonable time frame for example if we ordered a specific order early to the head office and if the head office fails to deliver our order in a reasonable time it creates a delay in our customer which are public hospitals so all parties in the logistics system have to finish his responsibility in a reasonable time."

Interview with Ethiopian customs commission Modjo Branch office,

The detailed interview also made with the Ethiopian customs commission Modjo Branch office senior officer, with this interview the officer describes the process

"...to start the clearance process medicines and medical equipment, first, the shipment has to arrive at our office, second the documents have to submit to our office, third the importer has to provide health certificate from the concerned party if these three conditions are fulfilled the officer immediately will release the cargo..."

The officer also describes the frequently occurs challenges with the customs process,

"... the main challenges with the process are the importer submission of erroneous documents and/or invalid documents, delay of health certificate from concerned party and customs brokers negligence to follow up for their shipment." In addition to these, interruption of system is also big problem to fast the process in our office..."

About the time takes to finalize the customs process the key informant of customs mentioned;

"*...With normal condition, for medical items it takes one day to release the container...*"

Interview with Ethiopian shipping and logistics service enterprise,

The researcher also made an interview with Ethiopian shipping and logistics service enterprise key informant.

1. Can you describe the shipment process in short?

"...First, the importer in Addis or his client in shipping country has to book the shipment by submitting Performa invoice. After booking, if the booking is made in shipping country branch office, the branch officer fills manifest and will send us by email. If the booking is made in head office we will send the booked manifest to our agent in shipping country. If there are enough shipments to full vessel we will assign the vessel and startthe loading process..."

2. What if the full vessel shipment is not available and you may have other booked shipments?

"...in this case we have to wait until the full vessel shipment will reach. Sometimes the full vessel shipment will not full and in this case, we use slot carriers and transiting shipments to another port to make consolidation and we will load in one vessel..."

3. What about the importer to use other shipping lines in case of vessel delay or you might not be available full vessel shipments?

"The enterprise policy doesn't allow for anyone who imports different goods using marine transportation to Ethiopia to use other shipping lines and must be loaded by Ethiopian shipping and logistics enterprise vessel. In the case of when we don't have the line in a specific port, we will give the importer waiver certificate to give the permission for the importer to use other shipping lines".

4. Does your enterprise give priority for shipments of pharmaceuticals and medicines?

"...In loading process we don't have. But in Modjo and Comet kality dry port we are giving them privileges to process their items in advance..."

5. What is the challenge your enterprise faces after shipment of a customer containers until delivery?

"*...Most time transportation problem is the big challenge in port of Djibouti. Especially, when wheat and fertilizer arrived at Djibouti port, most of our shipment stays in Djibouti port for more than 15 days. The shipments may be medicines or other goods. In Modjo dry port and head office system interruption and breakdown of forklifts are among the big challenges we are facing..."*

6. What measures your enterprise will take to expedite the delivery process?

"...honestly speaking, the only solution we search to expedite the solution is, if forklifts breakdown our mechanics are try to fix the machines and return back to operation. In the case of system interruption we will push telecommunication to return back the system..."

7. Does your enterprise have other option like manually release of the containers or other easy way?

"No have. We have only one choice to wait until the system works or the machines start operation."

8. What time it takes to process in head office and Modjo or Comet dry port to clear the container?

   In head office at normal condition it takes 1to 2 day for processing container release. But sometimes because of system interruption or slow system it takes 3 up to 4 days.

   Thank you for cooperation.

Interview with food and medicine quality control key informant,

The researcher also made an interview with Ethiopian food and drug quality control office Modjo Dry port branch office, the researcher asked the key informant.

1. How your office performs the inspection process in the customs office?

"...Firstly the customs broker/agent fills application form for inspection and will submit the application form and necessary documents to our office, secondly our officer checks the documents and will ask the customs broker/agent if the container is ready for inspection, then we will inspect first come first serve basis. If the item is free of any defect, our officer will give to the custom broker/agent the report signed and stamped. In this regard we can say we finished the inspection process..."

"...If the items have any defect it would be seen in committee. The committee may have the decisions, if the quality problem is not basic according to the standards, the office might be warn the importer and release the shipment. If the problem repeated by the importer, then our office may be order the importer to return back to exporting country. If the food or the medicine imported dangerous for human being it would be burned..."

Why the delays occur when you send the inspection report to customs?

