



Addis Ababa University School of Commerce  
Logistics and Supply Chain Management Unit

Medicine Reverse Logistics Management Practices and its challenge in  
selected Public Health centres in Addis Ababa

By

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This is to certify that the thesis is prepared by Netsante Diro, entitled, Medicine Reverse Logistics Management Practices and its challenge in selected Public Health centers in Addis Ababa, in partial fulfillment of the requirements for Masters of Arts in Logistics and Supply Chain Management with the regulation of the university.

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## DECLARATION

I declare that “ Medicine Reverse Logistics Management Practices and its Challenges in Selected Public Health Centers in Addis Ababa ” is my original work and that all the sources that I have used have been indicated and acknowledged using complete references.

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## **CERTIFICATE**

This is to certify that the thesis entitles “ Medicine Reverse Logistics Management Practices and its Challenges in Selected Public Health Centers in Addis Ababa” submitted to Addis Ababa University, School of Commerce for the award of the Degree of Masters of Arts in Logistics and Supply Chain Management complies with the regulations of the Addis Ababa University and meets the accepted standards for originality and quality.

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## ABSTRACT

In Ethiopia, out of the total amount of medicines distributed, 4.8 percent were found to be substandard medicines that did not meet appropriate quality standards and/or specifications. Such a significant amount of shortcomings triggers the need to study how expired, damaged, and overstocked items are managed at public health centers. The objective of the study is to assess how public health centers in Addis Ababa manage reverse logistics of medicines, the challenges associated with them, and their implementation status. Systematic random sampling was applied. A descriptive and exploratory research design was employed. Qualitative data from five professionals was collected, and quantitative data was collected through questionnaires, data abstraction formats, and checklists and analyzed using SPSS version 27. The results were presented using descriptive statistics. Based on the findings of this study, it can be concluded that the reverse logistics practice at health facilities is not implemented as per the guidelines of the MOH. 71% of the respondents said reverse logistics was not implemented at their facilities. The unavailability of a policy governing the reverse logistics of the medicine was confirmed by 69% of the respondents. Several challenges are making the implementation of reverse logistics difficult. This is due to the absence of stakeholder collaboration, which makes the practice difficult to implement across the board. Moreover, the absence of proper recording of the implementation status of reverse logistics makes the monitoring aspect difficult. Strategies for designing a proper reverse logistics system in the health supply chain system that would direct better management of expiries and overstocks were suggested. Reverse logistics need to be implemented at all health centers systematically and consistently. Health centers must consider reverse logistics activities in their planning and should correct the problems or challenges they experience promptly.

**Key terms:** Reverse Logistics, Reverse Logistics practice, Health centers Reverse Logistics and Medicines.

## Table of Contents

|  |     |
|--|-----|
| DECLARATION .....  | ii  |
| CERTIFICATE .....  | iii |
| ACKNOWLEDGEMENT .....  | iv  |
| ABSTRACT.....  | v   |
| List of Tables .....   | ix  |
| List of Figure.....  | x   |
| List of Abbreviations and Acronyms .....                               | xi  |
| CHAPTER ONE .....  | 1   |
| 1. Introduction .....  | 1   |
| 1.1 Background of the study .....                                      | 1   |
| 1.2 Statement of the Problem .....                                     | 3   |
| 1.3 Research Objectives.....   | 5   |
| 1.3.1 General Objective of the study .....                             | 5   |
| 1.3.2 Specific objectives of the study .....                           | 5   |
| 1.4 Research Questions.....  | 5   |
| 1.5 Significance of the study .....                                    | 5   |
| 1.6 Scope of the study.....  | 6   |
| 1.7 Limitations of the Study .....                                     | 6   |
| 1.8 Definition.....  | 6   |
| 1.9 Organization of the Study .....                                    | 7   |
| CHAPTER TWO .....  | 9   |
| 2. Related Literature Review.....                                      | 9   |
| 2.1Theoretical Literature Review.....                                  | 9   |
| 2.1.1 Definitions of Reverse Logistics .....                           | 9   |
| 2.1.2 Difference between Reverse Logistics and Forward Logistics ..... | 11  |
| 2.1.3 Reverse Logistics Activities .....                               | 12  |
| 2.1.4 Reverse Logistics Activities in Health Facilities .....          | 15  |
| 2.1.5 Fundamentals of Reverse Logistics .....                          | 17  |
| 2.1.6 Challenges and Driving Forces of Reverse Logistics.....          | 19  |
| 2.2 Empirical Literature Review .....                                  | 23  |
| 2.3 Conceptual Framework.....  | 26  |

|  |    |
|--|----|
| CHAPTER THREE .....  | 27 |
| 3. Research Methodology .....  | 27 |
| 3.1 Introduction .....   | 27 |
| 3.2 Description of the Study Area .....  | 27 |
| 3.3 Research approach.....   | 27 |
| 3.4 Research design .....  | 28 |
| 3.5 Population and Sampling .....  | 28 |
| 3.6 Data Source and Types.....   | 29 |
| 3.7 Data collection procedures .....   | 30 |
| 3.8 Data Analysis .....  | 30 |
| 3.9 Reliability and Validity Test .....  | 31 |
| 3.9.1 Validity .....   | 31 |
| 3.9.2 Reliability.....   | 31 |
| 3.10 Ethical consideration.....  | 35 |
| CHAPTER FOUR .....   | 36 |
| 4. Result and Discussion.....  | 36 |
| 4.1 Introduction .....   | 36 |
| 4.2 Response Rate and Demographic Data.....  | 36 |
| 4.2.1 Sex Distribution of Respondents.....   | 36 |
| 4.2.2 Age Distribution of Respondents .....  | 37 |
| 4.2.3 Educational Level of Respondents .....   | 37 |
| 4.2.4 Work Experience of Respondents.....  | 38 |
| 4.3 Results or Findings (Quantitative finding).....  | 39 |
| 4.3.1 Reverse Logistics Management Practices and Its Challenge in Descriptive Statistics ..... | 39 |
| 4.4 Qualitative Finding .....  | 51 |
| 4.4.1 Medicine reverse logistics practices in Health centers against MOH Guideline .....       | 51 |
| 4.4.2 Medicine Reverse Logistics Challenges.....   | 51 |
| CHAPTER FIVE .....   | 53 |
| 5. Summary of Key Findings, Conclusion, and Recommendation.....                                | 53 |
| 5.1 Introduction .....   | 53 |
| 5.2 Summary of the Key Findings.....   | 53 |
| 5.3 Conclusions .....  | 54 |

|  |    |
|--|----|
| 5.4 Recommendations .....  | 54 |
| 5.5 Limitations and Suggestions for Further Study.....               | 55 |
| References .....   | 56 |
| Annex 1: Questionnaire to experts in Health Center .....             | 61 |
| Annex 3: The AMHARIC version of verbal consent.....                  | 68 |
| Annex 4: List of Public Health Centers where data was collected..... | 70 |
| Annex 5: Copy of Ethical Clearance Letter.....                       | 71 |

## List of Tables

|   |    |
|---|----|
| Table 2.1: The Summary of RL definition.....  | 10 |
| Table 2.1: The difference between RL and forward Logistics,(Farahani, Rezapour, and Kardar, 2011) ..... | 12 |
| Table 2.2: Common Reverse Logistics Activities .....  | 15 |
| Table 2.3: Summary of Empirical Literature on Medicines Reverse Logistics.....                          | 24 |
| Table 3.1: Total Number of Population .....   | 29 |
| Table 3.2: Cronbach's Alpha Statistics for each items .....   | 32 |
| Table 3.3 Total Cronbach' Alpha Statistics .....  | 34 |
| Table 4.1: Gender Distribution of Respondents .....   | 36 |
| Table 4.2: Age Distribution of Participants .....   | 37 |
| Table 4.3: Educational Level of Respondents .....   | 38 |
| Table 4.4: Work Experience of Respondents .....   | 38 |
| Table 4.5: Reverse Logistic practice against MOH guideline .....  | 40 |
| Table 4.6: Reverse Logistics Practices .....  | 43 |
| Table 4.7: Challenges of Reverse Logistics Activities .....   | 47 |
| Table 4.8: Guidelines and Policy .....  | 50 |

## List of Figure

|  |    |
|--|----|
| Figure 2.1: a conceptual framework (own survey, 2023) .....                      | 26 |
| Figure 3.1: Map of Addis Ababa, with Sub-cities .....                            | 27 |
| Figure 4.1: Percent Implementation of Proper Reverse Logistics .....             | 45 |
| Figure 4.2: Percent Availability of Policy Governing the Reverse Logistics ..... | 50 |

## **List of Abbreviations and Acronyms**

|                      |  |
|----------------------|--|
| AACAHB               | Addis Ababa City administration Health Bureaus                 |
| EFMHACA<br>Authority | Ethiopia Food Medicine, Health care Administration and Control |
| EFY                  | Ethiopia Fiscal Year   |
| EPSA                 | Ethiopia Pharmaceutical Supply Agency                          |
| EPSS                 | Ethiopia Pharmaceutical Supply and Service                     |
| IPLS                 | Integrated Pharmaceutical Logistics System                     |
| LMIS                 | Logistics Management Information System                        |
| MOH                  | Ministry of Health   |
| NGO                  | Non-Government Organization                                    |
| RL                   | Reverse Logistics  |
| PFSA                 | Pharmaceutical Supply and Fund Agency                          |
| SOP                  | Standard Operating Procedure                                   |
| UNAIDS               | United Nations Program on AIDS                                 |

# CHAPTER ONE

## 1. Introduction

### 1.1 Background of the study

It is necessary to deliver purchased goods to clients. “A supply chain, in its classical form (forward supply chain), is a combination of processes to fulfill customers’ requests and includes all possible entities like suppliers, manufacturers, transporters, warehouses, retailers, and customers themselves” (Chopra and Meindl, 2013). Reverse logistics is the practice of picking up purchased goods from the client when necessary. Reverse logistics is defined as follows by the American Reverse Logistics Executive Council: “The process of planning, implementing, and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin to recapture value or proper disposal” (1999). Each form of return requires somewhat different kinds of reverse logistics process (JK Business School, 2021).

