



**LAST MILE DELIVERY PRACTICES, CHALLENGES AND
PERFORMANCE OF ANTI-PSYCHAITRIC DRUGS AT THE ETHIOPIAN
PHARMACEUTICAL SUPPLY SERVICES TO PUBLIC HOSPITALS IN
ADDIS ABABA, ETHIOPIA**

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JULY, 2024

ADDIS ABABA, EHIPIA

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**A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE
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Declaration

I, Leilina Teshome, hereby declare that this research paper entitled “Last mile delivery Practices, challenges and performance of Anti – Psychiatric drugs at the Ethiopian Pharmaceutical Supply Services to Public Hospital in Addis Ababa Ethiopia” is my original work and has not been used for any other requirements in any other requirements in any other university and all sources of information in the study have been appropriately acknowledged.

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This is to certify that the thesis is prepared by Leilina Teshome, entitled “Last mile delivery Practices, Challenges and Performance of Anti – Psychiatric drugs at the Ethiopian Pharmaceutical Supply Services to Public Hospital in Addis Ababa Ethiopia” for the partial fulfillment of the requirements for the degree of Masters of Arts in Logistics and Supply Chain Management with the regulation of the University.

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Statement of certification

This is to certify Leilina Teshome that has carried out her thesis on the topic entitled “***Last mile delivery Practices, challenges and performance of Anti – Psychiatric drugs at the Ethiopian Pharmaceutical Supply Services to Public Hospital in Addis Ababa, Ethiopia***”. She has conducted this thesis under my guidance and supervision. The study is her own original work and suitable for submission of the award of MA in Logistics and Supply Chain Management.

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The researcher

Abstract

The main objective of the study was to assess the new research area last mile delivery from practice, performance and challenge perspectives for Anti – Psychiatric drugs at the Ethiopian Pharmaceutical Supply Services to Public Hospital in Addis Ababa Ethiopia. The study used both quantitative and qualitative data for research approach with Descriptive and Explanatory type of research design. The research primary data was collected from EPSS and Public hospital professionals which most of them were pharmacists. The structured questionnaire was given to twelve public hospitals and EPSS professionals from Addis Ababa hub. Each questionnaire was provided to pharmacy heads, different pharmacy unit coordinators, supply chain managers and facility managers accordingly and then were filled and returned. Interview questions for key informants were used to assess more information on last mile delivery practices. Alfarra, W.A., based weighing scale was used for the analysis of descriptive statistics. The findings of the study shows the organization overall moderate performance towards the activities with better performance on facility technology, as the same time the last mile delivery were moderately practiced by the organizations while operation and ware house were highly practiced coming to man power and product related challenges both of them showed moderate influence on anti – psychiatric drugs delivery visualizing poor infrastructure and lack of proper training for professionals have more influential on last mile delivery of anti-psychiatric drugs. The study supports the need of preparedness for initiation of last mile delivery since it could give better customer satisfaction. The government involvement for legislative issue, integration, smooth communication in supply related activities and arranging trainings for the professionals are stated as basic prerequisite for the development and consistency of last mile delivery. The scope was limited to Addis Ababa and on anti – psychiatric drugs which directs more researchers' new area of study on last mile delivery in different health related sector.

Key Words: Last mile delivery, Distribution, Operation, Logistics and Transportation

Acronyms

CDC – Communicable Disease Control

ECT – Electroconvulsive Therapy

EMDR- Eye Movement Desensitization and Reprocessing

EML – Essential Medicine List

EPA – Ethiopian Pharmaceutical Association

EPSS – Ethiopian Pharmaceutical Supply Service

FMOH – Federal Ministry of Health

IPLS – Integrated Pharmaceutical Logistics System

LMICs – Low- and Middle-Income Countries

LMIS – Logistics Management Information System

NAFDAC – National Agency for Food and Drug Administration and Control

PTSD – Post Traumatic Stress Disorder

SDP - Service Delivery Point

WHO – World Health Organization

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CHAPTER ONE

INTRODUCTION

This chapter addressed back ground of the study, statement of the problem, basic research questions, objective of the study, significance of the study, scope of the study, limitation of the study, definition of terms, and finally gives organization of the study.

1.1 Background of the Study

A mental disorder is characterized by a clinically significant disturbance in an individual's cognition, emotional regulation, or behavior. It is usually associated with distress or impairment in important areas of functioning (WHO, 2023). At any one time, a diverse set of individual, family, community, and structural factors may combine to protect or undermine mental health. Although most people are resilient, people who are exposed to adverse circumstances – including poverty, violence, disability, and inequality – are at higher risk. Protective and risk factors include individual psychological and biological factors, such as emotional skills as well as genetics. Many of the risk and protective factors are influenced through changes in brain structure and/or function (WHO, 2023).

Mental health or psychiatric conditions are common. Many times, they run in families. The most common mental health conditions are depression, anxiety, and bipolar disorder. These illnesses and others like them interfere with your thoughts, feelings, and behaviors (WHO, 2023).

Anxiety disorder is one of the most well known mental disorders affecting many peoples. In 2019, 301 million people were living with an anxiety disorder including 58 million children and adolescents (WHO, 2023). The other most common mental disorder is **Depression**. In 2019, 280 million people were living with depression, including 23 million children and adolescents (WHO, 2023). People with depression are at an increased risk of suicide (WHO, 2023). **Bipolar disorder** is also one of the widely known mental disorders; in 2019, 40 million people experienced bipolar disorder (WHO, 2023). PTSD and other mental disorders are high in conflict-affected settings.

Schizophrenia; which is characterized by significant impairments in the way reality is perceived and changes in behavior, eating disorder, Neurodevelopmental disorders, Disruptive behavior and dissocial disorder are included under the class of mental illness (WHO, 2023).

Knowing you have a mental health condition can be frustrating, but there is hope. There are a variety of treatments available for mental health conditions. Some of the treatments are; Psychotherapy or counseling, **Prescription medicine, Support groups**, Electroconvulsive therapy (ECT) or other brain stimulation therapy, **Eye Movement Desensitization and Reprocessing (EMDR) therapy, Hospital or residential treatment program** and other physical activities like exercise and yoga can be stated as a best treatment option for mental disorders. (Peter Rippey, 2023)

In 2019, 1 in every 8 people, or 970 million people around the world were living with a mental disorder, with anxiety and depressive disorders the most common (WHO, 2023). In 2020, the number of people living with anxiety and depressive disorders rose significantly because of the COVID-19 pandemic. Initial estimates show a 26% and 28% increase respectively for anxiety and major depressive disorders in just one year (WHO, 2022). While effective prevention and treatment options exist, most people with mental disorders do not have access to effective care. Many people also experience stigma, discrimination and violations of human rights (WHO, 2023). Effective psychological treatment exists, and depending on the age and severity, medication may also be considered for all mental disorders (WHO, 2023).

Our mental health is our biggest health. According to WHO, all over the African Region, more than 116 million people were already estimated to be living with mental health conditions pre-pandemic; but few people in Africa have access to quality mental health care (WHO, 2022). Untreated mental health has a lot of impact for the continent at large which consequence a large number of adolescents to homeless and lives on the street.

When we come to Ethiopia the motto for mental health is stated as “There is No Health without Mental Health”. In Ethiopia regarding mental health there are no compiled data showing its being public issue but results of the 2005 Ethiopian Demographic and Health Survey and other secondary data sources explored dimensions to understand the mental health issues and Results showed that the average prevalence of mental disorders in Ethiopia was 18 % for adults and 15% for children (Sathiya, 2011). Mental illness is related with a lot of social, economical, personality and safety issues all over the country.

Getting treatment for mental health is not easy in our country Ethiopia since only one mental specialized hospital exists for the country at large at the capital city. In addition, accessibility of the drugs after treatment is also another challenge for the patients and the patient families.

Understanding the supply chain management process is prerequisite issue for the distribution of the treatment protocol for the patients with mental disorders as of the other diseases. World wide it is well known that availability of drugs everywhere especially in low-income countries are challenging for many years and it is directly affected by the last mile delivery system. Last mile delivery is the final leg of the supply chain that physically connects brands with consumers through the delivery of the purchase. Goods are transported from a warehouse or a distribution center and arrive either at end consumer's home, store or business. Finally, after realizing the effect of mental health on the overall whole world and the impact of last mile delivery for the distribution and accessibility of drugs it can be concluded that effective last mile delivery is essential.

However, to make the supply chain effective, efficient and achievable the best operational delivery performance and supply collaboration should be improved and practical. This study goal is just to empirically verify the last mile delivery practices and performance of anti-psychiatric drugs in the case supply service provider. The thesis also focused on challenges of the last mile delivery of Anti – psychiatric drugs.

1.2 Back Ground of the Organization

Ethiopian Pharmaceuticals Supply Service (EPSS) is a legal entity established under the law of Federal Democratic Republic of Ethiopia Government to overcome the main health problems in the country along with medical equipment and assure uninterrupted supply of pharmaceuticals to the public at an affordable price. The Pharmaceuticals Fund and Supply Service were established in September 2007 by Proclamation No. 553/2007 as part of Pharmaceutical Logistic Master Plan implementation (EPSS, 2012).

Up on EPSS foundation, the agency has identified three major objectives. The first is to enable public health institutions to supply quality assured essential pharmaceuticals at affordable prices in a sustainable manner to the public.

The second objective is to play a complementary role in developmental efforts for health service expansion and strengthening by ensuring enhanced and sustainable supply of pharmaceuticals (EPSS, 2012). The third major objective of the agency is 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 (EPSS, 2012).

With over seventy years of service, the Ethiopian Pharmaceuticals Supply Service (EPSS) is a veteran institution in providing pharmaceuticals, laboratory reagents, medical equipment and supplies to the Ethiopian people. Despite the numerous changes in nomenclature throughout the years, supplying pharmaceuticals has always been its core activity. Considering the population size has grown in folds since the establishment of the organization, they have launched an all-rounded reform in their work procedures (EPSS, 2012).

1.3 Statement of the Problem

Health systems have not yet adequately responded to the needs of people with mental disorders and are significantly under resourced. The gap between the need for treatment and its provision is wide all over the world; and is often poor in quality when delivered. For example, only 29% of people with psychosis (WHO, 2021) and only one third of people with depression receive formal mental health care (Moitra M et al, 2022). More than 75% of people in low- and middle-income countries (LMICs) does not receive any mental healthcare, and do not access essential medicines. In these settings, inclusion of essential medicines for mental disorders on national Essential Medical Lists (EML) has been suggested as a first, crucial step to improve global access to mental healthcare and reduce such a huge treatment gap. In the field of mental healthcare, access to evidence-based treatments remains a huge global challenge. World Health Organization's Comprehensive Mental Health Action Plan 2013-2030 recognizes the essential role of mental health in achieving health for all people. The plan includes 4 major objectives: to strengthen effective leadership and governance for mental health; to provide comprehensive, integrated and responsive mental health and social care services in community-based settings; to implement of strategies for promotion and prevention in mental health; and to strengthen information systems, evidence, and research for mental health (WHO, 2023).