About the delay of the inspection report the officer response was*"...there are a lot of reasons*

for the delay, first the items for inspection would not be ready as reasonable time. This happen because of different reasons, the reason might be breakdown of machines to move the containers, system interruption, customs brokers negligence, less professional manpower in the field for inspection and so on..."

About the time takes to issue the certificate the key informant said,

"...at normal condition it takes half a day but by different reason it may take 2 days..."

2. What are the main challenges your office faces during inspection?

"...During inspection we will face, the container might not be ready for inspection in reasonable time, customs broker negligence to finish the process, invalid or erroneous document submission by the importer, system and electric power interruption..."

Interview with Ethiopian social health institute key informant,

1. What are the effects of unavailability or shortage of medicines and medical equipments on the public hospital patients?

"...The effects of the unavailability or shortage of medicines and medical equipments on the patients are different in types based on their disease and illness. For some illness, if proper medicines do not available for the patients at the right time, it may crate permanent disability, like nerve system illness. For mental illness, if proper medicines would not be provided for the patients it kills the chance of recovery for the patients, in addition to these most of the illness, lack of the proper treatment and medicine may lead to cancer, permanent disability and then sometimes it can be causes for death..."

"...The other and the most dangerous effect of the lack of medicines and medical equipments is, dissatisfaction of the health workers with their jobs, this occurs when they see patients who struggle to be recovered from their illness without getting proper treatment and lack of medicines and medical equipment. Sometimes we are receiving reports that, some nurses are acquiring mental problems because of they have close relationship with their patient and seeing what have been going on their patient because of lack of different medicines and equipments..."

"...For Some medical doctors, lack of medicines and medical equipments are the main reason for immigrating to other countries. This is the big challenge that the country facing this time, currently we have not enough medical doctors and health professionals if we lose them, our capacity will not allow us to assigning new professionals with reasonable time. So modernizing logistics system to make it efficient and effective is the most important thing..."

2. How do you assess the failure and success of the logistics system for the supply of drugs and equipment for public hospitals of Addis Ababa city administration?

"...The failure or delay of the supply of medicines and equipments in the society has a big impact. For every society the first and the most important issue is the ability of the facility to provide proper health service to its customer. To forward the service properly, the health centres

need smooth and continuous supply of important aid facility which leads to development of healthy society..."

"...If the society is healthy, the country's subsistence development and change in life style will be assured. If the logistics system fails to do that, subsistence development and life style change cannot be assured..."

Thank you for your time and cooperation.

Table 6:.Wastage of time for shipments in different government offices

Process		**Time takes at normal condition**	**Time takes with problems**	**Difference from normal condition**	**Reasons for the delay**
To load on vessel		10-15 days (12.5)	15-45 days (30)	17.5 days	Vessel Delay
To receive the document from the bank		3 days	7 days	4 days	System interruption
To process ESLSE head office		2 days	3-4 days (3.5)	1.5 days	System interruption
To clear from Modjo or Comet dry port	Custom	3 days	4-7 days (5.5)	2.5 days	Delay of health certificate, Tax case ,document error, system interruption
	ESLSE	2 days	6 days	4 days	System interruption, forklift breakdown, loading unloading process
Quality control		½ days	2 days	1.5 days	Erroneous Document, Submission of application with miss document, fail to provide the container with reasonable time for inspection
Total days		23 days	54 days	31 days	

The table above shows the data obtained from concerned government offices that are integrated to facilitate the smooth flow of imported medicines and other products. The tables implies that, for a single operation or shipment it takes 23 days to process the shipment without the time related to transportation . But when we consider the process with different types of problem it takes 54 day which means 31 days delay occur for a single shipment.

CHAPTER FIVE

5. CONCLUSION AND RECOMENDATION

5.1.CONCLUSION

Currently, communicable diseases like HIV/AIDS, TB, malaria, respiratory infection, and diarrhea remain a serious challenge in Ethiopia. High fertility rates and low contraceptive prevalence continue to drive a rapidly increasing population in Ethiopia. With a growing middle class, the GOE is facing an increase in non-infectious diseases such as cancer, diabetes, heart diseases, hepatitis B&C and high blood pressure. Mental health and eye problems are also becoming major issues in Ethiopia. These illnesses create big socio economic crises if the patients have not gate the proper treatment for their disease. To give the proper service for the patient, the facilities have to posses the important medicines and medical equipments at the right time in the right condition at reasonable price in the right place.