Reverse logistics has important social, environmental, and commercial, implications for vendors, customers and society at large (JK Business School, 2021). There is a verifiable concern about environmental matters and sustainable development (Fernández, 2003). Activities that help a sustainable environment interest businesses. Because there are environmental issues as a result of the rapid expansion of industrial operations and the unrestricted use of natural resources. Here, the responsibility of the companies is to redesign their activities to prevent those problems (Akdoğan and Coşkun, 2012a). The challenges became worse with the industrial revolution due to the emergence of hazardous waste and materials, the influence on the environment, and the increased demand for the management and disposal of human and animal wastes to ensure the public's health and safety (Donald, 2005).

However, economic factors have also played a role in the rising importance of reverse logistics concerns (Fernández, 2003). Businesses are under pressure from the government

and customers to restructure operational processes including raw material procurement, distribution, and production in an environmentally responsible manner (Akdoğan and Coşkun, 2012a).

Forward logistics involves shipping newly created goods from a facility to numerous distributors or clients. Remanufacturing, recycling, refurbishing, or final disposal of returned goods that are gathered from several customers or collecting points and sent to the producer are all examples of reverse logistics. In reverse logistics, the transportation flows are many-to-one, whereas those in the forward supply chain are one-to-many (JK Business School, 2021).

The procedures a business employs to gather used, harmed, unwanted (stock balancing returns), or outdated products, in addition to the packaging and shipping materials from the end-user or the reseller, would be considered typical reverse logistics tasks (Reddy and Audo, 2011).

Reverse logistics encounter a variety of challenges, such as gatekeeping, waste management, misconceptions, product recalls, transportation challenges, and harm to the pharmaceutical sector. Additionally, it supports managers in raising organizational effectiveness, which reduces financial losses. Since reverse logistics is not given much priority, many organizations lack the procedures and commitment to deal with it (Makaleng and Lambert, 2021).

Reverse logistics in the pharmaceutical sector is crucial from an economic, environmental, and legal perspective (Abbas and Farooque, 2013). Evidence shows that there are unused (expired and leftover) medicines and medical devices across all levels of the supply chain due to various reasons. Providing close-expiry medications, destitute stock administration, the need for information exchange between partners in outside health facilities, and the need for a stock revolution or interchange guideline are some of the reasons for the wastage of products (MOH, 2021b). To increase availability, reduce wastage of health products, minimize safety risks, and reduce the economic cost of

unused medicines a reverse logistics system is needed to be utilized whenever there is. Among the solutions to ensure availability and decrease wastage of products; the development of resource sharing, and reverse logistics are very important (MOH, 2021b). Thus, this study is going to look at the challenges and practices related to reverse logistics implemented in selected Public health centers in Addis Ababa.

## **1.2 Statement of the Problem**

No attention is given to reverse logistics at the public health center, and the current regulation to manage unused medicines for different reasons is not clear and not well understood by reverse logistics practitioners. The country's 'Medicines waste management and disposal directives, 2011' which is not consistently implemented in all facilities dictates how the disposal of medicines must be implemented.

Currently, medicines in Ethiopia are supplied by Pharmaceutical Fund Supply Agency/PFSA and from the market if not availed by the same enterprise. Regarding the distribution of medicines, EPSA has distributed medicines and medical supplies worth ETB 27.6 billion to health facilities (ETB 4.2 billion Revolving Drug Fund (RDF) and 23.4 billion worth of health programs (MOH, 2021a).

An assessment of the wastage rate made by MoH in 2018–2019 shows that 3.9% of medicines worth 57,374,603.59 birrs by value are wasted. According to the same assessment, 81% of government health facilities reported waste ranging from 1.5% to 11%.

To manage unused medicines due to several reasons like expiration, damage, or oversupply, reverse logistics becomes essential to the health supply chain system. However, with the limitation of resources demonstrated in the same enterprise, shortages of some medicines and overstock of others are being prevailed in almost all government health centers. On the other hand, unused products may pose health, environmental, and economic risks. For instance, storing unwanted and expired medications at home increases the risk of misuse, and places children, seniors, and pets at risk for accidental poisoning. Improper disposal of expired/unwanted medication may also contaminate

surface water, groundwater and even drinking water which is very costly and harmful to the environment (MOH, 2021b).

Despite the measures taken by the Addis Ababa City Administration Health Bureau to ensure the effectiveness of the supply chain and the constant availability of medicines, substantial amounts of medicines have been out of use at health facilities, which has caused a stockout of some products. On the other hand, some facilities have reported having too many medicines on hand. Due to the high expense associated with medicines expiring, this has been a problem in the supply chain. Therefore, it is important to think about the right methods of managing reverse logistics for medicines in public health facilities, with a focus on overstocks and the prevention of expiration.

The AACAHB periodically performs supporting supervision at lower-level health centers to ensure that decisions about stock imbalances are anticipated and appropriately addressed. However, reports from health centers show that stock optimization is not being done due to resource constraints, and most health personnel at the facility level cannot determine overstock. In addition, almost all facilities have not made decisions regarding what to do with these medications. In previous years, it was noted that some facilities were in short supply of some medicines while other facilities were overstocked with the same medicines. This indicates that an opportunity was missed to optimize resources before expiring.

These all shortcomings trigger the need to study the management of unused medicines due to several reasons, like damaged, expired, and overstocked medicines, at public health centers and suggest strategies for designing a proper reverse logistics system in the health supply chain system that would direct better management of expiries and overstocks. This has forced health centers to compromise or look for alternative procedures for the disposal of medicines because there is no standard way of doing it. Therefore, the study has gone through how public health centers in Addis Ababa manage reverse logistics of medicines, the challenges associated and its implementation status.

### **1.3 Research Objectives**

#### 1.3.1 General Objective of the study

- To assess medicine Reverse Logistics Management practice and its challenges at selected public health centers in Addis Ababa

#### 1.3.2 Specific objectives of the study

- To examine the current status of Reverse Logistics in selected public health centers in Addis Ababa
- To identify the gap between Medicine Reverse Logistics Implementation status and MOH guidelines in selected public health centers in Addis Ababa
- To identify the challenges involved in implementing Medicine Reverse Logistics in selected public health centers in Addis Ababa

### **1.4 Research Questions**

The following research questions are being addressed by this study:

- How is reverse logistics practiced in selected public health centers in Addis Ababa in terms of its activities and processes?
- In what status is the reverse logistics Implementation in selected public health centers against MOH guidelines?
- What are the possible challenges faced by the the selected health facilities in Addis Ababa in terms of implementing reverse logistics?

### **1.5 Significance of the study**

A reverse logistics system is utilized whenever there is a need to increase availability, reduce the wastage of health products, minimize safety risks, and reduce the economic cost of unused medicines and medical devices. This study provides baseline information on how reverse logistics is being managed, challenges observed and its implementation status in AACAHB against country's guideline & directive on the subject. The study findings will be shared with different stakeholders who are involved in managing supply chain specifically reverse logistics. Furthermore, this study might initiate interest in further research on this topic so as to improve the problems observed in public health facilities in Addis Ababa.

## **1.6 Scope of the study**

The scope of the study was to assess the practice of reverse logistics of medicines in Addis Ababa Public Health Centres. 101 health centres provide services for the residents of the city under AACAHB. Out of these populations, 15 health facilities were selected as per the sampling procedure mentioned in Chapter 3.5 for this study. The study did not include Hospitals, Private and NGO health facilities due to time and budgetary constraints.

## **1.7 Limitations of the Study**

Due to variables under consideration, and resource limitations, this study was conducted at public health centers that are under Addis Ababa City Administration Health Bureau. The study did not include hospitals, private and NGO health centers due to time and budgetary constraints. Finally, the study did not consider other factors that are most often associated with the efficiency of reversal logistics in terms of societal conditions, financing, and policy related to government.

## **1.8 Definition**

**Supply chain management:** it includes the planning and management of all activities involved in sourcing and procurement and all logistics management activities (PFSA, 2017). Supply chain management is the coordination of production, inventory, location, and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served (Ferguson and Souza, 2010).

**Public Health facilities:** these are health facilities owned by the government of Ethiopia and managed under FMOH or regional health bureau.

**Medicine:** “any substance or mixture of substance used in the diagnosis, treatment, mitigation or prevention of human disease, disorder, abnormal physical or mental state, or the symptoms thereof; used in restoring, correcting or beneficial modification of organic or mental functions in human; or articles other than food, intended to affect the structure or any function of the body of human and it includes articles intended for use as a component of any of the above specified article” (Food and Medicine Administration, 2019,pp.11101)

**Pharmacy professional:** “a pharmacist, druggist, or pharmacy technician licensed by the appropriate health professional regulatory organ”(Food and Medicine Administration, 2019,pp.11102).

**Inventory Control System:** “ is a system designed to inform personnel when and how much of a pharmaceutical to order and to maintain an appropriate stock level to meet the needs of patients” (PFSA, 2017,pp.17).

**Integrated Pharmaceutical Logistics system:** “ is the single medicines reporting and distribution system based on the overall mandate and scope of the EPSA. It aims to ensure that patients always get medicines they need. To be successful, the system must fulfil the six rights of supply chain management by ensuring the right products, in the right quantity, of the right quality, at the right place, at the right time and for the right cost ” (PFSA, 2017,pp.1).