As it is well known mental health is vital for every one of us. The population mental health is too basic for the growth and sustainability of a country. When mental health is disrupted, it should get treatment as soon as possible; while getting treatment has a lot of issues. The treatment protocol highly relies on the distribution of anti-psychiatric drugs. Best last mile delivery system will provide the best treatment outcome. Most customers worldwide need their service to be on real time. Especially when we come to drug treatment the real time is so real and basic timely for the end customers. As it is well said the earlier is the better for any treatment. In mental illness the same is true here treating them early reduce the bad progress for good and gives better outcome.

Most Studies showed that; the challenge here in our country Ethiopia is also too wide regarding the last mile delivery. Some studies of the pharmaceutical delivery in Ethiopia have shown numerous challenges including undefined stock quantity as accessible, information disruption and hindrance (EPSS, 2018). The Ethiopian pharmaceutical supply chain had shown several problems from different studies including non-availability, unaffordability, poor storage, lack of stock management and weak distribution system including weak fleet management. Study made by Mereid stated that the main factors that affect EPSS performance are; its dependency on international suppliers due to lack of local Competitive supplier, very long procurement process, limited vehicle Capacity for distribution, lack of skilled manpower and poor demand forecasting Capacity (Mereid, 2015).

Health Facilities have problems to get right products; right quantity and right quality are not available at the right time, right place, for the right cost due to poor distribution system (EPSS, 2015). The distribution of pharmaceutical product is frequently handicapped by inadequate infrastructure (storage and transportation) and lack of effective management information systems. In addition to this EPSS is constrained by shortage of vehicles, portable cold chains, cold rooms, racks and pallets.

Even though there are limited studies regarding delivery of different drugs there are lots of geographical, practical, theoretical and policy related gaps of studies on the last mile delivery practices, performance and challenges for anti-psychiatric drugs delivery.

Therefore, the aim of this study is to assess the practice of the last mile delivery system for the distribution of anti-psychiatric drugs plus the performance and challenges regarding last mile delivery of anti-psychiatric drugs particularly in EPSS and Addis Ababa public hospitals.

1.4 Research Questions

In line with the above-mentioned objectives the researcher tried to address the three basic questions. The study is intended to answer the following research questions:

1. How last-mile delivery of anti-psychiatric drugs is being practiced at EPSS?
2. What is the performance of anti-psychiatric drugs at the last mile delivery in terms of availability?
3. What are the challenges of last-mile delivery of anti-psychiatric drugs?

1.5 Research objectives

1.5.1 General Objective

To assess the last mile delivery practices, measure performance and identify challenges of anti-psychiatric drugs availability in EPSS of Addis Ababa hub, Ethiopia.

1.5.2 Specific Objectives

1. To assess the last mile delivery practices of anti-psychiatric drugs in the selected public hospital and EPSS.
2. To measure the performance of last-mile delivery of anti-psychiatric drugs in terms of their availability.
3. To identify the challenges in the last-mile delivery of anti-psychiatric drugs.

1.6 Significance of the study

This study gave an insight about the Assessment of Last Mile delivery Practices of Anti-Psychiatric Drugs in Ethiopia: Experiences of EPSS Addis Ababa hub and selected public hospitals. In addition, it will be useful in providing relevant information for researchers who are interested in studying basic problems in the delivery practices.

The study might initiate further research to be conducted on the anti psychiatric drugs last mile delivery practices and related issues. Additionally, the study findings provided constructive recommendations that can assist the health facilities and EPSS in appropriate decision making and help to alleviate the challenges of delivery practices.

1.7 Scope of the Study

The last mile delivery practice of Anti-Psychiatric drugs is too vast portion of the supply chain management in EPSS and other distributor's experience. The findings of this research would be fruitful if it was conducted by including all other drug distributors', health offices on distribution of drugs and all EPSS Hubs in Ethiopia. However, this study only covered public hospitals giving mental treatment and EPSS of Addis Ababa hub. The study did not include other regional branches, similar service providers and governmental health bureau on the distribution of drugs due to time and resource constraints.

The geographic scope of the study was limited to 12 public hospitals in Addis Ababa Ethiopia. Temporal scope of this study was limited by time having 10 months obeying the schedule of the school. The methodological scope of the study used purposive sampling through collecting data from professionals working at those 12 public hospitals. Conceptual scope of the study encompasses practices, performance and challenges of the last mile delivery of anti-psychiatric drugs only.

Although this study didn't cover all providers' activity; the service provider EPSS is preferred because as it has been the well-known main service provider of Anti-psychiatric drugs in Ethiopia particularly for Addis Ababa public hospitals; which are giving treatment on mental health widely from different regions.

1.8 Definition of Terms

Last mile delivery - refers to the very last step of the delivery process when a parcel is moved from a transportation hub to its final destination which, usually, is a personal residence or retail store (Onfleet, Inc, 2024).

Distribution – Distribution in logistics refers to the overall management that oversees the movement of goods from their development to the point of sale.

This can include anything from transportation, packaging, inventory, stock control, and site and area examination to information handling (Dictionary on logistics, 2021).

Delivery practices logistics - is the process of planning, implementing, and controlling the efficient movement and storage of goods, services, and information from the point of origin to the point of consumption. It encompasses various aspects, each contributing to the overall success of the delivery process (Delivery Logistics, 2023).

Challenges - the situation of being faced with something that needs great mental or physical effort in order to be done successfully and therefore tests (Cambridge University Press, 2024)

Availability - Availability is reported as the percentage of medicine outlets where a medicine was found on the day of the survey (WHO, 2024).

Performance - is the accomplishment of a given task measured against preset known standards of accuracy, completeness, cost, and speed (Business dictionary.com, 2018).

1.9 Organization of the study

The paper is organized in five main topics. The first topic discussed the introductory part of the research encompassing background of the study and the organization, statement of the problem, significance of the study, objectives of the study, scope of the study and definition of terms. The second one provided the detailed review of concepts based on the existing studies on the matter under investigation on theoretical and empirical review. The third topic made explanation about the methodology of the research, sampling method and description of the study area. The fourth topic discussed about results on data gathered from the questionnaires and compiled the information interpreted for discussion based on the results driven from the study. The fifth chapter presents summary and conclusions on the results driven then give recommendations for future studies on its limitations. Then references and Annexes/Appendices are also listed.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

In this section, theories related to the research issues which are pertinent to the thesis work are described including the theoretical framework for last mile discussing all the important factors related to delivery. Furthermore, different authors' ideas are discussed to assist and have a solid ground especially for the analysis and interpretation of the data and to make recommendation based on the findings. The purpose of this part of the thesis work is to set up a basis for the theoretical frame of last mile concepts.

2.1 Theoretical Review

Last mile delivery is very recent issue in the logistics practices but nowadays it just become vital issue in the delivery process; which can be described as one of the most expensive, inefficient, and polluting parts of the supply chain.

Different authors define last mile in different ways. Many definitions of last mile exist, while the commonest view is that it concerns the last stretch of the supply chain from the last distribution center to the recipient's preferred destination point (John, Daniel and Henrik, 2019).

2.1.1 Dimensions of last mile Practices

Most recent studies view last mile from different dimensions such as; delivery process, transportation, distribution, and operation (Nghiep and Mohammadreza, 2022). In addition, warehouse is also another determinant in the last mile delivery (Aakanksha Gupta, 2023). The dimensions of the last mile delivery services are strongly related with the above determinants of the last mile delivery performance.

2.1.1.1 Delivery Process

Last mile delivery is seen as the last-point transportation activities in the supply chain, which connects products from the distribution centers or warehouses to the facilities or point of consumption (Nuraddeen and Usman, 2022).

Companies, businesses and government agencies that deal with end-users of products or services must have to depend on efficient last-mile transportation for them to serve their customers efficiently and effectively (Gevaers *et al.*, 2011).

Last-mile delivery is an important stage that fulfils customers promise if managed effectively; otherwise, it messes up all processes of supply chain efficiency. For example, the delay of medical supplies for a critical patient in the hospital that leads to death has rendered all processes right from order to delivery as useless. However, some of the process components of last mile delivery, such as technology used, cost incurred, a system of delivery, vehicles mode and many others, are responsible for the failure of efficient last-mile delivery (Nuraddeen and Usman, 2022).

2.1.1.2 Transportation

Last-mile transportation is considered as one of the critical parts of the supply chain, which could enhance the supply chain if monitored properly. Last-mile delivery is seen as the last point transportation from the origin of products which may be medicine, health supplies or health services to the point of consumption towards facilities or patients (Ojo, 2014). Any efficient and successful supply chain must have efficient last mile delivery service.

Transportation in Logistics Management is a fundamental part of the supply chain of goods and services from the point of origination to the destination (Tseng *et. al.*, 2014). Multi-national companies such as Coca-Cola and international pharmaceuticals such as Johnson & Johnson, Novartis and Bayer have demonstrated how they depend on a reliable transport system for their deliveries. (Tseng *et. al.*, 2014).

Further, change in techniques and management concepts increases moving load, distribution speed, and quality of service, running costs, facilities usage, and energy savings therefore making transportation to be a key aspect of logistics utilization (Ethel, Dryton, Bupe, Erastus *et. al.*, 2023).

In health logistics, transporting health commodities to the Service Delivery Point (SDP) and ensuring they reach the Last Mile is a critical component of the systems that support the availability of health products (Ethel, Dryton, Bupe, Erastus *et. al.*, 2023).

Pharmaceutical transportation should be secured and include the appropriate documentation to facilitate identification and verification of compliance with regulatory requirements. Policies and

procedures should be followed by all persons involved in the transportation, to secure pharmaceutical products. (WHO, 2010)

2.1.1.3 Distribution

The process of moving products from the supplier to the customer is called distribution process and distribution is the most important process in the final part of any logistics service (Chopra & Peter, 2011). Warehouse management, distribution centre and Last Mile delivery make up the highest cost hard to reduce in the logistics industry. The distribution process begins when the manufacturer ships the medicine and ends when the medicine consumption report is back to the procurement entity (Susarla & Karimi, 2012).

The distribution of pharmaceutical products is an important activity in the supply chain and involves several players. It consists of procuring, holding, supplying, importing and exporting of pharmaceutical products. Distribution activities are carried out by manufacturers, importers, wholesalers/distributors, retailers and other persons authorized to supply pharmaceutical products in the public and private sectors (NAFDAC, 2016).

2.1.1.4 Operation

Last mile delivery is the final phase of the delivery process. In a product's journey, it is moved from the warehouse shelf often at a distribution center, to the back of a truck, to the customer's doorstep (Alexander Samet, 2023).

2.1.1.5 Ware house

Warehouses serve as centralized distribution hubs, strategically located to facilitate efficient distribution of goods to customers or other final locations. This centralized approach minimizes transportation costs and reduces delivery times, enhancing overall supply chain efficiency. Now more than ever; there will be a stronger focus on enhancing safety measures in warehouses. Automation and robotics will play a significant role in reducing accidents and improving worker safety. Additionally, optimizing warehouse layouts and processes using data analytics will increase operational efficiency and reduce costs (Aakanksha Gupta, 2023).