To achieve these basic issues, the logistics system must be revised, assessed, implemented and follow ups are the basics for all health centers. In this research the researcher tried to identify and assess the challenges and bottlenecks of logistics management in public hospitals of Addis Ababa city administration and hope this may help for the concerned government offices to make decisions in public hospitals logistics management.

5.2 RECOMENDATION

5.2.1 PLANNING

The first thing in logistics management is preparing the plan which contains, what to buy, when to buy, from where to buy and in what quantity to buy. In this research all public hospitals have, plan and guideline, hospital EDL and National hospital EDL, but these essential issues does not given proper attention. Even these characters are available in the hospital these are almost inactiv e. The hospital's management has to follow up the implementation and activation of these important road maps of logistics management. Revision of essential drug list also very important issue, because now days the health condition of the public is very volatile because of the volatile nature of life style, with technology and the environmental change. With this volatility, the health conditions of the public are coincide with the situation. The medicines that used to treat the public sickness also have to revise with considering the situation. But in this research, only 50% of the public hospitals revise their essential drug list in one year, 10% in 2years, 20% in > 5 years, 20% responses never updated. For the purchase criteria, most of hospitals responded they prefer to purchase based on pattern of prevalent diseases, these criteria doesn't work properly at this time because of spontaneous expansion of some types of pandemic and epidemic diseases. The rush order system also was big challenge to 90% of public hospitals. It is also occurs because of, lack and inapplicability of proper purchase plan or guide line in the public government hospitals. Not only hospital managers, ministry of health and other governmental party have to inspect these situations and put standard and reasonable revision time frame for all hospitals and has to follow up the implementation of these plans.

For the decision of the resupply quantity, the researcher finding shows that, in most hospitals the decision for resupply quantity is made by the medical directors without proper data for decision making. The researcher will recommend there should be establish the ICT system that links between the store keeper and medical directors which helps them to decide the quantities of the items to be purchase and when to purchase. This will help to avoid manual communication which some time crates the transfer of erroneous information between store keeper and medical director and can help both of them or other interested party in the hospital can see the data about the stock.

5.2.2 PURCHASING

Regarding purchasing, the research shows that, most of hospitals source of supply is EPSA, with a huge quantity constraint. When hospital's purchase is from private importers the cost of purchase is very high as the same time if their purchase is from local manufacturers, the quantity and variety needed is not available. The researcher will recommend the government have to provide high level of incentives and provide facilities for local and foreign investors who want to engage in pharmaceuticals and medical equipment production. This increase the availability of medicines and medical equipment in large quantity and increase the competition among suppliers which creates a big advantage for public hospitals to get the quantity and quality products in the market.

The sensitiveness of the health sector is very high; the government also have to supervise strictly the quality of local manufacturers. If the government fails to do that, the medicines used to cure the society from their illness would be changed in to killer drugs of the human being. Misnaming is big problem in local manufacturers this is completely very dangerous.

As the government provides especial privileges for private importers, it also has to control the pricing system of the private importers pushing them to sell the imported medicines and equipments by reasonable price. As EPSA is the main distributer of medicines and medical equipments to public hospitals, private hospitals and health centres, it should engage in manufacturing of these products. This will avoid the huge amount of foreign currency consumption and assured the subsistence provision of medication to the public at all. Regarding the payment system, EPSA's delay of credit sales payment from public hospitals, is one of the barriers in the supply chain. The hospitals in other side have facing shortage of cash in their account. The researcher will recommend public hospitals finance system has to be revised and the finance department must follow up the proper utilization of medicines to the patients.

5.2.3 TRANSPORTATION

According to FMOHE report, it is known that the pharmaceutical industry in Ethiopia contributes for the supply of medicines and medical equipment for only 15% coverage and the other 85% is imported. Ethiopian shipping and logistics service enterprise is the only marine

transportation service giving company in Ethiopia and this enterprise doesn't allow importers to use other shipping company. This is a clear monopolistic type marine transportation and this monopolistic business by its nature exposes the service seekers to high price, dependent only one source of service and delay of shipments. In addition to that, it also pushes back the investment in the country. This monopolistic type of marine transportation service must be removed especially from health sector service seekers.

The researcher finding shows that, there is no proper transportation system for hospitals and for medication providers. Especially the vehicles that assigned to transport purchased and sold items from both sides of public hospitals and EPSA don't fit to transport these items. Because they are old, no have refrigerator, broke down repeatedly on the way and they are few in number. This is one of the reasons for delay of items and expose of items for different temperature which leads to perish the items before reaching their destination. Hospitals and EPSA head office and branches have to assign proper vehicles for transportation and ministry of health and other concerned party have to control availability and properness of the vehicles that used to transport medicines and medical equipment in all health sector and the number of vehicles must be assigned based on the service giving capacity of the public hospitals.