**Pharmaceutical:** “means any chemical product, vaccine or anti-allergenic (including any product with the primary purpose to dispense or deliver a chemical product, vaccine or anti-allergenic), not containing a radioactive component, that is intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease or injury in man or other animals; or any chemical product, vaccine or anti-allergenic (including any product with the primary purpose to dispense or deliver a chemical product, vaccine or anti-allergenic), not containing a radioactive component, that is intended to affect the structure or function of the body in man or other animals” (Newyork, 2014, pp.1)

### **1.9 Organization of the Study**

The study is organized into five chapters. It has an introductory part, literature review, methodology, result & discussion, and conclusion & recommendation. The introductory chapter contains the background of the study, statement of the problem, research question, research objectives, significance of the study, scope of the study, and definition of terms. The review of relevant literature on theoretical, empirical, and conceptual frameworks is covered in the second chapter. Research design, population, and sampling design, data collection methods and tools, data analysis, validity and reliability, and ethical consideration are all covered in the third chapter. The presentation, analysis, and

discussion of findings are covered in the fourth chapter. The summary, conclusions, and recommendations are covered in the fifth chapter.

## CHAPTER TWO

### 2. Related Literature Review

#### 2.1 Theoretical Literature Review

##### 2.1.1 Definitions of Reverse Logistics

The concept of reverse logistics is relatively new, even in public health practices, on which the study is centered, it has been described in several different ways, but they all broadly address the same problems. Some of these include:

Reverse logistics is defined by The Council of Logistics Management (1992) as “the term often used to refer to the role of logistics in recycling, waste disposal, and management of hazardous materials; a broader perspective includes all relating to logistics activities carried out in source reduction, recycling, substitution, reuse of materials and disposal.”

According to the American Reverse Logistics Executive Council, reverse logistics is defined as “The process of planning, implementing, and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin to recapture value or proper disposal” (Tibben-Lembke and Rogers, 2002) has defined reverse logistic in a precise way which is “the process of moving goods from their typical destination to capture value or proper disposal”.

The Council of Logistics Management (CLM) defines Reverse logistics as the “term often used to refer to the role of logistics in recycling, waste disposal, and management of hazardous materials; a broader perspective includes a relating to logistics activities carried out insource reduction, recycling, substitution, reuse of materials, and disposal” (Jamshidi, 2011).

Reverse logistics was defined by (Rogers et al 1999) emphasizing and outlining the purpose and procedures involved as “the process of planning, implementing, and controlling the efficient, cost-effective flow of raw materials, in-process inventory finished goods and related information from the point of consumption to the point of origin for the sake of recovering value or proper disposal.” On the other hand,(Kabir, 2013) described reverse logistics as “ the process of moving products from the final

destination back to the source”. Management of expired medicines must be closely monitored to ensure they are handled properly after leaving their control and ensure a secure chain of custody. On the other hand (Fernandez, 2003) expressed a more holistic approach to Reverse Logistics that includes the reduction of materials in the forward system in such a way that fewer materials flow back, reuse of materials is possible, and recycling is facilitated”. The fact of reducing materials used in the processes is according to some authors (Tibben-Lembke and Rogers, 2002) considered as Green Logistics and not Reverse Logistics, although the same authors agree in that the bound line between both concepts is not always clear.

**Table 2.1: The Summary of RL definition**

| Author(s)                   | Definition  |
|-----------------------------|---|
| (Stock, 1992)               | “The role of logistics in recycling, waste disposal and management of hazardous material; a broad perspective includes all issues relating to logistics activities carried out in source reduction, recycling, substitution, reuse of materials and disposal”                           |
| (Dekker et al., 2004)       | “a process which encompasses the logistics activities from used products no longer required by the user to products again usable in a market”   |
| (Krikke, 1998)              | “The collection, transportation, storage, and processing of discarded products”   |
| (Rogers&Tibben-Lembke 1998) | “The process of planning, implementing, and controlling the efficient, cost-effective flow of raw materials, in- process inventory, finished good and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal” |
| (Dowlatshahi, 2000)         | “a process in which a manufacturer systematically accepts previously shipped products or parts from the point for consumption for possible recycling, remanufacturing or disposal”  |

|                       |  |
|-----------------------|--|
| (Dekker et al., 2004) | “a process of planning, implementing and controlling the efficient, effective inbound flow and storage of secondary goods and related information opposite to the traditional supply chain directions for the purpose of recovering value and proper disposal” |
|-----------------------|--|

Source: (Vahabzadeh and Yusuff, 2015, pp 338)

Reverse logistics helps in recapturing or increasing value and for proper disposal. Value recovery for damaged or expired medicines is typically not attainable at health centers.

### 2.1.2 Difference between Reverse Logistics and Forward Logistics

Reverse logistics recovers the value of products, parts, and materials returned by end users. On the other hand, (traditional) forward logistics deals with the flow of products from the manufacturing site to the consumer. Reverse logistics processes typically include returns, recalls, and repairs, repackaging for replenishment or resale, recycling and disposal. Forward logistics includes direct order fulfillment, hub services, pick-up and packing services, and shipping. Retailers and e-commerce companies use forward logistics to get products to their customers, but not all use reverse logistics (ProLogis, 2022).

Forward logistics is used to manage the forward movement of goods from raw materials to consumers. Value is added to the product as it passes through each stage of its journey to the end user. Forward logistics diversifies the farther from raw materials. In other words, raw materials may only be found in limited locations around the world, but the final product must be delivered to each customer's home or place of business. Customer demand determines the proportion of forward logistics, and inventory is maintained at each stage to accommodate fluctuations in that demand (Pival, 2019).

Reverse logistics is used to manage the “reverse” movement of goods from the end user to the manufacturer and then back to the raw material through recycling. Reverse logistics must collect used products from many points and converge to return them to one or more production sites. The speed of reverse logistics is entirely dependent on supply.

Many product returns can make them busier and faster, but a lack of product returns can make the logistics stop entirely. The value of a product going through reverse logistics declines at each stage as costs rise due to the added materials handling requirements, (Pival, 2019).

**Table 2.1: The difference between RL and forward Logistics,(Farahani, Rezapour, and Kardar, 2011)**

| In Reverse Logistics   | In forward logistics:   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Prediction is more difficult.</li> <li>2. Transportation is many to one.</li> <li>3. Product quality and packaging are not uniform.</li> <li>4. Disposition and destinations and routing are unclear.</li> <li>5. Deviation based on the channel.</li> <li>6. Many items determine to price.</li> <li>7. Measuring reverse expenses usually is impossible.</li> <li>8. Inventory management is not congruous.</li> <li>9. Estimation of the product life cycle is more difficult.</li> <li>10. Extra discussion brings about complexity in transactions.</li> <li>11. The process is invisible.</li> <li>12. Complexity in marketing.</li> </ol> | <ol style="list-style-type: none"> <li>1. Prediction is relatively straightforward.</li> <li>2. Transportation is one to many.</li> <li>3. Product quality, packaging, and pricing are relatively uniform.</li> <li>4. Destination, routing, and disposition options are clear.</li> <li>5. There is a standardized channel.</li> <li>6. Accounting systems closely monitor forward distribution expenses.</li> <li>7. Inventory management is congruous.</li> <li>8. The product life cycle is controlled.</li> <li>9. Transactions between parties are straightforward.</li> <li>10. Real-time data is easily available to track products.</li> <li>11. There are clear marketing methods.</li> </ol> |

### 2.1.3 Reverse Logistics Activities

While the concept of reversed logistics has become more widely accepted, there is very little information on its size and scope in practice: How does reversing logistics work?

What are the companies doing in this area and why? The how viewpoint deals with how value is recovered from the products that are returned to the manufacturer (Rogers and Tibben-Lembke, 2001). Recovery is one of the activities which are involved in a reversal logistics process. There's the collection, there's the combined inspection selection and sorting process, there's the recovery, and there's the redistribution (Misganaw, 2020).

Activities undertaken by businesses to collect used, damaged, unwanted or obsolete products, packaging, and shipping materials from end-users or resellers can be considered reverse logistics activities. When products are sent back to a company, the company has to choose from many discarding alternatives (Rogers and Tibben-Lembke, 2001).

According to (Rogers and Tibben-Lembke, 2001), all supply chain tasks within a company are called reverse logistics, including the following activities: Remanufacturing, Refurbished, Recycled, Landfilled, Repackaged, Returned, Collected. As part of implementing reverse logistics, faulty product flows are subject to traditional logistics operations such as transportation, storage, and warehousing. However, they are complemented by specific processes relating to decisions regarding the collection, collection, management, classification, and subsequent disposal of returns (Starostka-Patyk, 2019).

A company may engage in a number of operations with respect to returned products under the idea of reverse logistics, including the necessity to determine potential locations for the returned products (i.e. manufacturing lines, delivery, assembly lines). Reverse logistics activities include a number of possibilities because of the variety of reverse flow products, including reuse, restoration, refurbishment, reclamation, cannibalization, and recycling (Akdoğan and Coşkun, 2012a).

(Lee *et al.*, 2013) suggest that the following be considered in reverse logistics at healthcare facilities: Mapping returns flows, specifying standard times for returns, defining returns costs, determining physical inventory locations. As with logistics, transportation also plays an important part in RL. Reliable shipping, hence, helps medical facilities manage inventory more effectively, as products that need to be reversed to suppliers can be transported efficiently. A key decision a company must make when processing returns is product disposal. As companies create more and more "dead"

products, they are looking for ways to extract more value from those products. These products may not be sold at retail prices, but demand may exist at lower prices. As such, items not sold at retail prices may appear in outlet stores and aftermarkets (Rogers and Tibben-Lembke, 2001). The collection of returned defective goods entails obtaining the entire product, its parts, and components from the end users. These items are then subjected to additional recovery procedures in an effort to regain the product's worth. This process is especially important for reverse logistics because defective product returns are disreputable for having a high level of uncertainty about when they will be used. It is also impossible to predict when a product will go from being a fully functional product to one that is defective and supplied to the reverse flows as a return (Dekker *et al.*, 2004).