2.1.2 Last mile delivery performance

Considering the importance of the determinants affecting the last mile delivery performance from different literature survey is too basic. Delivery Time, Delivery Cost, Mode of Delivery, Facility Technology and Product Mix are most common determinants of the last-mile delivery; if these components are managed effectively, they will improve the efficiency of the last-mile delivery, which consequently improves the lives saving of patients at last mile (Nuraddeen and Usman, 2022). This implies last mile delivery at the right time, with the right cost, through the correct mode of transportation using best facility technology for different products ordered at a time will give as the best last mile performance.

The last-mile part of the supply chain is considered very ineffective and **Expensive**, accounting for 13–75% of the full supply chain cost (Vasco silva, *et.al.*, 2023). At the same time Last mile is the well-known Time-consuming part of the shipping process which is the key step for overall customer satisfaction (Alexander Samet, 2023). Using best **Delivery system** will reduce the risk of failure to deliver health supplies to the facilities which even may be at remote area (Nuraddeen and Usman, 2022).

New **Facility Technologies** are proven to be beneficial in last mile delivery; as they optimize the whole delivery process through streamlining the delivery of items to clients with cost effective method (Luis B. Elvas *et.al.*, 2023). **Product Mix** deals with supplying different number of goods. Issues such as different products packaging, different destinations of products, selection and delivering of different products may distract the efficiency of last-mile delivery (Boyer and Hult, 2005 and Punakivi *et al.*, 2001).

2.2 Empirical Review

Studies have reported that last-mile delivery is considered as one of the most polluting and expensive part of the supply chain if it is not managed appropriately with extra care (Gevaers *et al.*, 2011).

2.2.1 Overview of last mile delivery

Over the past recent years Last mile logistics become an emerging research area with growing interest from scholars and practitioners.

Globalization also brings a lot of changes in the global business at large. In developed countries many commercial developments are being implemented. Most European consumers adopt e-commerce practices each year; with 75% of internet users have shopped online while they begin demanding more from the e-commerce services in terms of customization and convenience (Chaparro, Agudo & Pascual, 2016).

The rapid growth of last mile is mainly driven by increasing urbanization and population growth, e-commerce development, changing consumer behavior, innovation, and growing attention to sustainability at which its better understanding is required to enhance its economic, environmental, and social sustainability (John Olsson, Daniel Hellström and Henrik Pålsson, 2019).

Since last mile is latest interest of idea in the research area holistic and coherent literature overview on last mile practices are not easily accessible. The change in the customer behavior, the growing urbanization, the focus in the sustainability issue and others makes the research issue towards last mile delivery very crucial.

The issue of being too early research area makes the theoretical lens not to be explicit. The growth in academic publications has been tremendous, with three out of four articles appearing within the past five years (John Olsson, Daniel Hellstrom and Henrik Palsson, 2019). Empirical studies on last mile delivery show the importance of new delivery strategies in order to deal with the rising challenges of high growth rates in E-Commerce business for retailers and logistic service providers (S. Holdorf and H. -D. Haasis, 2014).

Most of the empiric literatures regarding the last mile deals on customer acceptance of service served by the business through different delivery dimensions. Especially after Covid-19 home delivery is becoming most simple and risk minimized way of shopping. Studies demonstrate that

unattended delivery experience is a multidimensional construct that comprises consumers' cognitive, emotional, behavioral, sensorial, physical and social responses to the service (Olsson, J., Hellstrom, D. and Vakulenko, 2023).

2.2.2 Last mile delivery practices of drugs

In general, the delivery process from the moment at which the end product is shipped from its last distribution centre to the moment it is received at a customer's home or a collection station is called the Last Mile in the whole delivery operation (Gevaers *et al.*, 2014).

Differently in the health sector, the Last Mile delivery system goes beyond the physical distribution of commodities in many activities such as; Medicines move toward the end user while logistics information needs to flow backwards to the distributor (Ethel, Dryton, Bupe, Erastus *et al.*, 2023). Efficient last-mile delivery is expected to solve some of the challenges that lead to mortality as a result of non-access to drugs and health supplies. For example, 7.3 billion people, almost half of the world's population, including one billion in remote areas, were reported to lack access to health supplies and services (World-Bank-Report, 2017; World Health Organization: Kumar *et al.*, 2008).

2.2.3 Performance of last mile delivery of drugs

Having an efficient last-mile delivery is an indication that lives will be saved. This could be achieved through integrated logistics channels that give the facility a good advantage that leads to achieving high efficiency in satisfying the patients' needs (Nuraddeen and Usman, 2022).

Efficient last-mile delivery was reported to have a positive and significant impact on inventory management (Nuraddeen and Usman, 2022). So, when this comes to health system issue it meant to be achieving high patient satisfaction. An efficient inventory control system minimizes spoilage and expiry then maximize appropriate usage at all levels for medicines and other health supplies.

Today, In Ethiopia EPSS is serving for approximately 4263 Health facilities trying to address all over the country with different service types at reasonable price. Recently EPSS uses both push and pull system; Push system is being performed for the program drugs donated from different stake holders (EPSS, 2016). The pull system uses integrated pharmaceutical logistics system primarily using the essential data items reported from health facilities regularly every other month.

Using its 11 distribution centers, EPSS will distribute drugs and supplies to public health facilities throughout the country (EPSS, 2016).

2.2.4 Challenges of last mile delivery practices of drugs

The mortality rate all over the world is related with efficient accessibility of drugs. In low-income countries especially in Africa this problem is at the top gear.

In the same attitude to other studies that stress last-mile logistics as an important part of the supply chain taking 50% of the logistics cost of a product; Some studies reported that between 13% and 75% of the total logistics costs are incurred as a result of inefficiencies and poor environmental performance of the processes used in the last-mile delivery of products. Products shortage, products late delivery, products damages and spoilage are some of the problems encountered during last mile delivery, which causes failure or inefficient last-mile delivery. (Nuraddeen and Usman Abbas, 2022).

Program Managers at different level of the supply chain should know the consumption rate of each health commodity to use as an input data into their procurement plan and make decisions on the restocking levels for each SDP during the next delivery cycle to reduce wastage of drugs and have good transaction. However, this planning cycle faces challenges relating to the last mile: lack of access to communication technology at the SDP, lack of proper training in data collection and reporting by health Centre workers, and most significantly failure to balance typical health work and data collection and reporting (Ethel, Dryton, Bupe, Erastus *et. al.*, 2023).

In our country Ethiopia studies regarding challenges on the last mile delivery are too rare especially in the health sector; the challenges of the supply chain have been tried to be seen in other industrial sectors at which most of the results shows poor knowledge of supply chain management in the workers of most companies. Mesfin (2007) studied the supply chain management and model development study as a case study of Mesfin Industrial Engineering plc. The result of this study shows that most of the employees of the company don't have awareness of SCM.

In addition, According to Dessalegn (2015) study result the data visibility at EPSS showed poor coordination generally which lack accountability, lack data management and dissemination skills. As a result, stock on hand, procurement and pipeline information, and stock out notifications were

not organized and shared to both Federal Ministry of Health (FMOH) and stakeholders on regularly bases.

Studies done by WHO and Health Ministry of Ethiopia on 2010 at the pharmaceutical sector showed that the storage conditions of many stores and dispensaries nationally were inadequate. In addition to the bad storage condition the transportation of drugs; if not done with caution will also be another source of spoilage since exposure for sunlight and moist in transportation causes substantial damage for the drugs.

From different studies the challenges of the last mile delivery can be concluded and seen from two different perspectives; **Man power related Challenges** and **Product related challenges**. Man power related challenges can be stated as lack of accountability, poor adherence to schedule, lack of completeness and quality of reports. In addition, product related challenges can be seen from product shortage, product late delivery, and product damage or spoilage perspectives.

2.3 Literature gaps of the study

From the above literature review section, several studies have been carried out in relation to pharmaceutical distribution; however, there are little or no theories exist in relation to last mile delivery of pharmaceutical products to health facility. Therefore, this research is intended to fill these gaps in the areas which are not researched by others.

2.4 Conceptual Frame work

Adopted from the Source: Framework of Last Mile Logistics Research: A Systematic Review of the Literature accessed on www.mdpi.com/journal/sustainability

Last Mile

Last Mile Delivery

the last mile logistic practices of anti-psychiatric drug
 the last mile logistic practices of anti-psychiatric drug

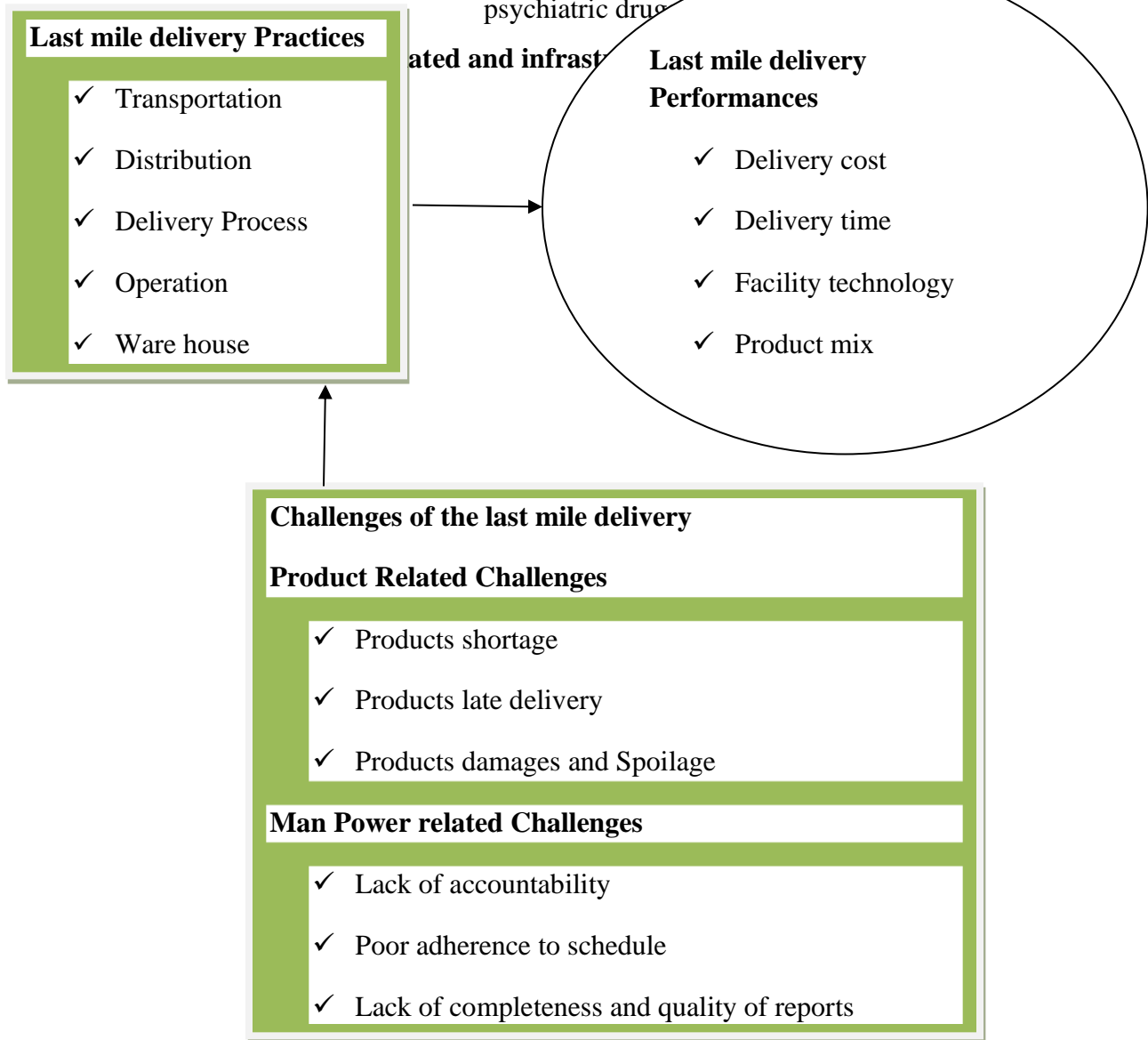


Fig 1: Conceptual Frame work of the study (own design)

CHAPTER THREE

METHODOLOGY OF THE STUDY

Introduction

The aim of this study is to find how last mile logistics practices affect the distribution of anti-psychiatric drugs through collection, organization, and analysis of information to increase understanding of the issue. Widely defined, the purpose of the research is to answer questions and acquire new knowledge.