5.2.4 PORT CLEARANCE

The Ethiopian shipping and logistics service enterprise is responsible to transport the containers from shipper port to Modjo or Comet dry port. The enterprise has to give all priorities to medicine and medical equipment shipments. The system interruption in Modjo dry port and delay of shipment in Djibouti, because of delay of port fee payment, late clearance and shortage of transportation is a big challenge in the import process. All shipping data are available in the enterprise database and the enterprise should give continuous follow up for the medication shipments. The EPSA logistics officer has to communicate the enterprise concerned party for any delay of their shipment.

Customs office should allow EPSA shipments to be inspect the documents after the shipment delivered to EPSA and if necessary, the containers in its warehouse. This will save the time takes to loading unloading process in the port, clearance time and quality inspection time. Because the

customs commission proclamation declares For the purpose of this chapter, "*emergency relief consignment" may include goods, vehicles and other means of transport, foodstuffs, medicaments, clothing, blankets, tents, prefabricated houses, water purifying and water storage items, and other goods of prime necessity, forwarded as aid, upon the request of the appropriate government body, to those affected by disaster.* In this chapter, letter C article says "*clearance outside the designated hours of business or away from customs stations and the waiver of any charges in this respect."* (Federal negarit gazeta, 2014).The food and drug control authority also have to make inspection in EPSA premise to save time that takes for inspection in Modjo or Comet dry port. The manual system sending the report of inspection to customs should be supported by ICT system. This helps to prevent wastage of time and to lay responsibility on he/she wastes time for inspection and transfer and receiving of report.

5.2.5 WAREHOUSING

The researcher finding shows that the branch distributer of EPSA Addis Ababa No. One and two are working in rented warehouse and building. Basically these warehouses have built for other normal goods. These goods don't need any especial care and air condition. But medicines and drugs needs special care and air condition to protect the drugs from perishing. EPSA had to consider these conditions before renting these warehouses. In the long term plan, EPSA must built its own warehouses that can fit to store medicines and equipment without perish and damage. In short term plan EPSA has to made modification on rented warehouse to make them comfortable to store medications.

In this research most of public hospitals warehouses haven't built to store drugs and equipment. In fact, the warehouses have built to store some broken furniture and damaged equipment, some warehouses are built as a cleaning room, and some warehouses are located in front of generator room of Public hospital. In addition to that most of public hospitals do not have proper standard storage facilities in the warehouse. These storage facilities are designed to prevent medicines from damaging and to stay in their shelf without changing their original character. Without these storage facilities, all the warehousing conditions don't fit with the warehouse standards for medicines storage. All public hospitals have to build warehouses with standard storage facilities that can keep the medicines properly and fit with the standards.

4.2.6 INTERNET, SYSTEM AND POWER INTERUPPTION

In this study system and power interruption is the big problem in the logistics flow. Modjo Dry port, Comet dry port, Ethiopian shipping and logistics service enterprise and custom administration has to work closely with Ethiopian telecommunication office to solve the system interruption problem. Establishing modern and well organized ICT department and improving the existing ICT department with modern technology communication tools helps to decrease the frequency of system interruption as a result of using back ward technology communication apparatus. The concerned government authority has to follow up the daily operation progress of the government parties who participate in the logistics system of imported items.

The researcher also recommends Customs commission, ESLSE and other government offices who actively participate in import logistics has to prepare manual processing system for imported medications at the time of system interruption.

To prevent power interruption the researcher will recommend the logistics parties in import process; to buy and make stand by automated power generators that continuing the supply of power automatically when the power is interrupted.

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ANNEXES

ANNEX 1 QUSTIONAIR PREPARED FOR LOGISTICS HEADS OF PUBLIC HOSPITALS

Questionnaire to Logistic Heads of Public Hospital

Challenges of Pharmaceutical Logistics System in Public Hospitals of Addis Ababa, Ethiopia

February, 2020

I. Verbal consent form before administering the questionnaire to the logistics head

"Good day, My name is SelehaddinAbdella I am a student of Public Administration and Development Management MSC program in Faculty of Business and Economics, Addis Ababa University. I am here to collect data about the pharmaceutical logistics challenges of your hospit als that are needed for my thesis titled*"Challengs of Logistics Management in the supply of medicines and medical equipments the case of Public Hospitals of Addis Ababa"*. This survey will cover in all Public Hospitals of Addis Ababa. Your hospital is selected because it is one of them. The research will provide an empirical snapshot of the current pharmaceutical logistics challenges at Public hospitals level in Addis Ababa and provide baseline information to track cha nges and improvements in pharmaceutical logistics performance.