Reverse logistics can be divided into two general areas based on whether the reverse flow consists primarily of products or packages. Products can be in reverse flow for a variety of reasons such as remanufacturing, refurbishment or returned by a customer. Packaging materials typically backflow because they can be reused (such as pallets or plastic containers) or because disposal is restricted by regulations (like corrugated paper). Both products and packaging can be recycled or landfilled, but when reused, they can go through different processes/activities as shown in the table below (Rogers and Tibben-Lembke, 2001).

**Table 2.2: Common Reverse Logistics Activities**

| Material  | Reverse Logistics Activities  |
|-----------|---|
| Products  | <ul style="list-style-type: none"><li>• Return to supplier</li><li>• Resell</li><li>• Sell via outlet</li><li>• Salvage</li><li>• Recondition</li><li>• Refurbish</li><li>• Remanufacture</li><li>• Reclaim materials</li><li>• Recycle</li><li>• Donate</li><li>• Landfill</li></ul> |
| Packaging | <ul style="list-style-type: none"><li>• Reuse</li><li>• Refurbish</li><li>• Reclaim materials</li><li>• Recycle</li><li>• Salvage</li><li>• Landfill</li></ul>  |

#### 2.1.4 Reverse Logistics Activities in Health Facilities

To offer comprehensive medical treatment, medicines must be easily accessible and of the necessary quality and quantity. In spite of this, the country's pharmaceutical supply chain has suffered from different problems in the past, such as unavailability, inaccessibility, poor inventory management, and irrational use. To solve these problems in public health facilities, the Pharmaceuticals Fund Supply Authority (PFSA) was established in 2007 by Proclamation No. 553 of 2007 under the Medicines Logistics Master Plan (PLMP).

The agency is responsible for ensuring the sustainable availability of affordable, standard medicines to all health centers and their appropriate and sustainable use. The Integrated Pharmaceutical Logistic System ("IPLS") has been created and put into use since 2010 in order to make delivery of medicines efficient and effective. IPLS is the term used for the individual drug reporting and distribution system under the overall authority and responsibilities of the PFSA. The aim is to ensure that clients always have access to the drugs they need. For the system to be successful, it must satisfy all criteria of supply

chain management so that you can ensure the right product at a reasonable price and at the appropriate time.

In accordance with national government procurement policies and proclamation of drug funds and supply agencies, the pharmaceutical supply management unit procure the required drugs and evaluate their performance. All medical facilities should preferably be purchased through EPSA and payment may be made by credit/cash based on a contract between EPSA (EPSA Hub) and the facility. During procurement, all transactions must follow the principles of Good Pharmaceutical Procurement Practices and Procedures. Whenever medicines are not available at EPSA and an out of stock is secured from the agency, procurement from private suppliers on request for quotation, restricted tendering, open bidding, and direct procurement can be considered as per the conditions set by the public procurement agency of Ethiopia. Additionally, for products that cannot be supplied by EPSA, but their timely purchase and delivery are critical for the health facilities services, the facilities may consider establishing preferred supplier arrangements as an option each year by signing flexible framework agreement. This process of selecting preferred supplier(s) should be done in open bid and competitive process (MOH, 2016).

The forward direction of the supply chain to the end user is clear, but the reverse logistical side is not. Given the challenges facing AACAHB, let's see how facilities are handling expired items. Handling of expired medicines at AACAHB begins with health centers collecting expired products from display and sending them to district healthcare facilities for disposal. The district health facilities compile the list for all expired medicines and sends a request to the Ministry's pharmaceutical section seeking authorization to dispose the products (FMHACA, 2012). However, there is clearly no central databank and the paperwork of the discarded products is not secured appropriately.

Expiry of medicines are a common challenge in most countries. In Uganda, a large number of medicines are expired in pharmacy stores, district stores and health facilities across the country. Similar problems have been reported from Botswana, India and Tanzania. (Nakyanzi *et al.*, 2010). "Reuse", "recycling", and "disposal" are the three

primary reverse logistics operations that healthcare facilities should implement in order to preserve the quality of medicines (Abbas and Farooque, 2013). Reverse logistics' significance in the pharmaceuticals is also covered in this study from an economic, environmental, and legal standpoint. Some important considerations are return safety, reduce costs through automation and traceability of goods returned by customers until final disposal.

The overall conclusion is that developing an effective Reverse logistics process has proven to have significant economic and operational benefits for the National Health Service (NHS) and other organizations (Ritchie *et al.*, 2000).

### 2.1.5 Fundamentals of Reverse Logistics

#### 2.1.5.1 Why considering Reverse Logistics

In recent years, rising environmental concerns, legislation, corporate social responsibility, and sustainable competitiveness have made reverse logistics (RL) an important area for all organizations (Agrawal, Singh, and Murtaza, 2015). There are many reasons to implement or operate RL. The most important ones are:

- Economic direct reasons: decreasing the use of raw materials, reducing disposal costs, creating added value for end-of-use products, and indirect reason demonstration of environmentally responsible customer behavior, improved customer relations
- Legal: Companies are responsible for the recovery or appropriate removal of waste created by-products produced and distributed in a wide range of Member States within the European Union.
- Social: Increased public awareness of the importance of protecting the environment has led to increased pressure on companies, especially in terms of carbon emissions and waste generation, to take steps toward environmental responsibility (Rubio and Jiménez-Parra, 2014).

RL has become an interesting topic for companies and experts who consider the recovery of end-of-life products as a business opportunity, and who are going to take these activities on board in their strategy decisions (Rubio and Jiménez-Parra, 2014). Reverse logistics has increased the image of companies that are doing business with it in certain

sectors. For instance, a customer buys an item and notes at home that it's defective. Companies that operate under a -client-oriented reverse logistics would be willing to return the products and offer their customers another choice. This gives the company an advantage, as most of its customers would have chosen to trade with it, as opposed to a company with a clear mark on the goods sold, which cannot be returned. The implementation of reverse logistics at healthcare facilities can also improve corporate image among the patients and other clients by providing them with quality products that lead to good health care.

(Khan and Subzwari, 2009) emphasizes that companies take pride in themselves if they protect the environment and minimize the environmental impact of their supply chains, of which RL has a significant importance. In addition, they emphasize that the company's image is an important factor in competition. That's one of the crucial factors for doing RL. To remain competitive, they follow a liberal return policy for their customers as part of the customer service companies. Similarly, in the absence of a sufficient budget for medicines, the AACAHBs pharmacy supply chain system should take advantage of profits from reverse logistics to limit possible losses caused by expired or damaged medicinal products.

Several reasons that force businesses to implement a reverse logistics system are regulatory requirements related to the collection or return of goods. For instance, if a pharmaceutical corporation learns that a particular product has a flaw that may endanger people, the product must be recalled for re-manufacturing or proper disposal to avoid legal repercussions. As a result, all products manufactured may be recalled from the regulatory point of view due to manufacturing defects, expiration, safe disposal, or recycling. In the case of all products produced, once their life is over, they are deemed to be discarded and what happens next has a bearing on RL.

A reverse logistics strategy is very important when dealing with product recalls. This is especially true for products that pose a health and safety risk to the public and must be returned to the supplier or manufacturer. Allocating the resources to quickly scale supply chain operations to deal with a high rate of returns, can keep the impact of recalls to a minimum.

Some researchers have argued that medicines require meticulous storage and transportation, and not many other products, such as snow blowers and sneakers. The requirement for temperature-controlled transportation is another important issue. For many medicines, a temperature change of 2 degrees Celsius will spoil the entire batch. A good example is the live attenuated cholera vaccine. The shelf life is 1 year when stored at 2-8°C. But at room temperature, its shelf life is seven days (Abbas and Farooque, 2013)

Once a company develops standardized operational processes and returns management capabilities, it can be used as a competitive weapon. To create an effective rear logistics network several tradeoffs need to be taken into account. These trade-offs include centralized versus decentralized sorting and testing, dedicated dismantling plants and in-plant remanufacturing, and company-specific and industry-wide collection systems (Tan *et al.*, 2016). Good reverse logistics management not only reduces costs but also increases sales. Although it is sometimes jokingly called junk, there is a lot of value to be gained from managing the reverse flow cost-effectively. Efficient handling and disposal of returned products are unlikely to be a major basis for a company's competition, but it can make a competitive difference.

In some cases, reverse logistics can be strategic. Good reverse logistics practices can increase a company's competitiveness by reducing customer risk when purchasing products. Customers know that products can be easily returned. Most customers prefer risk mitigation and consider transaction risk when choosing a supplier. Reverse logistics can also help your company become more agile. The majority of companies do not sell their stock in line with expectations. Their ability to succeed on the market will increase as long as they can quickly sell this material and maybe even recover a portion of their costs (Rogers and Tibben-Lembke, 2001).

#### 2.1.6 Challenges and Driving Forces of Reverse Logistics

##### 2.1.6.1 Technical Challenge

The problem of predicting the return period for products is one of the main challenges encountered by reverse logistics, which differs from forward logistics. An object may be tracked through every step until it reaches the last customer, as part of a conventional

forwarding supply chain. Because every stakeholder at all levels of the supply chain cooperates, it enables one to keep track of the product and make sure it reaches its destination on time. For reverse logistics, a customer needs to be waiting until he introduces the used product back onto the reverse channel and this is not convenient for planning his cover. One of the main reasons for the industry's lack of implementation of reverse logistics is technical difficulties. It is frequently difficult to deal with these, and a limited range of solutions tends to be very costly which can lead to problems for the economy. Products, networks, and associated materials can be classified as technical difficulties (Amico, 2021).

Manufacturers face the challenge of predicting the quality of returned materials. They are subject to prolonged use and exposure to external influences and can be damaged as a result. It is easy to apply the identification method implementation in the forward supply chain as the customer is not involved, but the same solution is not valid in reverse logistics. The biggest challenge is implementing product tracking technology to fill the information gap. Another technical issue in reverse logistics concerns network structure. The returns process should be set according to the company's needs and financial capabilities (Amico, 2021).