To this end this chapter discussed the description of study area and setting, approaches and design of the research, population and sampling design, methods of data collection and data analysis technique.

3.1 Description of the Study Area and Setting

The study is conducted in Addis Ababa (AA) city administrative capital city of Ethiopia. From institution's distributing drugs the researcher selected EPSS which primary activity is to sustainably supply basic pharmaceuticals and medical equipment, mainly to governmental health institutions, which are giving treatment for the main health problems of the country.

The agency acquires pharmaceuticals and medical equipment through local and international procurements (EPSS, 2015). In addition, the researcher selected 12 public hospitals in Addis Ababa which gives psychiatric service to the country.

3.2 Research Approach

In this study both quantitative and qualitative approaches are employed to achieve the aim of the study; the quantitative approach is used to capture the responses of the sample respondents through questionnaire. The qualitative approach employed to use detail views and opinion of some selected key respondents with the use of open-ended questions.

3.3 Research Design

Descriptive and explanatory research design was conducted for this specific study on Last Mile delivery Practices of Anti-Psychiatric Drugs in Ethiopia EPSS Addis Ababa hub and selected public hospital. The design was selected since the study intends to assess the new topic with limited

information towards last mile delivery practices and describe the practice at hand, performance and challenges faced during last mile delivery.

3.4 Population and Sample Design

Target population is defined as the complete group of objects or elements relevant to the research project. They are relevant because they possess the information that the research project is designed to collect. The population, also called the universe, is the set of people or entities to which findings are to be generalized and the population must be defined explicitly before a sample is taken.

Since this study focused on last mile delivery of anti-psychiatric drugs the source and delivery system of this issue forwarded us towards hospitals which are the last mile receiver of the anti-psychiatric drugs and the giant supplier of the anti-psychiatric drugs. For this study purpose the source population consists of public hospitals served by EPSS Addis Ababa 1 & 2 hubs including the service provider EPSS too. The unit of analysis covered 12 public hospitals in Addis Ababa and 2 of the Addis Ababa EPSS hubs.

3.4.1 Sample size and sampling techniques

The study uses purposive sampling method; so as mentioned in the title “last mile delivery practice of anti - psychiatric drugs’’, the investigator focused on 12 public hospitals which are the known total governmental public hospitals; which already started psychiatric diagnosis and treatment and are being served under EPSS Addis Ababa hub 1 & 2. From each hospital the researcher tried to collect response through questionnaire; from Hospital managers, Supply chain manager of the facilities, Drugs procurement manager, Pharmacy head, pharmaceutical drug store manager of the facility with his/her coworkers and different dispensary unit coordinators (outpatient, inpatient and emergency pharmacy) from each facility most of which are pharmacists since they are the key workforces with a total of approximately 9 respondents.

From the above assumption $12 \times 9 = 108$ respondents are included

The study also included workers at EPSS Addis Ababa hub 1&2 purposively as these hubs majorly deliver all pharmaceuticals including anti - psychiatric drug to these respective 12 hospitals.

From the hub workers the researcher tried to collect response through questionnaire from professional of the service providers at the supply of anti-psychiatric drugs. About 12 workers from the 2 hubs of EPSS; each hub having 6 respondents including 3 professionals of the warehouse; store managers with his/ her co worker, 1 supply chain manager from each hub and 2 professionals from forecast and capacity building officers were included. So, in the quantitative part of the study, the sample size is determined by using the purposive sampling method to select respondents from each health facilities from the target population of 12 public hospitals and EPSS of Addis Ababa Hub 1&2.

Therefore, the overall sample or the grand total of respondents was 120 to meet the objectives of the research. In addition to quantitative data source the interview part was forwarded to selected key professionals from the supply chain units at different managerial position of facilities and some hospital managers for the qualitative data.

3.4.2 Inclusion Criteria and Exclusion Criteria

The Governmental public hospitals supply chain office and dispensary unit coordination workers that received anti – psychiatric drugs from EPSS of Addis Ababa hubs and EPSS distribution workers which distributes anti - psychiatric drugs in Addis Ababa Ethiopia were Included in the study.

The personnel and institution that have no role in the last-mile delivery of Anti-psychiatric drugs are excluded in the study.

3.5 Data Sources and Type

The principal sources of data for the research were primary data source. The primary tool to be used is questionnaire. The questionnaire had three parts: demographic, knowledge and last mile practices of the institution.

Secondary data were also used to developed questionnaires based on the information gathered from different published journal articles related to this study. The questionnaire is used to collect data from selected responsible individual respondent.

3.6 Data collection procedures

This study was designed to assess the overall effect of last mile delivery practice of Anti-psychiatric drugs on EPSS of Addis Ababa Hubs and public hospitals for the purpose of identifying the scope of improvements. To achieve this, the researcher used both qualitative and quantitative research model which mainly based on primary data. The first step conducted before designing the data collection procedure was visiting the organization's website, watching different documentaries made on EPSS on YouTube, and speak to selected public health facility assigned personnel's for receiving anti – psychiatric drugs for their facility in order to get an overall impression of the company last mile practices, performance and the challenges encountered in last mile delivery.

On this basis of contextual analysis and the information gathered from similar published journals; the researcher prepared a closed-ended likert-scale questionnaire, with a space for open comments at the end of each question. Before providing the questionnaire, the researcher briefed the purpose of the study and provided information on operational terminology to each sample individual. Secondary sources (reports, books, articles etc.) are used to develop the questionnaire and the conceptual framework. The Qualitative research model was done by transcribing the responses after the interview of some selected key respondents' from EPSS of two Addis Ababa Hubs and the department heads of the health facilities logistics management.

3.7 Data analysis procedures

The quantitative data entered and analyzed using the Statistical Package for the Social Sciences version 21 (SPSS). Descriptive statistics such as frequency, percentage, mean, standard deviation, variance and analysis were computed; and results are presented using tables and graphs. The qualitative data were used to elaborate the ideas and also to show similarities and differences among the responses as a means of triangulation through Explanatory method.

3.8 Validity and Reliability test

3.8.1 Validity test

Validity implies the degree to which a question measures what it is intended to measure. A questionnaire was needed to be tested in order to ensure that all items are clear and understandable.

This had been done before the main study was conducted. To guarantee the validity of the study, all questionnaires were self-administered to the right persons of respondents by the researcher and only data that was collected was analyzed. A pilot study was conducted to confirm validity of the questionnaire in one hospital just to refine the methodology and to test the questionnaire before administering the final phase.

Questionnaires are tested on potential respondents to make the data collecting instrument's objective, relevant, suitable to the problem and reliable as recommended. The pilot study was done with 3 persons (one Store managers and one supply chain manger and one pharmacy unit coordinator at one hospital). Twenty minutes were given to the respondents to complete the questionnaire and the researcher was there to aid them. Respondents were also asked to comment on the wording and formatting of the questionnaire. Some changes were made to the questionnaire after the pilot study. The changes were related to questionnaires repeated items and terminology. Then the results proved that the respondents have good understanding of the questions and concepts of the study given.

3.8.2 Reliability Test

Reliability test measures the consistency of scores. To achieve the reliability of the questionnaires and to capture intended objective of the study the researcher did statistical investigations using the Cronbach's alpha for all questions under dimension of the study objectives then it was calculated by application of SPSS 21.

Analysis values near 0.7 are used as a benchmark value for cronbatch's alpha (Jim Frost 2019). Reliability was tested taking 10 questionnaires at the beginning as a pilot test before the distribution of the questionnaires for the right respondents. The results of the pilot questionnaires cronbatch alpha test were above 0.8 which is considered to be excellent with overall reliability test of cronbatch alpha 0.882. All results are shown on the table below;

Table 3.1: Reliability Cronbach's alpha

S/N	Variables	N of Items	Cronbach's alpha
1	Delivery Cost	3	0.889
2	Delivery Time	4	0.810

3	Facility Technology	3	0.868
4	Product Mix	3	0.874
5	Delivery System	3	0.908
6	Transportation	4	0.950
7	Distribution	3	0.899
8	Delivery Process	3	0.854
9	Operation	6	0.832
10	Warehouse	3	0.932
	Overall Reliability	35	0.882

Source: Own Survey, 2024

3.9 Ethical Considerations

Several ethical issues are considered throughout the study. The first thing done was submitting the supporting letter of Addis Ababa University, School of Commerce mentioning the purpose of the research, to EPSS in order to be credible.

Furthermore, the participants have taken part on the survey which briefed about the purpose of the study strongly with high confidentiality; and some of them were let free to resign at any time they felt uncomfortable in the processes of data collection. The participants were informed that they have the right to ask and understand any unclear content of the data gathering instrument. The responses collected from the participants are analyzed without any change and anonymously. In addition to the above the reference works of other researchers and authors were cited appropriately.

CHAPTER FOUR

RESULT, DISSCUSION AND INTERPRETATION

Introduction

This chapter explains information gathered from the public hospitals and Ethiopian Pharmaceuticals Supply Service (EPSS) through questionnaires. These are analyzed to emphasize response from respondents using tables, graphs and charts to enhance clearer and consistent understanding of the analysis.

This chapter is also divided into sub-headings to throw more light on questions asked on the field.

4.1 Response Rate

Here an analysis of the respondents who were responsive and non-responsive was illustrated in the table 4.1 and on the below 3D pie chart.

Table: 4.1 Response Rate

Rating	Frequency	Valid Percent
Non-respondent	18	15.0
Respondent	102	85.0
Total	120	100.0

Source: own survey, 2024

Most of the data is collected from key pharmacy health professionals and some managerial staffs of the health facilities and EPSS Hubs using structured questionnaires. A total number of one hundred twenty (120) questionnaires were administered out of which one hundred two (102) were retrieved.

These valid questionnaires used for the analysis yielded $102/120 \times 100 = 85.00\%$ of response rate and of which 1 of them were found incomplete and hence rejected. This indicates that, the response rate was high and reflects the entire views of the population.