In this structured interview I would like to ask you few questions about the planning, selection, procurement of essential drugs, transportation and warehousing. The interview will take 15-20 minutes of your time.

Your participation is completely voluntary. You can refuse to answer any questions and/or withdraw from the study at any time. All of the information collected is strictly confidential. No one other than the researcher will have access to your responses. Your personal identifiers such as your name and that of your public hospital will not be used. The principal investigator will not refer to individual respondents or individual facilities in the report, but rather will describe the ov erall picture of all public hospitals.

Do I have your permission?

Yes☐ ☐No☐ ☐If Yes, Continue

***Note**: Throughout the questions **Non-Program Drugs (NPDs)** refer to drugs **excluding** program drugs such as antimalarial drugs, antiretroviral drugs, family planning drugs, and TB drugs, as well as laboratory* 59 *reagents, medical supplies, and*

Equipments

II. Hospital Identification

Public Hospital code-

_____

Researcher:SelehaddinAbdella

Date of research

_____

How long you have worked as a Logistic heading this hospital_____

III. Planning, Selection and Procurement of Drugs and Medical equipments

1. Is there any documented plan or guideline for drug and equipment procurement?

Yes ……..1 No..... 0

2. Does the hospital have its' own Essential drugs list

Yes ……..1 No..... 0

3. How often it is revised?

Annually.....1
Every 2 years 2
Every 3 years.....3
Every 4 years.....4
Every 5 years 5
> 5 Years.....6
Never updated 7
other (specify) _____ 8

4 .Who do the Planning?

The pharmacy unit only.....1

DC (Drug committee).....2

Other (specify) _____3

5. What are the criteria for drug and equipment purchase planning in the hospital?
(Circle all applies)

Pattern of prevalent disease 1

Efficiency and safety.....2

Cost of the drugs 3

Preference for well-known drugs 4

Durability of previous equipment.…….5

others (specify) _____6

6. What are the main challenges of equipment and drug purchase planning?

Emergency purchase 1

Epidemic disease.....2

Other_____3

Please specify_____

7. Is there a national Hospital essential drugs list available In the Hospital?

Yes.....1

No.....2

8. Is there any documented policy or guideline for procurement of **NPDs**?

Yes.....1

No 2

9. What type of purchasing analysis conducts your hospital?

ABC Analysis.....1

VEN Analysis……..2

Other (Mention)…….…..3

No Have……...4

10. Who determines the Hospital's resupply quantities of **NPDs**?

The Hospital itself 1

Health office/health bureau.....2

Other_____9

11. Which type of quantification methods is/are employed? (Circle all applies)

Consumption method 1

Morbidity method.....2

Other (Please specify) _____3

12. How is the Hospital's resupply quantities determined?

Formula 1

Guess 2

Other means (Specify)_____3

13. How your Hospitals procure drugs and equipments?

Import …….....1

Local 2

Other(mention)..…….....3

14. Which procurement pattern is usually used?

Monthly.....1
Bimonthly 2
Quarterly.....3
Every 4 months.....4
Semi-annually.....5
Annually.....6
Perpetually 7
Other (Specify) _____9

15. If your Hospital purchase is from local, from whom your hospital will purchase drugs and supplies?

From PFSA…….....1
From private suppliers.....….....2
Other (specify) _____3

_____

16. What are the main challenges and problems when you buy from private suppliers?

Transportation 1
High price.....2
Quality.....3
Delivery time.....4
Other (Mention)_____5

_____

17. Who is responsible for transporting **drugs and equipments** to your hospital when your hospital is purchase from private suppliers?