Another problem in implementing reverse logistics is the lack of a reverse logistics information system. There are several reasons why there aren't many good reverse logistics systems. Most returns processes are paper intensive. In addition to inadequate programming resources, the reverse logistics process has so many exceptions that it is difficult to automate. Reverse logistics is generally carried out by companies or units of a company across borders. The problem is becoming even more complex with the development of systems that work across borders. The reverse logistic information system must be adaptable for its effectiveness (Rogers and Tibben-Lembke, 2001).

#### 2.1.6.2 The Economic Challenge

A key challenge in implementing a reverse logistics system is the economic aspect. Many industries are reluctant to do so because creating a reverse supply chain would require restructuring a well-run process, which could threaten sales. The biggest obstacle in implementing a reverse logistics solution is its importance compared to other topics. For

many companies, it just didn't justify large-scale investments to improve their reverse logistics systems and capabilities. At least not as a priority. (Rogers and Tibben-Lembke, 2001). The challenge that the industry has to face is the high cost of reverse logistics specialists and qualified employees due to a lack of expertise. Moreover, adaptation to the environment is costly and new machinery or work equipment is required to implement well-organized reverse logistics.

A final major economic challenge in reverse logistics concerns the marketing area. The industry must be able to rely on customers' willingness to pay for remanufactured, recycled, or reused products. To achieve better financial results through reverse logistics, this issue needs to change. Another marketing issue concerns the cannibalization of new products. Selling restored items may affect sales of newer versions. For smartphones, for example, selling a refurbished product at a lower price can convince buyers of an expensive new product.

#### 2.1.6.3 The Legislative/political challenge

A legal driver is a jurisdiction that stipulates that a company must recall or withdraw a product. Strict environmental laws reflect increased producer responsibility, so companies have the right to recycle or take back their products. Companies are no longer responsible for the entire product lifecycle (Akdoğan and Coşkun, 2012b).

Political challenges in reverse logistics are often closely related to and sometimes overlap with financial and social challenges. Above all, social values are the driving force behind implementing solutions to political problems. These can be divided into legal, operational, and strategic challenges. National differences are reflected not only in law but also in expertise.

Operational challenges are primarily related to the lack of government and political support for companies implementing reverse logistics. Lack of guidelines, rules, and procedures for handling used products. One of the major policy challenges in implementing a reverse logistics network, caused by a lack of understanding of this issue, is the difficulty in obtaining the necessary permits and operating locations for testing and sorting. As remanufacturing has the potential to limit climate change, it is in the interest

of society as a whole, so companies should help and support the construction of recycling systems in terms of infrastructure and licensing.

Many political difficulties can be classified as strategic. Reverse logistics is not yet an established process in today's supply chain and therefore not integrated into the business plans of many companies.

#### 2.1.6.4 Environment and Sustainable Development Challenges

On the one hand, there are environmental concerns and obvious concerns about sustainable development. In this sense, many countries have enacted some legislation, with Germany (regulations on packaging and take-back of electronics) and the Netherlands (strict motor vehicle laws) probably being the pioneers. However, its influence spread rapidly to Europe, America, Japan, and elsewhere (Fernández, 2003).

The process by which businesses can become more environmentally friendly through recycling, reuse and the use of fewer materials is called reverse logistics. In other words, it should be viewed as a reverse distribution of goods among the members of the channel. A more holistic view of reverse logistics involves using less material in the forward system, less material flowing back, enabling material reuse, and facilitating recycling" (Fernández, 2003).

As a tool and as a process, reverse logistics is a technology that creates an instantaneous system of enterprise functions, creates favorable conditions for cooperation with suppliers, intermediaries, dealers, and distributors, and creates a coordinated flow within the enterprise. form a suitable consumer loyalty with a high level of logistics services, (Lukic and Zekic, 2019)

The biggest social challenge associated with reverse logistics is how to get customers closer to remanufactured products. Consumer willingness and awareness to pay for reverse supply chain products remains low.

#### 2.1.6.5 Management of Expired, Recalled, or Returned Product

As (Nwachukwu *et al.*, 2013) suggest, it is important to have clear guidelines for the management of unused medicines in healthcare facilities. The policy should clearly outline waste segregation, treatment, storage, and disposal at the end, as well as how healthcare professionals should handle each phase. This allows healthcare facilities

to implement the system (Nwachukwu *et al.*, 2013). In addition, it suggests that health waste disposal plans should be developed and relocation or redistribution plans should also be followed to mitigate medical or pharmaceutical disposal problems. And all of this is achieved when there is a dedicated medical staff to facilitate the management of relocation and proper removal.

Nowadays, it is understandable how crucial reverse logistics management is. Misshipped, expired or damaged products should be promptly recalled and substituted with salable products to avoid sales disruptions. To avoid legal complications, it is imperative to ensure that all expired medications are completely removed from the channel (Khan and Subzwari, 2009). However, most public health facilities do not have clear guidelines for managing unused products, so the system is not clear. In addition to regulatory requirements, other important factors that influence medical device disposal alternatives are the facility's available area, accessibility of disposal, and cost. For example, some facilities use flush down to the sewer as their first choice of disposal method due to its ease and accessibility.

According Alzahrani (2014) "most government and other hospitals in developing countries agree that they are suffering from growing size of medical waste". They struggle to come up with effective ways to get rid of hazardous medical waste produced by hospitals. It's possible to cause infectious diseases. Such wastes are also easily tampered with or transferred to municipal rubbish into landfills when they are carelessly placed in front of hospitals and left in the open. It is not healthy and can hurt citizens. There is an urgent need to eliminate the disposal problem of these hazardous wastes through advanced technology and special modern facilities. Also, integrated environmental management of hospital hazardous medical waste should be implemented, these wastes should be safely disposed of, and these wastes should be accessed and prevented.

## **2.2 Empirical Literature Review**

Most researchers, especially in Ethiopia, have not yet identified the issue of back logistics practice with sufficient attention. Concerning exposure, there are a limited number of researchers who carried out an investigation in the area of pharmaceutical reverse

logistics into public health. Nevertheless, the researcher discovers six studies on RL practices in various industries and nations. These are:

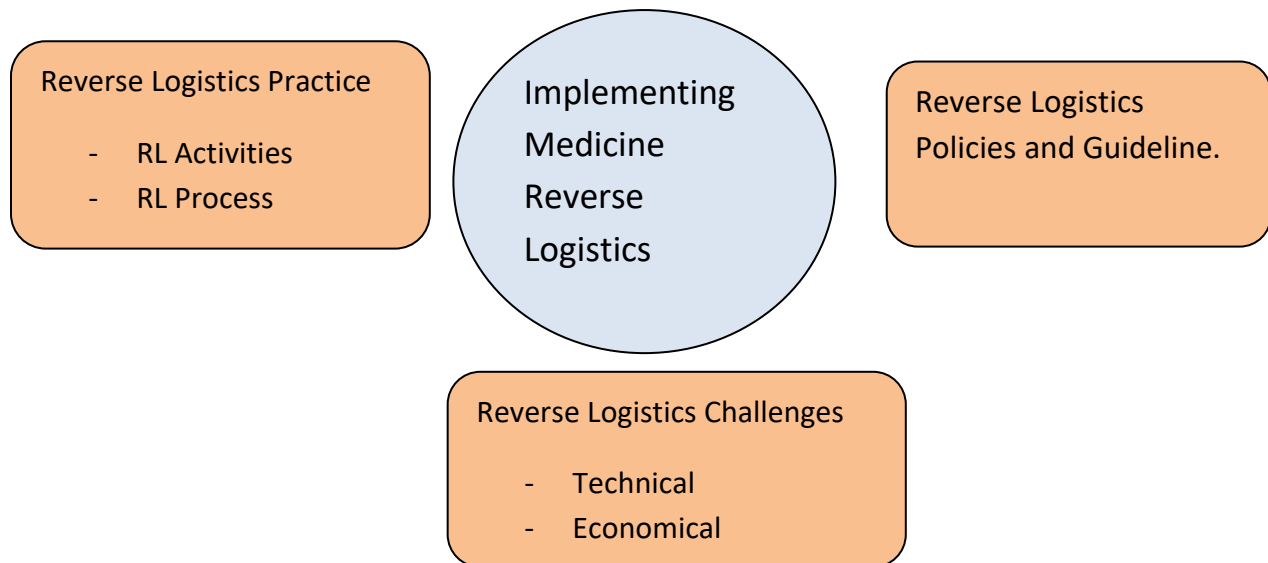
**Table 2.3: Summary of Empirical Literature on Medicines Reverse Logistics**

| S/N | Title and Author  | Objective of the study  | Major Findings   |
|-----|---|---|--|
| 1   | “Assessment of medicines wastage and its contributing factors in selected public health facilities in South West Shoa Zone, Oromia Regional State, Ethiopia”<br>By: EsayasTadesse | to determine medicines wastage rate and to identify its contributing factors  | Quantification of medicine waste   |
| 2   | “Return and disposal of unused medicine: A customer perspective of Reverse Logistics”<br>By: Haidar Abbas & Jamal A Farooque  | Exams some key issues of reverse chains in India Medicines from a customer perspective                                  | The return rate of medicines by customers in India.  |
| 3   | “Medications reverse logistics: A systematic literature review and a method for improving the Brazilian case”<br>By: Pedro A., Fernanda, &Thalita                                 | To study medication waste concerns from environment & public health   | Proposal of a better reverse logistics system  |
| 4   | “Analyzing pharmaceutical reverse logistics barriers an interpretive structural modeling approach”<br>By: Chehab Ali &AlaaAbdelsalam  | To explore the barriers affecting the application of reverse logistics at leading pharmaceutical manufacturers in Egypt | The study reviled as many as 17 reverse logistics barriers are affecting the case company in implementing reverse logistics. |
| 5   | “Reverse logistics in Morocco: The case of Hospitals”<br>By: Monsif B, Abdellatif& Mohammed   | Exploring the methods of drug distribution and control to reorganize the supply chain.                                  | Building a reverse logistics management system with the implementation of traceability.                                      |
| 6   | “Reverse logistics in Pakistan’s pharmaceutical sector”<br>By: Asma Khan and Masood S.  | To see the economic impact of implementing reverse logistics.   | Retrieve medicines have lost their value while in sales centers  |
| 7   | “Drivers of reverse logistics   | To explain drivers of reverse   | There are significant  |