4.2 Demographic Characteristics of Respondents

The demographic profile of the respondents was brought up by the researcher and the information gathered from their responses is shown in the table below

Table 4.2: Demographic Characteristics of Respondents

Demography	Characteristics	Frequency	Percent (%)
Gender	Female	50	49.0
	Male	52	51.0
	Total	102	100.0
Age	18-28 years	12	11.8
	28-40 years	70	68.6
	Above 40 years	20	19.6
	Total	102	100.0
Educational Qualification	Below College diploma	0	0
	Diploma	0	0
	First Degree	50	49.0
	Masters	52	51.0
	PhD and above	0	0
	Total	102	100.0
Organization	EPSS	12	11.8
	Hospital	90	88.2
	Total	102	100.0
Profession	Others	6	5.9
	Pharmacist	96	94.1
	Total	102	100.0
Current Position	Facility Manager	10	9.8
	Others	54	52.9
	Store Manager	28	27.5
	Supply Chain Manager	10	9.8
	Total	102	100.0
Years of Experiences	5 - 10 year	56	54.9
	Above 10 years	32	31.4
	Less than 5 years	14	13.7
	Total	102	100.0

Source: Own Survey Finding, 2024

Table 4.2, which displays the gender distribution of the sample, indicates that of the total respondents (50) 49.0% are females and (52) 51.0% are males. This suggests almost both female and male are almost at equilibrium percentage regarding the employees at the pharmaceutical supply chain sector.

The age distribution of the respondents is also shown on the above table 4.2. According to the data, (12) 11.8% of respondents are between 18 and 28 years, followed by those respondents between

28 and 40 are (70) 68.6% and at last (20) 19.6% are those beyond the age of 40. The above data suggests most of the workers are at the age of best working potential.

Table 4.2 indicates that, all the respondents selected were well educated, it was found that, majority of the respondents were holders of Masters Degree, which constitute (52) 51%, others are First Degree holders, which also constitutes (50) 49%. The analyses shows that the pharmacy health professionals have some level of acceptable qualification to properly manage and control the activities of the health facility under study and this undoubtedly deals with change and more importantly the impact of change. Educational level is a high priority for all organizations to pay maximum respect to the level of qualification and the skills of the employee in the sense that this contributes immensely to the achievement.

On the type of organization regards most of the respondents (90) 88.2% were employee of hospital whereas (12) 11.8% were EPSS employees.

Regarding the profession in charge (96) 94.1% of them are pharmacy professional and (6) 5.9% are other professionals. The above stated pharmacy health professionals with their respective positions have direct involvement on the management of pharmaceutical supply chain management last mile practices and the stated positions purposely selected for the study.

Table 4.2 displays the current job positions held by the respondents. The chart indicates that (10) 9.8% of the respondents are Facility Manager, (54) 52.9% are other pharmacy professionals at different dispensary unit coordination, (28) 27.5% are store managers, the rest (10) 9.8% are supply chain managers. This suggests that the percentage of respondents with different pharmacy unit coordinator positions other than managerial position is higher than the percentage of employees at the organization's managerial positions.

The respondents work experience were different, as shown in table 4.2 the work experience of the professionals is, (56) 54.9% have work experience between 5 - 10 years, (32) 31.4% above 10 years, (14) 13.7% of them worked less than 5 years.

The work experience has impacts on the skills of managing pharmaceutical supply chains management practices or those managing the pharmaceuticals supply chain management practices at their organization have experience. Therefore, there is expectation that they will do the right thing.

4.3 Descriptive Statistics on last mile delivery Performance in public hospitals and Ethiopian pharmaceuticals supply service, Addis Ababa

The Last mile delivery performances included in this study were delivery cost, delivery time, facility technology, product mix and delivery system. Respondents were asked to rate their opinion. In descriptive data analysis, averages (mean) were calculated for each construct in the Likert Scales, from Strongly Disagree=1 to Strongly Agree=5. The numbers entered into the SPSS version 21 thus represented the weight and the weighted averages for the scales were calculated to understand the mean values. This was accomplished by dividing the distances between the scale values (4 in a 5-point Likert Scale by the number of values (5)). Thus, the period length is $4/5=0.80$, which is used to calculate the weighted averages (Alfarra, W.A., 2009). The weighted average categories (mean value) are interpreted with the degree of agreement for each factor calculated accordingly and its interpretation based on the issue raised was made on the basis of Alfarra, W.A., (2009) differently based on the measurement suggestion as weighted average between 1.00-1.79 interpreted as Very low, 1.80-2.59 as Low, 2.60-3.39 as Moderate, 3.40-4.19 as High and 4.20-5.00 as Very high as shown in the table 4.3 below. In general mode of the respondents shows attribute of a variable that appears most frequently, mean of the respondent's responses score for determinants illustrates their effects on the last mile delivery performance where as standard deviation illustrates the deviation from the central value.

Table 4.3: Weighted Averages for 5-point Likert Scales for result interpretation

Weighted Average	Result	Result Interpretation
1.00-1.79	SD (Strongly Disagree)	Very low performance/not practiced/not challenge
1.80-2.59	D (Disagree)	Low performance/poorly practiced/low influential challenge
2.60-3.39	N (Neutral)	Moderate
3.40-4.19	A (Agree)	High performance/highly practiced/ highly influential challenge
4.20-5.00	SA (Strongly Agree)	Very high performance/very high practiced/ very highly influential challenge

(Source: Alfarra, W.A., 2009)

4.3.1 Delivery cost on anti –psychiatric drugs

Incorporating inappropriate delivery cost in the last mile often led to inadequate budget utilization in the delivery, resulting in an under or oversupply of lifesaving anti – psychiatric drugs. To understand the effect of delivery cost on anti – psychiatric drugs three items were developed in this research. The following table shows the delivery cost on anti – psychiatric drugs.

Table 4.3.1: The delivery cost on anti – psychiatric drugs

	Delivery cost	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	The average shipment cost of anti – psychiatric drugs including packaging, transport, insurance, return and preparing cost are affordable by our institution	10	36	22	22	12	2.902	1.1983
2	Our institution Anti-Psychiatric drugs delivery cost is well managed	14	34	8	28	18	3.02	1.3714
3	Delivery cost of anti – psychiatric drugs are reasonable	6	44	10	30	12	2.98	1.2021
Grand Mean							2.97	

Source: Own Survey, 2024

Table 4.3.1 indicates the values of delivery cost on anti – psychiatric drugs; regarding the affordability of delivery cost mean scores 2.90 with high standard deviation 1.19 indicates most of the respondent’s moderate performance, the institution delivery cost being well managed or not was also shown by the respondents mean value of 3.02.

Delivery cost being reasonable shows moderate performance by respondents which are confirmed by the mean value 2.98 with standard deviation of 1.20. Delivery cost results a grand mean value of 2.97 near to the average relatively shows that the response was generally moderate performance for the last mile delivery.

Regarding the interview survey; respondents also highlighted key issues on delivery cost of last mile delivery, “The delivery cost including its shipment, insurance, preparing cost in addition to

its being affordable, reasonable and being well managed or not is not as such clear issue and varies based on the status of the different external market related factors , our experiences on the delivery process shows the need of improvement on cost issues, from the cost issues on previous exposure the gap is too wide which is under performance for the fulfillment of the need of our patients”(R2,R6,R7)

4.3.2 Delivery time on anti – psychiatric drugs

The other concern is delivery time. Appropriate usage of the delivery time will maximize the customer satisfaction. The researcher summarized the delivery time on anti – psychiatric drugs with the following table.

Table 4.3.2: Delivery time on anti – psychiatric drugs

	Delivery time	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	EPSS supplies anti-psychiatric drugs on time	4	56	22	18	2	2.588	0.894
2	The percentage unit delivered in specified time is consistent	4	46	26	26	0	2.725	0.892
3	The average delivery time is reliable	4	46	26	22	4	2.765	0.966
4	Anti- psychiatric drugs are delivered as promised perused in specification of time	8	44	34	10	6	2.627	0.974
Grand Mean							2.68	

Source: Own Survey, 2024

To understand the delivery time on anti – psychiatric drugs four items were developed in this research.

Table 4.3.2 indicates the values of delivery time on anti – psychiatric drugs; The mean value for on time delivery was 2.59 with standard deviation 0.89 which implies the majorities of respondents disagreed and showed low performance, the percentage unit delivered in specified time being consistent shows mean value of 2.72, the time reliability mean value was 2.76 with standard deviation 0.97 which indicates most the respondents moderate performance, being delivered on the promised time still stays on moderate performance value by respondents with mean of 2.63.

Delivery being on time, consistently and reliable was shown by respondents with a grand mean value 2.68, being below average.

Regarding the interview survey; respondents also reflected key issues on delivery time, “*The delivery being on time, consistent, reliable and on the specified timeline is limited due to lack of uniform supply from the suppliers, the general procedures of delivery really have issue of time, most of the items are not being delivered on time consistently, time issue on the last mile delivery of drugs is too sensitive issue which should be at good performance whereas this can’t be reached by our organization*” (R1,R5,R6).

4.3.3 Facility technology on anti – psychiatric drugs

To understand the facility technology on anti – psychiatric drugs three items were developed in this research. Different organizations have different facility technology as shown on the table below:

Table 4.3.3: The Facility technology on anti – psychiatric drugs

	Facility Technology	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	An Integrated Pharmaceutical Logistics System is in place	10	28	10	30	24	3.294	1.354
2	Our institution works network analysis with other stake holders for better data optimization	10	28	28	14	12	3	1.177
3	Logistics Management Information System is in place	4	24	16	42	16	3.412	1.129
Grand Mean							3.24	

Source: Own Survey, 2024

Table 4.3.3 indicates the values of facility technology on anti – psychiatric drugs; IPLS implementation was indicated by mean value 3.29 and standard deviation of 1.35 with moderate performance, network analysis work with others for data optimization having mean value 3 shows most of the respondents relatively moderate performance, and implementation of LMIS showed mean value of 3.41 and standard deviation 1.13 which was agreed by the respondents showing its high performance.

The requested technologies were moderately implemented by the organization which was confirmed by the grand mean value of 3.24.

Regarding the interview survey; respondents also reflected some ideas on facility technology, *“implementation of different technology at the organization level is being processed at different pharmaceutical activities, most of the activities these days are computed digitally, requesting and receiving formats are now computerized, IPLS activities have been well implanted on day to day activities of the overall supply chain whereas awareness and trainings based on guidelines are not well done on every professional, IPLS and LMIS are well implemented in our organizations, work analysis with other stake holders are been well done in EPSS, Updating new technology and unavailability of training system for new staff regularly is another gap”*(R3,R4).

4.3.4 Product mix on anti – psychiatric drugs

To deal the product mix on anti – psychiatric drugs three items were arranged in this research. The researcher states the product mix on anti – psychiatric drugs with the following table.