Supplier delivers.....1
Health office/health bureau delivers.....2
The hospital collects 3
Other (specify) 4

_____

18. What type of cars is most often used for transporting drugs and equipments?

Hospital ambulance.....1
Hospital vehicle…….....2
Public transportation.....3
Rent Private vehicle.....4
Supplier vehicle 5
on foot.....6
other (specify) _____9

---

19. On average, approximately how long does it take between ordering and receiving from private suppliers?

Less than 1 week.....1

1 week to 2 weeks.....2

Between 2 weeks & 1 month 3

1 month to 2 months.....4

> 2 months.....5

20. How many cars do you have for transportation of drugs and medical equipments?

1-5 cars……...1

5-10cars …….2

10-15cars ……...3

15-20 cars……...4

>20 cars……..5

No have……..6

21. What are the main challenges and problems when you buy from PFSA?

Transportation 1
High price.....2

Quality.....3
Delivery time….....4

Quantity……...……...5

Other (Mention)_____6

21.Who is responsible for transporting **drugs and equipments** to your hospital when your hospital is purchase from PFSA?

PFSA delivers.....1
Health office/health bureau delivers…..2
The hospital collects 3
Other (specify) 4

22. What type of cars is most often used for transporting drugs and equipments when your hospital purchases from PFSA?

Hospital ambulance.....1
Hospital vehicle……..…..2
Public transportation.....3
Rent Private vehicle.....4
Supplier vehicle 5
on foot.....6
other (specify) _____7

23. On average, approximately how long does it take between ordering and receiving **from** PFSA?

Less than 1 week.....1

1 week to 2 weeks.....2

Between 2 weeks & 1 month 3

1 month to 2 months.....4

> 2 months.....5

24. Does your hospital import medicines and medical equipments from outside the country?

Yes.....1

No.....0

25. What type of purchase system your hospital used when it imports from abroad?

FOB LC.....1

FOB CAD.....2

TT.....3

CREDIT.....4

OTHER (MENTION)……..…..…..5

26. Can you gate the permit for foreign currency to import drugs and equipments as per your demand?

Yes.....1

No.....2

27. What is the main challenge to gate your order in import process?

Fail of supplier early shipment 1

Unavailability of vessel/

Plane for shipment……..….2

Djibouti Port clearance ……..3

Shortage of inland Transportation……..4

Custom Process……...5

Failure of custom broker to process early..6

Shortage of hard currency……....7

If other, please specify_____8

---

28. Does your hospital purchase drugs and equipment from local manufacturer?

Yes…….....1 NO…….....
.....2

29. How many days does it take between ordering and receiving of items when your hospital purchase from local manufacturers?

1-5 days……1

5-10 days……..2

10-15 days.....3

15-20 days…….…….....4

Other (specify)_____

30. What is the main challenge when your hospital purchase supplies from local manufacturers?

Transportation.....1
High price.....2

Quality.....3
Delivery time….....4

Packaging…….....5

Other (Mention)_____6

---

31. Do you have appropriate warehouse for medicines and medical equipment

Yes…….1

No……..2

Please fill the attached checking list about the availabilities of important facilities in your hospital warehouse.

Thank you for your cooperation.

ANNEX 2

INTERVIEW QUESTIONS EPSA ADDIS ABABA NO. 1 AND NO 2

1. Thank you for cooperation to make an interview, how and to what purpose is EPSA established?

2. "How is your institution purchases medicines, drugs and medical equipments?"

3. What is the logistics problem your institution faces in import process?

4. How your enterprise distributes medicines and medical equipments to government hospitals?

5. What is the main problem when your institution procures medical supplies from local market?

Thank you for your cooperation.

ANNEX 3

INTERVIEW QUESTIONS WITH EPSA ADDIS ABABA BRANCH 1 AND 2

1. How and to whom your branch is distributes drugs and medical supplies to the public hospitals?

2. Please define in short the process of selling the items and problems during the supply to hospitals?

3. What is the main challenge your institution faces during the supply of medical items to government hospitals?

4. How do you assess your branch warehousing system?

5. What is your suggestion to improve your logistics performance to public hospitals of Addis Ababa city administration?

Thank you for your cooperation.

ANNEX 4

INTERVIEW WITH ETHIOPIAN CUTOMS COMMISSION MODJO BRANCH OFFICE.

1. How your office performs the clearance process in short?

2. What are frequent challenges your office faces with custom process?

Thank you for your cooperation.

ANNEX 5

INTERVIEW WITH FOOD AND DRUG QUALITY INSPECTION MODJO OFFICE

1. How does your office perform the inspection process in customs office?

2. Why the delays occur when you send the inspection report to customs?

3. What are the main challenges your office faces during inspection?

Thank you for your cooperation.