|    |  |   |  |
|----|--|---|--|
|    | activities: An empirical investigation”<br>By: Akdogan, M.S. and Coskun, A.  | logistics   | differences of the factors that affect producers’ reverse logistics activities between firms.  |
| 8  | “Assessment of medicine reverse logistics management Practice in Selected Puplic hospitals in Addis Ababa, Ethiopia”.<br>By: Wendesen Misganaw | To assess the current practices of reverse logistic management of medicines in public hospitals under AARHB.            | The overall existing unfit medicines management practice in public hospitals with respect to collection, storage, transportation and disposal is poor.   |
| 9  | “Evaluation of Reverser logisitics in challenges within the manufacturing pharmaceutical companies”<br>By: Makaleng, M.S.M and Lamber, K.R.    | To examine reverse logistics challenges in manufacturing pharmaceutical companies in the city of Tshwane (South Africa) | Manufacturing pharmaceutical companies face variety of challenges; Such as lack of skills and skill transfer, transport and gatekeeping (amongst other), when dealing with reverser logistics. |
| 10 | “The concept of reverse logistics. A review of Litrature”<br>By: Isabel Fernandez Quesada  | To provide a review of reverselogisticsfrom a broad set of articles published mainly in the last decade.                | Provided a reasoned characterization of new part of the logistics.   |

**Source:** Collected from empirical evidence.

## 2.3 Conceptual Framework



**Figure 2.1: a conceptual framework (own survey, 2023)**

The Conceptual framework was developed by consulting MoH guideline, drivers of reverse logistics activities, Management of closed loop supply chain and framework for reverse logistics.

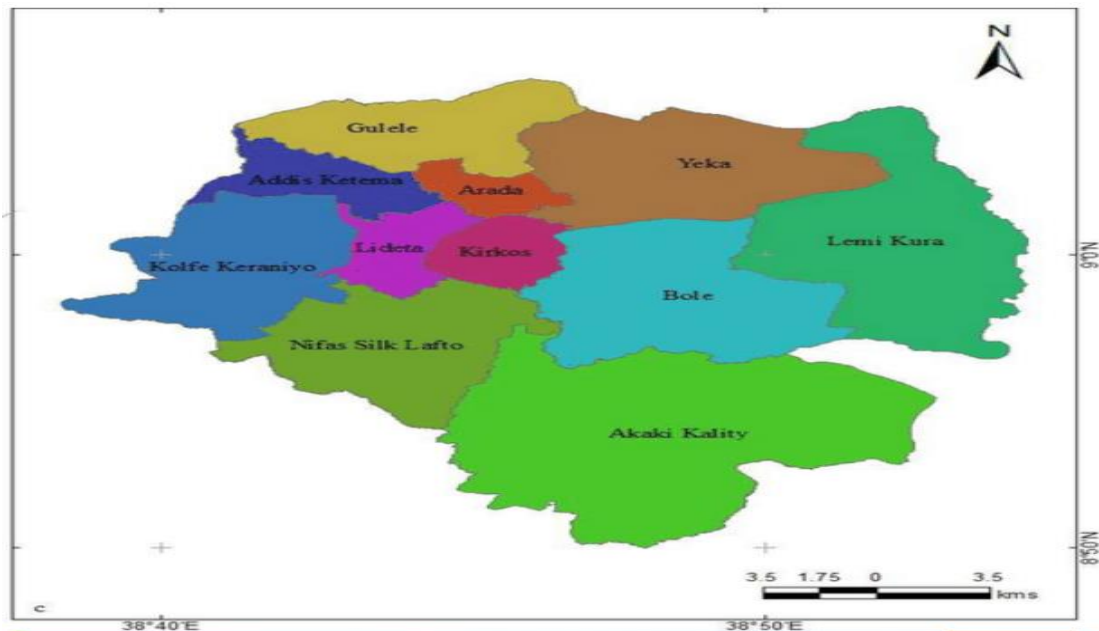
## CHAPTER THREE

### 3. Research Methodology

#### 3.1 Introduction

#### 3.2 Description of the Study Area

Addis Ababa is the county's capital which has got 11 sub-cities and 117 woredas (see pic below). Addis Ababa has 101 public health centers distributed within the city. Looking at the distribution of health facilities; the city has 11 hospitals (6 regional and 7 Federal) and 29 Private hospitals. According to the data taken from AACAHB, the city has 2,832 private health facilities.



**Figure 3.1: Map of Addis Ababa, with Sub-cities**

Source: Map of Sub-cities, Addis Ababa (Ethio GIS, 2022)

#### 3.3 Research approach

This study used a hybrid method that combined a quantitative and qualitative approach. To evaluate the existing situation, a quantitative approach has frequently been applied while a qualitative approach applied to support quantitative findings by interviewing

important personnel working at sub-cities, AACAHB, and MOH professionals who coordinate reverse logistics activities from public health centers.

### **3.4 Research design**

Exploratory and descriptive research was employed. Qualitative data from interviews have been used to help better understand the findings of research in this respect, using both supplementary and primary information sources.

### **3.5 Population and Sampling**

Health centers in the Addis Abeba City Administration Health Bureau served as the study's population. Addis Ababa has eleven sub-cities, and it has 101 public health centers distributed within the sub-cities. Using the standard sampling formula, a statistically significant sample size was determined. As per Logistics Assessment Indicator Tool(USAID | DELIVER PROJECT, 2009), 15% of the facilities can be considered statistically significant in case of resource constraints. Out of 101 total sample size, 15 health centers represent 15% of the population. As per the recommendation of (Ensermu, 2014), out of the eleven sub-cities, three were chosen via systematic random sampling. For doing so names of sub-cities were listed alphabetically. The sampling interval was determined by dividing the sub-city number which is 11 (as indicated above) by 3 which is rounded to 4. To select the first sub-city number 3 was selected randomly and the remaining sample followed the patterns 3, 7, and 11. These sub-cities are found to be Arada, Kolfe Keranyo, and Yeka. These three sub-cities have got 25 health centers. Then systematic random sampling was applied to select the fifteen facilities from the above-stated three sub-cities.

Quantitative data was collected from respondents of pharmacy professionals, medical director, and from members of drug therapeutic committee (DTC).

**Table 3.1: Total Number of Population**

| Population Study                   | From each Health Center | Total (15 health centers) |
|------------------------------------|-------------------------|---------------------------|
| Medical Directors                  | 1                       | 15                        |
| Pharmacy Professionals             | 6                       | 90                        |
| Drug Therapeutic Committee Members | 4                       | 60                        |
| Total                              |                         | 165                       |

Sample size determination was done by calculation formula of Taro Yamane formula, (Yaman, 1973). The calculation is presented as flows:

$$n = N / (1 + Ne^2)$$

Where:

n = represents corrected sample size, N = population size, and e = Margin of error (MoE), e = 0.05 based on the research condition (Uakarn, 2021).

$$n = 165 / (1 + 165 * 0.05 * 0.05)$$

$$n = 117$$

For qualitative data, one coordinator from FMOH, two responsible supply chain experts from AACAHB, and four professionals from two sub-cities were purposefully interviewed depending on their experience and positions in the organization. Because the public health centers have professionals who directly involve in reverse logistics activities it was appropriate to use them as a direct data source. Therefore, these professionals were chosen for primary data collection from each selected fifteen health facilities.

$$n = 117 + 7(\text{interview}) = 123 \text{ samples}$$

### **3.6 Data Source and Types**

To evaluate inventory differences and expired medicines management reverse logistics in Addis Ababa's public health centers, both primary and secondary data have been gathered

and analyzed. FMOH is a regulatory body that device directives and monitors their implementation while health facilities are direct implementers of reverse logistics. Hence, primary data was collected from 117 respondents from fifteen health facilities using a structured questionnaire. Seven respondents from sub-city, MOH, and AACAHB were approached for an unstructured interview questionnaire. For secondary data sources, the following documents were reviewed: Inventory reports, monthly, and annual reports, stock cards, Receiving & Issuing vouchers, supportive supervision reports, Policy, Directives, and Guidelines on RL.

### **3.7 Data collection procedures**

Questionnaires were distributed to each respondent and feedback was collected on the designed questions of reverse logistics practices at each facility. The collection of data on receipt, storage, distribution, transmission, bin-card, internal facility reports, supportive supervision, and interviews for unstructured questions was carried out in combination with a structured questionnaire.

Five professionals from the central and sub-city levels were picked for interviews to evaluate the present reverse logistics guideline: the interviewees were selected according to their expertise and their current role in the identified sub-cities and AACAHB. The main reason for this is to focus attention on experts who have experience in managing the pharmaceutical supply and at the same time who have knowledge and understanding of current policies that govern the medicine supply chain throughout the country as well as at the city level.

### **3.8 Data Analysis**

Before the data were converted to a soft copy, their completeness and consistency had been verified using manual checking. The software SPSS version 27 has been used to analyze the quantitative data. Descriptive statistics in the form of percentages, frequencies, mean and standard deviations were applied. Qualitative data were analyzed in the context of content exploration.

### **3.9 Reliability and Validity Test**

#### 3.9.1 Validity

A pilot study involving fifteen professionals from different health centers has been conducted to assess the validity of this questionnaire. Changes or adjustments were made, after the pilot study, to the questionnaire to attain the objective of this research.

Before sending the questionnaire to respondents, comments from the adviser have also been collected. In this context, the validity of content has been assessed by a review of the literature as well as adaptation tools used in prior studies.