Table 4.3.4: Product mix on anti – psychiatric drugs

	Product Mix	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	Different anti-psychiatric drugs are mixed with caution appropriately while packaging, shipping and delivering	0	24	26	42	10	3.373	0.954
2	Brands of different anti-psychiatric drugs are properly described with the correct product line	0	30	42	28	2	3.020	0.808
3	The anti – psychiatric drugs life cycle is appropriately described for cautious delivery	4	24	24	38	12	3.294	1.077
Grand Mean							3.23	

Source: Own Survey, 2024

Table 4.3.4 indicates the values of product mix of anti – psychiatric drugs; the idea of mixing different products while packaging and shipping was stated with mean value 3.37 with standard deviation 0.95. Properly describing anti-psychiatric drugs with their correct product line was

showed by respondents mean value 3.02, cautious description of the life cycle of anti – psychiatric drugs show mean value of 3.29 with standard deviation of 1.08. The grand mean value 3.23; which is above average showed that the respondent’s product mix performed moderately on the last mile delivery performance.

Regarding the interview survey; respondents reflected some ideas on Product mix, *“Having different product being mixed while packaging, shipping and related issues including to give brief description of the anti-psychiatric drugs cautions is performed in our organization, personnel’s working on supply chain look over the product mix while receiving and distributing which is done cautiously by our professionals, mixing different product for shipment is done regularly in our organization with relatively good performance”*(R2,R7)

4.3.5 Delivery system on anti – psychiatric drugs

Different organizations have different delivery system. The researcher states the effect of delivery system on anti – psychiatric drugs with the following table.

Table 4.3.5: The Delivery system on anti – psychiatric drugs

	Delivery system	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	Anti – psychiatric Drugs are been delivered with the preferable mode of freight shipping	0	36	26	32	8	3.118	0.988
2	Big sized cartoons carrying Anti- psychiatric drugs are been well delivered with caution	6	28	12	46	10	3.255	1.140
3	Our delivery system obeys of all relevant condition regarding delivery of anti – psychiatric drugs.	4	36	14	36	12	3.157	1.149
Grand Mean							3.18	

Source: Own Survey, 2024

Table 4.3.5 indicates the values of delivery system of anti – psychiatric drugs; the delivery system used for last mile delivery with preferable mode of freight shipping described with mean value of 3.12 with standard deviation of 0.99, cautious delivery of big sized cartoon shows mean value 3.25 with standard deviation of 1.14, obeying relevant condition on the delivery of anti – psychiatric

drugs was shown by a mean value of 3.16. The overall delivery system stays above average by respondents with mean value 3.18 stating its moderate performance on the last mile delivery of anti – psychiatric drugs.

Regarding the interview survey; respondents also reflected some ideas on Product mix, *“the delivery system really affects the last mile delivery performance, and to have smooth last mile delivery first the delivery system should be appropriately handled with caution”*

4.3.6 The overall last mile delivery performance

Over all the dimensions showed different values on the last mile delivery performance. As shown on table 4.3.6: the delivery being on time is disagreed by the respondents with a mean value 2.59, standard deviation 0.89 and mode of 2 showing its low performance. The implementation of LMIS is agreed by the respondents with a mean value of 3.41, standard deviation of 1.13 and mode of 4, showing its high performance in the organizations. The overall mean level 3.03 showed that all dimensions have moderate performance on the last mile delivery.

4.4 Descriptive Statistics on last mile delivery Practices in public hospitals and Ethiopian pharmaceuticals supply service, Addis Ababa

The Last mile delivery practices included in this study were transportation, distribution, delivery process, operation and ware house. Respondents were asked to rate their opinion and scaled based on weighted averages of Alfarra, W.A., (2009)

4.4.1 Transportation of anti – psychiatric drugs

As it is well known transportation is basic practice of the last mile delivery. Without transportation nothing will be done in any of the delivery.

So best practice of transportation will make the last mile delivery meets its goal. The researcher summarized the transportation on anti –psychiatric drugs with the following table.

Table 4.4.1: Transportation of anti – psychiatric drugs

Transportation	Response (N=102)	Mean Deviation
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		SD	D	N	A	SA		
1	Good pharmaceutical storage is placed on vehicles that are transporting drugs	4	26	32	28	12	3.176	1.066
2	Anti - psychiatric drugs are protected from direct sunlight, humidity and contaminants during transportation	0	38	20	24	20	3.255	1.158
3	The interior of vehicles and containers remain clean and dry while transporting anti – psychiatric drugs	12	16	38	26	10	3.059	1.133
4	Our transportation for delivery of anti – psychiatric drugs are free of damage	12	40	14	26	10	2.824	1.222
Grand Mean							3.08	

Source: Own Survey, 2024

To look over the transportation of anti – psychiatric drugs four items were developed in this research. Table 4.4.1 indicates the values of transportation on anti – psychiatric drugs; the presence of good pharmaceutical storage on vehicles shown with mean value of 3.18 with standard deviation of 1.07 which shows its being moderately practiced by the organization, contaminant free transportations are maintained within the acceptable mean value of 3.25 with standard deviation of 1.16 having moderate practice in the organization, the interior vehicles neatness and dryness stays on the mean value of 3.06 with standard deviation of 1.13 showing moderate practice, delivery of anti – psychiatric drugs free of damage shows slightly lower than the average with a mean value of 2.82 with high standard deviation of 1.22 moderately practiced. Overall transportation practice on the last mile delivery is seen with grand mean of 3.08 which shows that it is moderately practiced by the organization.

Regarding the interview survey; respondents also reflected some ideas on Transportation, “*the transportation practice is the well-known practice of all delivery; practicing best in the transportation is basic for preferable delivery, even though there are no vehicles which are specially arranged for transportation of drugs our hospital use its own cars for collecting anti – psychiatric drugs from EPSS, our cars for collecting drugs from EPSS are contaminant free and clean*” (R1, R3, R5)

4.4.2 Distribution of anti – psychiatric drugs

Distribution is also another basic issue in the last mile delivery. With best distribution practice the last mile could be well done. To look over the distribution practice of anti – psychiatric drugs three items were developed in this research. The researcher summarized transportation with the following table.

Table 4.4.2: Distribution of anti – psychiatric drugs

	Distribution	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	Our facility is successful in uninterrupted supply of anti-psychiatric drugs	16	48	2	36	0	2.569	1.130
2	Our facility is successful in reducing wastage of anti-psychiatric drugs	2	36	14	46	4	3.137	1.015
3	Our facility is supplying/receiving anti-psychiatric drugs with its original quality throughout the distribution process	6	26	12	48	10	3.294	1.131
Grand Mean							3	

Source: Own Survey, 2024

Table 4.4.2 indicates the values of distribution on anti – psychiatric drugs; uninterrupted supply of anti – psychiatric drugs got a mean value of 2.57 with standard deviation of 1.13 which was disagreed by respondents and shows its being poorly practiced. Reduction in wastage of anti – psychiatric drugs mean value was 3.14 with standard deviation 1.01 with moderately practice. Supplying and receiving of anti – psychiatric drugs with its original quality showed mean value 3.29 with standard deviation 1.31 indicating its moderate practice by the organization. Overall distribution practice on the last mile delivery is seen with grand mean of 3 which shows that it is moderate practice in the organization.

Regarding the interview survey; respondents also reflected some ideas on Distribution, *“uninterrupted distribution practices is not simple issue in our organization due to lack of consistency from the suppliers, distribution is complicated due to its dependency on supply which is mostly over our control, reduction of wastage rate is done through interaction with other facility by supplying near expiry drugs early if the receiver is under stocked and receive if the supplier is over stocked and we do need so, preserving original quality is on the hand of the manufacturer*

and since most of the manufacturers are out of country controlling the issue is not as such easy but strictly we are selecting the best anti - psychiatric drugs”(R2,R4,R6)

4.4.3 Delivery Process of anti – psychiatric drugs

Having well managed delivery process makes the last mile comes true. To look over the delivery process three items were developed in this research. The researcher summarized the delivery process of anti – psychiatric drugs with the following table.

Table 4.4.3: Delivery process of anti – psychiatric drugs

	Delivery Process	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	Delivery is done within recommended timeliness	10	32	26	34	0	2.824	1.009
2	Fast moving and slow moving anti-psychiatric drugs are delivered and reported periodically	0	26	28	46	2	3.235	0.858
3	Full quantity of the requested anti-psychiatric drugs is delivered to our facility	18	38	26	18	2	2.490	1.041
Grand Mean							2.85	

Source: Own Survey, 2024

As shown on the table above the delivery process impact on anti – psychiatric drugs was detected with different respondent’s response; obeying the timeline for the delivery practice gave the research mean value 2.82 with standard deviation 1.01 even though it is below the average the result shows moderate practice at the organization, periodical reporting of fast and slow moving drugs stays at moderate practice with a mean value 3.23, delivering full quantity as requested amount of drugs by the facility shows a mean value 2.49 with standard deviation 1.04 which was disagreed by respondents and poorly practiced with the organization.

Overall, the mean value for the delivery process is 2.85 with a moderate practice in the organization.

Regarding the interview survey; respondents reflected some ideas on Delivery process,” *our delivery process reliability depends on many external factors, availing full quantity of anti –*

psychiatric drugs for the facility is not satisfactory, obeying the timeliness of the delivery process is not done as expected by our clients”

4.4.4 Operation of anti – psychiatric drugs

Operation encompasses most of the activities. The researcher summarized the activities under operation with the following table.

Table 4.4.4: Operation of anti – psychiatric drugs

	Operation	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	Storage area is visually free from harmful insects and rodents	4	14	28	50	6	3.392	0.935
2	Fire safety equipment is available and accessible	4	14	12	62	10	3.588	0.978
3	There is security controlling system in the warehouse with camera and alarms	0	44	18	28	12	3.078	1.087
4	Drugs are stored at the appropriate temperature to products including cold chain storage	4	6	16	62	14	3.745	0.909
5	Floor is at convenient for movement of goods	0	12	24	54	12	3.647	0.840
6	Our institution has established quantification practices with a scheduled work plan and budget.	4	14	4	56	24	3.804	1.072
Grand Mean							3.54	

Source: Own Survey, 2024

To look over the operation of anti – psychiatric drugs six items were developed in this research. Table 4.4.4 indicates the values of operation on anti – psychiatric drugs; the establishment of quantification practices with a scheduled work plan and budget got mean value of 3.80 which was agreed by respondents and highly practiced within the organization, in addition storage of drugs with the appropriate temperature was also highly practiced with a mean value of 3.75 with standard deviation of 0.91.

Overall operation activities grand mean value was 3.54 showing the activities being highly practiced within the organizations.

Regarding the interview survey, “the overall operation of our organization supply chain related activities are doing good, our annual quantification activities are been performed with well advanced supply chain workers regularly, fire safety equipment are regularly checked and maintained appropriately, cameras for controlling the transaction system is not available in our organization, the floors are convenient for movement of good from one place to another appropriately while receiving and supplying anti – psychiatric drugs”(R1,R7)

4.4.5 Ware house of anti – psychiatric drugs

Warehouse is where the drugs kept safe before being delivered for receivers of different units. Appropriate storage of drugs keeps the drug safety. To look over the warehouse of anti – psychiatric drugs three items were developed in this research. The researcher summarized the activities under ware house with the following table.