ANNEX 6

INTERVIEW WITH ETHIOPIAN SHIPPING AND LOGISTICS ENTERPRISE

1. Can you describe the shipment process in short?

2. What if the full vessel shipment is not available and you may have other booked shipments?

3. What about the importer to use other shipping lines in case of vessel delay or you might not be available full vessel shipments?

4. Does your enterprise give priority for shipments of pharmaceuticals and medicines?

5. What is the challenge your enterprise faces after shipment of a customer containers until delivery?

6. What measures your enterprise will take to expedite the delivery process?

7. Does your enterprise have other option like manually release of the containers or other easy way?

Thank you for your cooperation.

ANNEX 7

INTERVIEW WITH SOCIAL HEALTH INSTITUTE KEY INFORMANT

1. What are the effects of unavailability or shortage of medicines and medical equipments on the public hospital patients?

2. How do you assess the failure and success of the logistics system for the supply of drugs and equipments for public hospitals of Addis Ababa city administration?

Thank you for your cooperation.

ANNEX 8

STORAGE FACILITIES CHECK LIST

No.	Description	Yes	No	Comments
01.	Products are arranged systematically (pharmacological/ alphabetical)			
02.	Products are arranged so that identification labels are visible.			
03.	The products are stored and organized in a manner accessible for first-to-expire, first-out (FEFO) issuing.			
04.	Cartons and products are in good condition, not crushed due to mishandling. If cartons are open, determine if products are wet or cracked.			
05.	Damaged and/or expired products/ TDs are separate from usable products and removed from inventory.			
06.	Products are protected from direct sunlight			
07.	Cartons and products are protected from water during all seasons.			
08.	Storage area is visually free from harmful insects and rodents. (Check the storage area for traces of rodents [droppings or insects].)			
09.	Security devices (grilles for windows and doors made of glass, and lock and key) are in place			
10	Products that need cold temperature are stored in a functional refrigerator.			
11.	Storeroom is maintained in good condition (clean, all trash removed, strong shelves, organized boxes).			
12.	The current space and organization is sufficient for existing products and reasonable expansion (i.e., receipt of expected product deliveries for foreseeable future).			
13.	Products are stacked at least 10 cm off the floor.			

14.	Products are stacked at least 30 cm away from the walls			
15.	Products are stacked no more than 2.5 meters high.			
16.	Fire safety equipment is accessible (any item identified as being used to promote fire safety should be considered).			
17.	Products are stored separately from insecticides and chemicals.			

18. Are the following equipment's available in the store?	
Shelves	
Pallets	
Bin dust	
Trolley	
Cold boxes	
Refrigerator	
Wall thermometer	
Fire extinguisher	
Ladder	
Table and Chair	

ANNEX 9

Addis Ababa University
College of Business and Economic (CBE)
Department of Public Administration and Development Management
Post Graduate Programs Coordination Office
አዲስ አበባ ዩኒቨርሲቲ
የቢዝነስና ኢኮኖሚክስ ኮሌጅ
የሕዝብ አስተዳደርና ልማት አመራር ት/ክፍል
የድህረ-ምረቃ ፕሮግራሞች ማስተባበሪያ ቢሮ

Date Feb 24, 2020

To: Ethiopian Pharmaceuticals Supply Agency

Dear Madam/Sir:

Student Selehaddin Abdella is a Master's program student in Public Management and Policy at the College of Business and Economics, Addis Ababa University. He/She is currently undertaking a research titled: Challenges of Logistics Management in Public Hospitals of Addis Ababa as part of the requirement for the successful completion of the program of study. To this end, he/she identified your organization as a focus of study and a potential source of vital data for the research under consideration. We are, therefore, writing this to request your good office to cooperate in providing the necessary data and wish to assure you that the information provided will be used only for academic/research purposes.

Thank you in advance for your time and the assistance extended to student!

Sincerely,

Berhanu Temesgen (Ph.D.)
Department of Public Administration and Development Management
College of Business and Economics
Addis Ababa University