#### 3.9.2 Reliability

In this study reliability test was performed before going through the measurement. The sample group was identified and the members of the respondents were found to be consistent across the facilities. Cronbach's alpha, the most widely used scale, was applied to measure reliability. Cronbach alpha is a measure of internal consistency, which shall mean how closely linked a set of items are to each other. It should be viewed as a measure of scale reliability. In technical terms, Cronbach alpha is neither a statistical test nor a coefficient of reliability and /or consistency. The tool requires satisfactory value for the scale to be reliable. A reliability coefficient of 0.70 or above is regarded as "acceptable" in the majority of social science research situations.

Cronbach's Alpha was employed to ensure the reliability of the Likert, the challenges of RL activities, and the guideline & policy study part. The result is shown below:

**Table 3.2: Cronbach's Alpha Statistics for each items**

| <b>Item-Total Statistics</b>   |                            |                                |                                  |                                  |
|--|----------------------------|--------------------------------|----------------------------------|----------------------------------|
|  | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
| The health center that you are currently working at practices proper RL for medicines  | 64.64                      | 73.324                         | -0.037                           | 0.767                            |
| Some products cannot be used in health facilities regularly  | 64.50                      | 71.038                         | 0.101                            | 0.757                            |
| The reverse practice of overstocked, defective and near expiry to suppliers, distributors or other health facilities is implemented          | 64.64                      | 67.478                         | 0.307                            | 0.744                            |
| The health facility receives unusable prescribed and/or OTC pharmaceuticals from customers (patients)  | 66.21                      | 60.181                         | 0.731                            | 0.711                            |
| The health facility reverse expired or damaged pharmaceuticals to disposal center.   | 63.64                      | 69.170                         | 0.731                            | 0.737                            |
| The facility reverses products to suppliers whenever there is wrong order or delivery.   | 65.71                      | 63.758                         | 0.623                            | 0.724                            |
| The health center identifies & recorded defects, and expired, unused product   | 63.36                      | 71.170                         | 0.264                            | 0.747                            |
| The health facility collects (defect, expired, unused product) & put on designated place within the facility                                 | 64.07                      | 58.841                         | 0.727                            | 0.709                            |
| The facility segregates pharmaceuticals (quantity, package, status of product, expired, damaged, spilled, unsealed or any other)             | 63.71                      | 66.374                         | 0.573                            | 0.731                            |
| The facility sorts pharmaceutical base on their disposal method. (Controlled drug, anti-cancer, toxic medicine, solid, liquid, aerosol etc.) | 63.79                      | 65.720                         | 0.454                            | 0.734                            |

|  |       |        |        |       |
|--|-------|--------|--------|-------|
| Are there written provisions for the redistribution of overstocked and near-expired medicine | 66.36 | 75.478 | -0.227 | 0.764 |
| Ineffective use of stock status analysis to determine what is redistributable                | 66.07 | 74.225 | -0.090 | 0.758 |
| Lack of understanding of reverse processes   | 66.43 | 68.725 | 0.576  | 0.737 |
| No technical support from FMHACA, EPSS and disposal firms                                    | 66.50 | 73.808 | -0.038 | 0.757 |
| Never had a manufacturer or regulatory agency initiated a recall.                            | 66.21 | 70.951 | 0.290  | 0.747 |
| Lack of a responsible body for collecting, segregation, storage and recording                | 66.07 | 72.379 | 0.141  | 0.752 |
| Lack of clear guidelines and norms for handling returned goods.                              | 66.14 | 67.670 | 0.709  | 0.732 |
| No simple procedures and guidelines for Reverse  | 66.71 | 73.604 | 0.010  | 0.754 |
| Lack of appropriate technology (proper transportation, incineration, etc.)                   | 66.50 | 72.731 | 0.096  | 0.753 |
| Budget limitation  | 66.71 | 72.989 | 0.144  | 0.752 |
| Transportation problem for reversing the product to the source                               | 66.50 | 72.731 | 0.096  | 0.753 |
| Absence of follow-up and inspection  | 66.43 | 72.571 | 0.106  | 0.753 |
| Are products are unfriendly to the environment?  | 65.93 | 72.071 | 0.246  | 0.749 |
| Lack of clear guidelines & polices for managing unused medicines                             | 66.14 | 76.593 | -0.359 | 0.767 |
| Infrequent inspection  | 66.21 | 69.720 | 0.436  | 0.742 |

|   |       |        |        |       |
|---|-------|--------|--------|-------|
| high cost of disposal & limited resources (land, budget, equipment)             | 66.71 | 73.912 | -0.057 | 0.755 |
| The long procedure of disposal  | 66.57 | 69.495 | 0.570  | 0.739 |
| Lack of clear policies on the return of products from customer                  | 66.43 | 71.956 | 0.180  | 0.750 |
| Lack of departmental collaboration / communication in reverse logistics         | 66.50 | 72.423 | 0.135  | 0.752 |
| Lack of communication with supply chain partners in reverse logistics           | 66.50 | 72.423 | 0.135  | 0.752 |
| Lack of top management awareness of the reverse logistics                       | 65.86 | 49.670 | 0.458  | 0.764 |
| Lack of top management commitment to reverse logistics                          | 66.64 | 72.555 | 0.167  | 0.751 |
| Do the health center have policies & guidelines governing the RL for medicines? | 65.86 | 73.978 | -0.072 | 0.756 |
| Is there any guideline governing the disposal of medicines?                     | 66.64 | 69.170 | 0.731  | 0.737 |

The cronbach's Alpha result of each questionnaire was found to be above 0.7 which is acceptable and above the standard threshold  $> 0.7$ . Looking at the result, it can be concluded that the questionnaire is reliable.

**Table 3.3 Total Cronbach' Alpha Statistics**

| Reliability Statistics |            |
|------------------------|------------|
| Cronbach's Alpha       | N of Items |
| 0.753                  | 34         |

The total cronbach's Alpha result is 0.753, which is acceptable and above the standard threshold  $> 0.7$ , thus the questionnaire was reliable.

### **3.10 Ethical consideration**

As supply chain experts, respondents were duly informed about the objectives of the study and their involvement in it. They have also been informed of how this data will be used. Regardless of whether the information is confidential or not, respondents were given an assurance that it would remain confidential. For the central-level supply chain experts at MOH, ACAHB, and Sub cities, appointments were made before the interview.

## CHAPTER FOUR

### 4. Result and Discussion

#### 4.1 Introduction

The findings from the study on a medicine reverse logistics management practice and its challenges are explained in this chapter, as well as their interpretation. This information was gathered based on both primary and secondary data. The primary data were collected using a structured Likert scale and a dichotomous questionnaire and interview. Facility reports, models, and various vouchers have been used to collect secondary data.

#### 4.2 Response Rate and Demographic Data

117 questionnaires were distributed to fifteen health facilities. 107 respondents reply to questionnaires which are 91% of the population. Five respondents who were purposefully selected for an interview were approached and interviewed for the same research. This was 71% of the plan. Demographic data is described below to see the respondents' composition in this study. The data are reported in table format with brief narratives.

##### 4.2.1 Sex Distribution of Respondents

The respondent's sex distribution is tabulated below.

**Table 4.1: Gender Distribution of Respondents**

| <b>Gender of Respondent</b> |        |                              |                    |
|-----------------------------|--------|------------------------------|--------------------|
|                             |        | <b>Number of Respondents</b> | <b>Percent (%)</b> |
| Valid                       | Male   | 57                           | 53.3               |
|                             | Female | 50                           | 46.7               |
|                             | Total  | 107                          | 100.0              |

Source: Own Survey Data, 2023

As the result shows 57 respondents are male which represents 53.3% and 50 respondents which accounts for the remaining 46.7% are female.

#### 4.2.2 Age Distribution of Respondents

Age is another demographic data collected in this study and it is shown below.

**Table 4.2: Age Distribution of Participants**

| Age of Respondent |       |                       |             |
|-------------------|-------|-----------------------|-------------|
|                   |       | Number of Respondents | Percent (%) |
| Valid             | <25   | 2                     | 1.9         |
|                   | 26-34 | 57                    | 53.3        |
|                   | 35-44 | 32                    | 29.9        |
|                   | 45-54 | 16                    | 15.0        |
|                   | Total | 107                   | 100.0       |

Source: Own Survey Data, 2023

Respondents' age varies from the early twenties to the late fifties. Only two individuals of age less than 25 participated in this research. Respondents of age from 26-34 were 57 which represents more than half of the population (53.3%). Participants of age 35-44 represents the second majority in this composition. They represent close to 30%. Senior professionals of age 45-54 accounts for 16% of the age composition. Overall, the data suggests that the majority of responders are between the ages of 26 and 34. Respondents of this age range accounts for 83.2% of the population.

#### 4.2.3 Educational Level of Respondents

Respondents also analysed based on their educational level of preparation. The table below shows its distribution.

**Table 4.3: Educational Level of Respondents**

| <b>Educational background</b> |               |                              |                    |
|-------------------------------|---------------|------------------------------|--------------------|
|                               |               | <b>Number of Respondents</b> | <b>Percent (%)</b> |
| Valid                         | Diploma       | 11                           | 10.3               |
|                               | BSC/BA Degree | 85                           | 79.4               |
|                               | MA/MSc        | 11                           | 10.3               |
|                               | Total         | 107                          | 100.0              |

Source: Own Survey Data, 2023

Most of the respondent have got BSC/BA in their educational preparation. They represent 79.3%. Diploma holders accounts for 10.3% and the remaining 10.3% is respondents with MSc/MA educational preparation.

#### 4.2.4 Work Experience of Respondents

Respondents work experience is also another demographic data collected on this study. They do have diversified work experience ranging from single year to more than fifteen years.