Table 4.4.5: Warehouse of anti – psychiatric drugs

	Warehouse	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	The ware house of our institution is maintained appropriately	2	2	28	58	12	3.745	0.7667
2	Ware house obeys the standard operating procedures of Ethiopian Food and Drug Administration	6	6	6	80	4	3.686	0.879
3	The overall ware house process has good communication with every concerned body	2	12	10	62	16	3.765	0.925
Grand Mean							3.73	

Source: Own Survey, 2024

Table 4.4.5 indicates the values on warehouse of anti – psychiatric drugs; the institution highly practiced the warehouse activities appropriately which was confirmed with a mean value 3.75 with standard deviation of 0.766.

Overall, the ware house has good internal communicating staffs and obeys the standard operating procedures of Ethiopian FDA which was confirmed with a Grand mean value of 3.73.

Regarding the interview surveys; “Our organization ware house is relatively well done with dedicated staffs, the warehouse obeys the standard of the country, and even though our institution

didn't get enough space to full fill the standard of pharmaceutical store procedures we tried to arrange the drugs accordingly within the given space”

4.4.6 The overall last mile delivery practices

Over all the activities in the organizations showed different values on the last mile delivery practices. As shown on tables above: Transportation of anti – psychiatric drugs are moderately practiced by the organizations with a mean value 3.08, The distribution of anti – psychiatric drugs are moderately practiced by all organizations with a mean value of 3, the delivery process was also moderately practiced with all organizations having a mean value of 2.85 scoring the least fifth level.

Operations of anti-psychiatric drugs were highly practiced by all organizations with a mean value of 3.54 scoring second from the overall practices. As that of operation ware house was also highly practiced scoring first by the organizations getting the highest mean value of 3.73. The overall grand mean level 3.24 showed that all activities stated above are moderately practiced within the organization which really impacted the last mile delivery.

4.5 Descriptive Statistics of challenges on anti – psychiatric drugs at public hospitals and Ethiopian pharmaceuticals supply service, Addis Ababa.

The challenges included in this study were stated as man power related and product related. Respondents were asked to rate their opinion on each challenge to visualize their individual influence.

4.5.1 The Product related challenges on anti – psychiatric drugs

The most known product related challenges on anti - psychiatric drugs were asked for respondents then the responses were rated as follows on the following table

Table 4.5.1: Product related challenges on anti – psychiatric drugs

	Product related Challenges	Response (N=102)	M	e	a
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		SD	D	N	A	SA		
1	Anti-Psychiatric drugs aren't delivered on time	14	32	6	46	4	2.941	1.2172
2	Anti-Psychiatric drugs are damaged during delivery process	6	48	38	10	0	2.510	0.7545
3	Quantified amount of anti-Psychiatric drugs isn't accessible from supplier	12	34	22	26	8	2.843	1.1667
4	Different anti-psychiatric drugs being delivered aren't at safe condition	14	46	26	16	0	2.431	0.9175
5	Budget allocated by the government for the last mile delivery of anti-psychiatric drugs are inadequate	12	8	18	54	10	3.412	1.1463
6	Poor Infrastructures while delivering really affects the distribution of anti-psychiatric drugs	4	8	18	56	16	3.706	0.9605
Grand Mean							2.97	

Source: Own Survey, 2024

Table 4.5.1, shows the results of product related challenges on anti – psychiatric drugs on anti – psychiatric drugs delivery;

Poor safety issue on delivering was disagreed by respondents with a mean value of 2.43 with standard deviation 0.92 which was less influential, while negative impact of poor infrastructure on distribution of anti – psychiatric drugs was agreed by respondents being high influential challenge with mean value of 3.70 with standard deviation of 0.96.

But the overall product related challenges on anti – psychiatric drugs got a mean value of 2.97 this shows its moderate influence.

Regarding the interview survey; *“product related challenges are our hindrances of day-to-day activities in our organization, quantified number of drugs are not accessible from the supplier in addition to the inadequate budget allocation, poor infrastructure effect on delivery of anti – psychiatric drugs is also not fully resolved”*

4.5.2 The Man power related challenges on anti – psychiatric drugs

Man power related challenges on anti - psychiatric drugs were asked for respondents then the responses were rated as follows on the following table

Table 4.5.2: Man power related challenges on anti – psychiatric drugs

	Man power related Challenges	Response (N=102)					Mean	Standard Deviation
		SD	D	N	A	SA		
1	Proper training is ready for all our institution supply chain related workers	26	46	8	22	0	2.255	1.069
2	Our professionals have updated information regarding data collection and report system	14	32	22	34	0	2.745	1.069
3	Our institution store managers and co-workers are accountable for their own activities	2	14	10	62	14	3.706	0.939
4	Our institution store managers and co-workers adhere for schedule of requesting and receiving Anti-Psychiatric drugs	0	14	6	66	16	3.824	0.861
5	Our institution reports are with good quality and well completed	2	20	22	50	8	3.412	0.958
6	Our institution has enough, adequate skilled and experienced man power	6	20	18	50	8	3.333	1.065
7	Our institution top management have awareness regarding supply chain activity	6	20	28	44	4	3.196	0.995
Grand Mean							3.21	

Source: Own Survey, 2024

The results on the above table shows the manpower related moderate challenges on anti – psychiatric drugs; The grand mean value was shown as 3.21 which is above average value showing man power related challenges moderate effect on anti-psychiatric drugs delivery.

Regarding the qualitative data found from the interview, the respondents reflected the following opinions: *“man power related challenges occurs in our organization many steps which is also related with the turnover of the professionals; while leaving the organization most professionals haven’t practiced the habit of experience and skill sharing, regular training and updating of professionals is not well done in our organizations, even though the skill problems really affect the supply chain related works most of our professionals are trying to work efficiently, our store*

manager with his coworkers adhere for schedule while requesting anti – psychiatric drugs from EPSS”

Regarding the interview survey about 14 key respondents were selected from the total respondents and 10 of them were willing to give their opinion about their own knowhow, practice and challenges of last mile delivery then respondents from each organization forwarded the following ideas; *“last mile delivery is recent idea which is not still implemented in our organization, our institution is planning to initiate the last mile delivery system looking other organization experience, last mile delivery is reaching the end customer cost effectively and on time, for the delivery of drugs we are using push/pull system, last mile delivery is not applicable in our organization, Challenges regarding last mile delivery is expected both from man power and product; last mile delivery challenges are its cost and time as seen from different organization experiences other than the health sector which hinders us to simply start the last mile delivery, lack of proper man power utilization with updated information and trainings for the staff makes the last mile delivery challenging, governmental involvement is basic for the initiation of this new delivery system, to increase the customer satisfaction last mile delivery have a strong influence on the delivery system of anti – psychiatric drugs, working on the challenges of the last mile delivery and overcoming it will make the last mile delivery smooth”*

4.5.3 The overall last mile delivery Challenges

Over all the challenges from man power and product related issues in the organizations showed different values on the last mile delivery of anti-psychiatric drugs. As shown on tables above: product related challenges score the second challenges from the two factors having a mean value of 2.97 showing moderate influence on the last mile delivery of anti-psychiatric drugs from which poor infrastructures affect the distribution highly. The primary challenge man power related one got a mean value of 3.21 influencing the last mile delivery of anti-psychiatric drugs moderately. Their grand mean value 3.09 shows the impact of both man power and product related challenges on the last mile delivery of anti-psychiatric drugs being moderately influencing.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The final part of this research paper provides summary of the findings of the study, conclusions and recommendations for the last mile performance, practices and challenges of anti-psychiatric drug on public hospital and EPSS of Addis Ababa Ethiopia which were drawn from the findings and discussions of the data collected by questionnaires and interview. The chapter briefly shows Summary, conclusion, recommendations and suggestions for further research

5.1 Summary of major findings

The purpose of this study was to assess last mile delivery performance, practices and challenges of anti – psychiatric drugs in selected public hospitals found in Addis Ababa and Ethiopian pharmaceuticals supply service, Addis Ababa hub.

From the demographic characteristics of respondents', the percentage for female was (50%) and the remaining (52%) were male respondents. 68% of the researcher respondents were adults between the age of 28 and 40, About 56% of them have served more than 5 years below 10 years in the pharmaceutical sector and this had its advantages to the study as measurement needs enough knowledge and exposure of the sector. The majorities of the respondents, 52 % of them had masters' degree and the rest 50% had first degree. As a result, the validity of the research will increase and the findings can describe the existing situation of the sector.

The sampling technique used for this study was purposive sampling technique. This sampling technique was used to select 12 public hospitals and EPSS, Addis Ababa hub (which supplies and distributes pharmaceuticals to the majorities of public hospitals) as a population. In addition, purposive sampling technique was also used to select professionals from different dispensary units, pharmacy leaders, drug supply management officers, pharmaceuticals procurement focal, storekeepers, EPSS's manager, distribution officers, forecasting and capacity building officers and store managers of EPSS. Then, the sample size for the study was 120 respondents.

A total of 120 questionnaires were distributed to professionals working in 12 public hospitals and in EPSS, Addis Ababa hub which were mostly pharmacists. Finally, 102 questionnaires were returned which represents nearly 85.0% of the total sample size.

The study was guided by the following research questions: How last-mile delivery of anti-psychiatric drugs is being practiced at EPSS? What is the performance of anti-psychiatric drugs at the last mile delivery in terms of availability? And what are challenges of last-mile delivery of anti-psychiatric drugs? Descriptive statistics was used to answers the research questions posed.

Therefore, the following summaries of major findings of the study are presented based on the analysis and interpretation of collected data.

➤ **The last mile delivery performance of anti – psychiatric drugs from different dimension**

The findings of the analysis show that most of respondents with 3.03 grand mean moderately affects last mile performance in public hospitals and EPSS. Different facility technologies are been implemented in many of the organization with moderate performance.

From the five dimensions of the last mile delivery performance facility technology scored first with a mean value of 3.24 with moderate implementation. Next product mix of anti-psychiatric drugs scored second with mean value relatively near to facility technology 3.23 then delivery system scored third with mean value 3.18 still being moderately implemented. The fourth and fifth score goes to delivery cost and delivery time with mean value of 2.97 and 2.68 respectively.

➤ **The last mile delivery practices of anti – psychiatric drugs**

From the major 5 activities being practiced in the organizations; transportation, distribution and delivery process are moderately practiced in most of the organization from which delivery process being the last activity to be practiced in the organizations next to transportation and distribution scoring the third and fourth practices respectively, where as operation and warehouse are been highly practiced in many of the organization with a mean value of 3.54 and 3.73 respectively. Ware house scored the first activity from the overall practices.

➤ **Challenges affecting the last mile delivery practices of public hospitals and EPSS**

The study shows product related challenges moderate influence on anti – psychiatric drugs with a mean value 2.97, poor infrastructure challenge was responded by most key interview respondents. Man power related challenges show moderate influence as that of product related challenges with a mean value of 3.21. Store manager’s accountability and adherence for schedule was told by key interview respondents.

Overall, both manpower and product related challenges influenced moderately. The man power related challenges influenced the last mile delivery of anti-psychiatric drugs primarily followed by the product related challenges.

5.2 Conclusions

To ensure uninterrupted supply of safe, effective and quality anti – psychiatric drugs, the hospital pharmacy shall have effective and efficient last mile delivery system. However, such new practices could be affected by various factors which lead to interruption and inefficiencies.