መፈአኤ ገቢ ደረሰኝ
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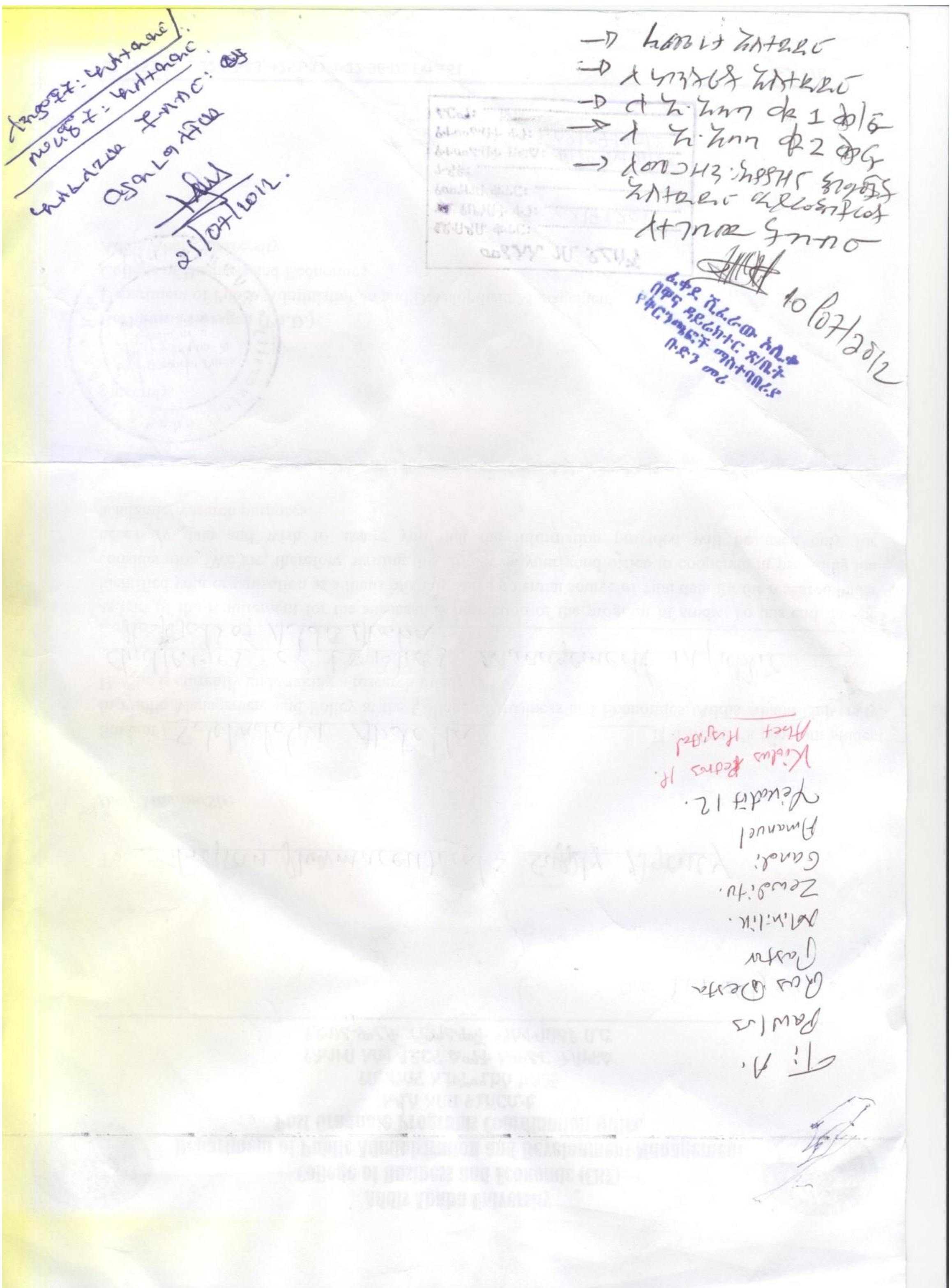
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Addis Ababa University
College of Business and Economic (CBE)
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Post Graduate Programs Coordination Office
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Date 17/03/2020

To: PAWLOS HOSPITAL

Dear Madam/Sir:

Student Selehadelin Abdella is a Master's program student in Public Management and Policy at the College of Business and Economics, Addis Ababa University. He/She is currently undertaking a research titled:

Challenges of Logistics management in public Hospitals of Addis Ababa

as part of the requirement for the successful completion of the program of study. To this end, he/she identified your organization as a focus of study and a potential source of vital data for the research under consideration. We are, therefore, writing this to request your good office to cooperate in providing the necessary data and wish to assure you that the information provided will be used only for academic/research purposes.

Thank you in advance for your time and the assistance extended to student!

Sincerely,

Addis Ababa University Department of Public Administration & Development Management

Berhanu Temesgen (Ph.D.)
Department of Public Administration and Development Management
College of Business and Economics
Addis Ababa University

To Research Directorate
For your attention
Thank you
17/03/2020

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