Therefore, the purpose of this research is to assess the practices, performance and challenges of last mile delivery of anti – psychiatric drugs in public hospitals and EPSS, Addis Ababa hub.

Based on the findings of the perceived evaluation of the respondents the following conclusions are drawn related to last mile delivery.

- Last mile delivery system is relatively new idea for our country which makes most of the respondents not briefly discuss activities in detail but most of the respondents have the information about the system and believes in its efficiency
- Last mile delivery by most responders was stated as the overall delivery system from the supplier to the final customer which approaches to the scholar's definition
- Most of the organization response towards the initiation of last mile delivery was not applicable and some told as they are on the way to start. Their previous delivery system was push and pull system at most organizations
- Transportation, distribution, operation, delivery process and ware house affect the last mile delivery performance moderately while proper utilization of these practices will make the last mile delivery reliable
- Challenges regarding the manpower and product related problems on the last mile delivery shows that both challenges affect the last mile delivery such as poor coordination, integration, communication and infrastructural problems in addition to the Lack of data quality, lack of technical expertise and gaps in legislative and regulatory framework really impacts the last mile delivery practices from being simple
- Most of the last mile delivery practices are significant for the best performance of the organizations last mile delivery.

5.3 Recommendations

- ❖ Considering the findings of this study, the following recommendations are made so as to improve the last mile delivery practices in public hospitals and EPSS of Ethiopia:
 - Since the customer satisfaction is significantly affected by delivery of anti – psychiatric drugs it is better to deal with best last mile delivery system to have convenient delivery using different updated technologies at EPSS and others

- The results of this study showed that the best practice of last mile delivery will enhance for best performance of the last mile which should be considered well by both government and other stakeholders for better achievement on health of citizens.
- Both man power related and product related challenges on the last mile delivery influences the practices and performance of the last mile; so as taking corrective measure for the challenges may resolves the problems and opens the door for advancement in the practices of the last mile delivery with better performance.
- Man power related challenges are of more influential in the last mile delivery of anti-psychiatric drugs delivery as seen from the study results so that resolving these problems will definitely adjust the last mile delivery of anti-psychiatric drugs
- From the product related challenges perspective poor infrastructure showed to be the highest challenge affecting most organization which implies resolving the problem can also resolves the obstacles of the last mile delivery drugs.
- The ware house activity being well practiced at most of the organizations should continue being well organized and maintained its function as well.
- Delivery time should be well performed in all organizations since all activities being on time resolves most the problems related with last mile delivery of anti-psychiatric drugs and late delivery will reduce the effectiveness of the last mile delivery of anti-psychiatric drugs. All stakeholders and the government at large should act on the issue of time.
- Transparency, communication, coordination, integration and information exchange with supply chain partners are always important to make last mile delivery smooth at different areas; such as ministry of health, EPSS and other agencies
- Since last mile delivery practices by health sector agents is too important new scope which will increases the customer satisfaction it's better to start last mile delivery of anti – psychiatric in all organization giving psychiatric treatment
- Mental illness burden affects every one of us which disturbs not only the families of the victim but the community at large, but early treatment makes the patients' progress to be good. One person after being treated with ongoing treatment by

schedule may return to his/her previous life effectively and continue his/her day-to-day life including their carrier which converts them to self control.

- The need of updated technology including electronic procurement, electronic dispensing tool and advanced technologies eases the last mile delivery
- The Government involvement is very crucial for the sustainability of last mile delivery of anti – psychiatric drugs which needs its own legislative guideline, protocol and allocated budget for the system and training of the professionals.

5.4 Limitation and Suggestions for Future Studies

Due to limitation of budget and time the study scope was focused on anti – psychiatric drugs only. In addition, last mile practices, performance and challenges on those public hospitals and in EPSS, Addis Ababa hub only.

It didn't cover some pharmaceuticals supply chain management practices and areas like pharmaceuticals manufacture, importers, custom clearing agents, ports, stakeholders and others. The researcher emphasized and need to know last mile delivery practices in public hospitals and EPSS only. Therefore, detailed analysis of data related to the preparedness is needed for further conclusion. Since literatures are not enough to define last mile related activities especially in health sector of our country it needs further scholar's study.

In addition, comprehensive studies should be conducted to understand the relationship between last mile delivery practices and last mile delivery performance taking a broader range of data, different geographical locations and longer time frames.

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ANNEX: QUESTIONNAIRE

ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE DEPARTMENT OF LOGISTICS
AND SUPPLY CHAIN MANAGEMENT POST GRADUATE PROGRAM

QUESTIONNAIRE

Dear respondents:

I'm a graduate student at Addis Ababa University, School of Commerce, Department of Logistics and Supply Chain Management. Currently, I'm conducting a research entitled with Last mile delivery Practices, Challenges and Performance of Anti-Psychiatric Drugs at the Ethiopian Pharmaceutical Supply Services to Public Hospital in Addis Ababa, Ethiopia as a partial requirement for the award of Master of Art Degree in Logistics and Supply Chain Management. The purpose of this questionnaire is to gather data for the proposed study, and hence you are kindly requested to assist the successful completion of the study by providing the necessary information. I confirm you that the information you share will stay confidential and only used for the academic purpose and the administered questionnaire may take about 10-15 minutes. Hence, your genuine, frank and timely response is vital for the success of the study. I want to thank you in advance for your kind cooperation and dedication of your precious time to fill this questionnaire.

Note:

- No need of writing your name;
- Indicate your answer with a check mark (v) on the appropriate box

- If you need further explanation, I can be reached with the below contact address

I would like to thank you in advance for your participation

Sincerely

Leilina Teshome

E-mail: leilinatesthome22@gamil.com

Phone Number: 0910 892274

PART I: Demographic and Knowledge Information

1. Gender:

Male

Female

2. Age:

18 – 28

29 – 40

Above 40

3. Educational Qualification:

Below Diploma

Diploma

First degree

Masters

PhD and Above

4. Type of organization:

Hospital

EPSS

5. Profession:

Pharmacist

Others

6. Current Position

Store manager

Supply chain Manager

Facility Manager

Others

7. Years of Experiences:

Less than 5 years

5– 10 years

Above 10 years

Part II: Please indicate your level of agreement with the following statements regarding the accomplishments of your company using (√) to the appropriate answer according to the following code of definition.

1= Strongly Disagree (SD) 2=Disagree (D) 3=Neutral (N) 4=Agree (A) 5=Strongly Agree (SA)

Last mile delivery performance						
Delivery cost		1	2	3	4	5
1	The average shipment cost of anti – psychiatric drugs including packaging, transport, insurance, return and preparing cost are affordable by our institution					
2	Our institution Anti-Psychiatric drugs delivery cost is well managed					
3	Delivery cost of anti – psychiatric drugs are reasonable					
Comment:						
Delivery Time		1	2	3	4	5

1	EPSS supplies anti-psychiatric drugs on time					
2	The percentage unit delivered in specified time is consistent					
3	The average delivery time is reliable					
4	Anti- psychiatric drugs are delivered as promised perused in specification of time					
Comment:						
Facility Technology		1	2	3	4	5
1	An Integrated Pharmaceutical Logistics System is in place					
2	Our institution works network analysis with other stake holders for better data optimization					
3	Logistics Management Information System is in place					
Comment:						
Product Mix		1	2	3	4	5
1	Different anti-psychiatric drugs are mixed with caution appropriately while packaging, shipping and delivering					
2	Brands of different anti-psychiatric drugs are properly described with the correct product line					
3	The anti – psychiatric drugs life cycle is appropriately described for cautious delivery					

Comment:

Delivery system		1	2	3	4	5
1	Anti – psychiatric Drugs are been delivered with the preferable mode of freight shipping					
2	Big sized cartoons carrying Anti-psychiatric drugs are been well delivered with caution					
3	Our delivery system obeys of all relevant condition regarding delivery of anti – psychiatric drugs.					

Comment:

Last mile delivery practices						
Transportation		1	2	3	4	5
1	Good pharmaceutical storage is placed on vehicles that are transporting anti - psychiatric drugs					
2	Anti - psychiatric drugs are protected from direct sunlight, humidity and contaminants during transportation					
3	The interior of vehicles and containers remain clean and dry while transporting anti – psychiatric drugs					
4	Our transportation for delivery of anti – psychiatric drugs are free of damage					

Comment:

Distribution		1	2	3	4	5
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1	Our facility is successful in uninterrupted supply of anti-psychiatric drugs					
2	Our facility is successful in reducing wastage of anti-psychiatric drugs					
3	Our facility is supplying/receiving anti-psychiatric drugs with its original quality throughout the distribution process					
Comment:						
Delivery Process		1	2	3	4	5
1	Delivery is done within recommended timeliness					
2	Fast moving and slow moving anti-psychiatric drugs are delivered and reported periodically					
3	Full quantity of the requested anti-psychiatric drugs are delivered to our facility					
Comment:						
Operation		1	2	3	4	5
1	Storage area is visually free from harmful insects and rodents					
2	Fire safety equipment is available and accessible					
3	There is security controlling system in the warehouse with camera and alarms					
4	Drugs are stored at the appropriate temperature to products including cold chain storage					
5	Floor is at convenient for movement of goods					

6	Our institution has established quantification practices with a scheduled work plan and budget.					
Comment:						
Ware house		1	2	3	4	5
1	The ware house of our institution are maintained appropriately					
2	Ware house obeys the standard operating procedures of Ethiopian Food and Drug Administration					
3	The overall ware house process have good communication with every concerned body					

Challenges of the Last mile delivery						
Product related challenges		1	2	3	4	5
1	Anti-Psychiatric drugs aren't delivered on time					
2	Anti-Psychiatric drugs are damaged during delivery process					
3	Quantified amount of anti-Psychiatric drugs aren't accessible from supplier					
4	Different anti-psychiatric drugs being delivered aren't at safe condition					
5	Budget allocated by the government for the last mile delivery of anti-psychiatric drugs are inadequate					
6	Poor Infrastructures while delivering really affects the distribution of anti-psychiatric drugs					
Comment:						

Challenges of the Last mile delivery						
Man power related challenges		1	2	3	4	5
1	Proper training are ready for all our institution supply chain related workers					
2	Our professionals have updated information regarding data collection and report system					
3	Our institution store managers and co-workers are accountable for their own activities					
4	Our institution store managers and co-workers adhere for schedule of requesting and receiving Anti-Psychiatric drugs					
5	Our institution reports are with good quality and well completed					
6	Our institution have enough, adequate skilled and experienced man power					
7	Our institution top management have awareness regarding supply chain activity					
Comment:						

Part III: Interview guide

Please indicate your level of agreement with the following statements regarding the accomplishments of your organization

1. How do you express last mile delivery?
2. What logistics practices is your facility exercising?
3. What is your facilities' best practices regarding the last mile practice?
4. If your facility has best practice of last mile delivery, mention the advantages you get from your experiences?
5. Are you facing challenges in the last mile delivery system? If so what makes it such challenging?
6. If the answer to question number 4 is yes, could you please tell me some general points that make the last-mile delivery smooth?

Any Comment