**Table 4.4: Work Experience of Respondents**

| <b>Work experience</b> |       |                              |                |
|------------------------|-------|------------------------------|----------------|
|                        |       | <b>Number of Respondents</b> | <b>Percent</b> |
| Valid                  | 1-5   | 26                           | 24.3           |
|                        | 6-10  | 54                           | 50.5           |
|                        | 11-15 | 21                           | 19.6           |
|                        | >15   | 6                            | 5.6            |
|                        | Total | 107                          | 100.0          |

Source: Own Survey Data, 2023

From junior to senior employees participated on this research. 26% of all responders have fewer than five years of experience. More than half of the responders, 54%, had an experience of six to ten years. Of the participants, 21% had between eleven and fifty years of work exposure. Respondents with an experience of more than 15years are also participated and they represent 5.6% of the population.

#### **4.3 Results or Findings (Quantitative finding)**

##### 4.3.1 Reverse Logistics Management Practices and Its Challenge in Descriptive Statistics

###### 4.3.1.1 Reverse Logistic Practice against MOH guideline

The Ministry of Health has prepared reverse logistics guideline which has got operational standard assessment checklist. The table below is a survey result that shows health facilities practice against the above-mentioned guideline.

**Table 4.5: Reverse Logistic practice against MOH guideline**

| <b>Descriptive Statistics</b>  |      |      |      |      |                |
|--|------|------|------|------|----------------|
|  | N    | Yes  | No   | Mean | Std. Deviation |
| Did the health center use the proper supply chain cycle? (medicine & medical device)?                    | Freq | 92   | 15   | 1.14 | .349           |
|  | %    | 86   | 14   |      |                |
| Did the facility perform pharmaceutical stock analysis & consumption that cannot be used every 2 months? | Freq | 90   | 17   | 1.16 | .367           |
|  | %    | 84.1 | 15.9 |      |                |
| Specify the reasons for the products not to be used within the facility.                                 | Freq | 42   | 65   | 1.61 | .491           |
|  | %    | 39.3 | 60.7 |      |                |
| a. Above stock   |      |      |      |      |                |
| b. Near expiry   | Freq | 49   | 58   | 1.54 | .501           |
|  | %    | 45.8 | 54.2 |      |                |
| c. Service interrupted   | Freq | 23   | 84   | 1.79 | .413           |
|  | %    | 21.5 | 28.5 |      |                |
| d. Level of health facility  | Freq | 30   | 77   | 1.72 | .451           |
|  | %    | 28   | 72   |      |                |
| e. Damaged medicine  | Freq | 53   | 54   | 1.50 | .502           |
|  | %    | 49.5 | 50.5 |      |                |
| f. Expired   | Freq | 68   | 39   | 1.36 | .484           |
|  | %    | 63.6 | 36.4 |      |                |
| g. Lack of professionals   | Freq | 26   | 81   | 1.76 | .431           |
|  | %    | 24.3 | 75.7 |      |                |
| Did you inform about unused pharmaceuticals to responsible   | Freq | 54   | 53   | 1.50 | .502           |

|   |      |      |      |      |      |
|---|------|------|------|------|------|
| administrative for a decision?  | %    | 50.5 | 49.5 |      |      |
| Can the product (medicines/medical devices) be used within facility after the stock status reported?                    | Freq | 44   | 63   | 1.59 | .494 |
|   | %    | 41.1 | 58.9 |      |      |
| Did the facility try to exchange used medicines with another health facility?   | Freq | 101  | 6    | 1.06 | .231 |
|   | %    | 94.4 | 5.6  |      |      |
| Did the facility notify the supplier to have the products reversed?   | Freq | 30   | 77   | 1.72 | .451 |
|   | %    | 28   | 72   |      |      |
| Did the facility sign a written agreement for product disposal or reimbursement?  | Freq | 38   | 69   | 1.64 | .481 |
|   | %    | 35.5 | 64.5 |      |      |
| Did you have an authorized permit for reversed logistics from the administrative body/health facility higher officials? | Freq | 79   | 28   | 1.26 | .442 |
|   | %    | 73.8 | 26.2 |      |      |
| Did you sort products to be returned?   | Freq | 42   | 65   | 1.61 | .491 |
|   | %    | 39.3 | 60.7 |      |      |
| Did the facility arrange and properly pack for return?  | Freq | 55   | 52   | 1.49 | .502 |
|   | %    | 51.4 | 48.6 |      |      |
| Did you record the necessary data of reversed products in standard formats?   | Freq | 85   | 22   | 1.21 | .406 |
|   | %    | 79.4 | 20.6 |      |      |
| Did the transportation mean ensure manufacturers recommended storage conditions?  | Freq | 45   | 62   | 1.58 | .496 |
|   | %    | 42.1 | 57.9 |      |      |
| Did the facility reverse to the concerned partners? Such as manufacturers, suppliers, etc.                              | Freq | 38   | 69   | 1.64 | .481 |
|   | %    | 35.5 | 64.5 |      |      |
| Did the verification documents for the products that were returned to the   | Freq | 41   | 66   | 1.62 | .488 |

|                                      |     |      |      |  |  |
|--------------------------------------|-----|------|------|--|--|
| supplier been given to the facility? | %   | 38.3 | 61.7 |  |  |
| Valid N (listwise)                   | 107 |      |      |  |  |

Source: Own Survey Data, 2023

MOH guideline has requirements that are expected to be fulfilled by the facility. From these requirements, facilities are compliant on some of them but not on most of the requirements.

The requirement for facilities to properly quantify (86%), monitor stock status (84%), and keep records of the necessary data (85%) are some of the activities which are being done by most of them. Health facilities have authorized permits (73.8%) and are also practicing product exchange or sending to other facilities (94%).

On the other hand, almost all facilities are not applying all criteria for not using the product. Products will not be used for a variety of reasons, including overstock, near-expiry, service interruption, and health facility level. But facilities are currently avoiding products from usage due to expiry and damage reasons only.

The following activities have visible gaps on facilities: report to supplier for products to be reversed (28%), facility agreement with partners for product disposal (35.5%), transportation means ensures manufacturers storage condition recommendations (42%), facility reverse to concerned supplier and manufacturer (35.5%), and confirmation of document for product reversed to the source (38.3%).

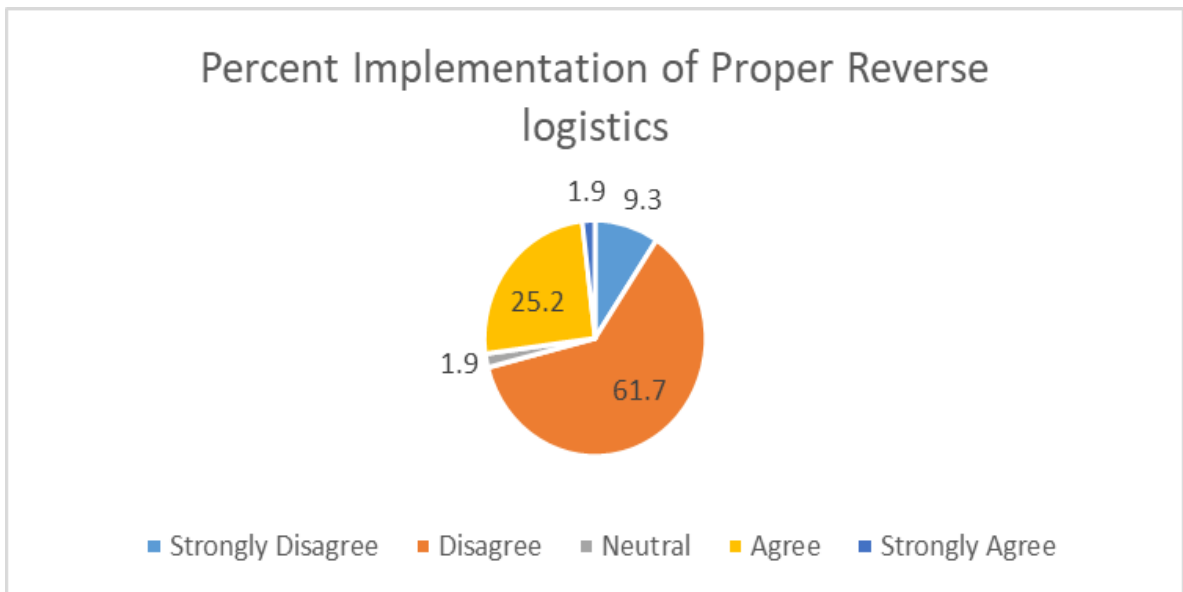
#### 4.3.1.2 Reverse Logistics Practice

**Table 4.6: Reverse Logistics Practices**

| S.N |  | Descriptive Statistics |       |      |      |      |       |      |                |
|-----|--|------------------------|-------|------|------|------|-------|------|----------------|
|     |  |                        | 1(SD) | 2(D) | 3(N) | 4(A) | 5(SA) | Mean | Std. Deviation |
| 1   | The health center that you are currently working at practices proper RL for medicines.   | Freq                   | 10    | 66   | 2    | 27   | 2     | 2.49 | 1.031          |
|     |  | %                      | 9.3   | 61.7 | 1.9  | 25.2 | 1.9   |      |                |
| 2   | Some products cannot be used in health facilities regularly.   | Freq                   | 14    | 19   | 7    | 46   | 21    | 3.38 | 1.336          |
|     |  | %                      | 13.1  | 17.8 | 6.5  | 43.0 | 49.6  |      |                |
| 3   | The reverse practice of overstocked, defective, and near expiry to suppliers, distributors or other health facilities is implemented | Freq                   | 10    | 62   | 3    | 30   | 2     | 2.55 | 1.057          |
|     |  | %                      | 9.3   | 57.9 | 2.8  | 28.0 | 1.9   |      |                |
| 4   | The health facility receives unusable prescribed and/or OTC pharmaceuticals from customers (patients)                                | Freq                   | 69    | 24   | 3    | 5    | 6     | 1.64 | 1.118          |
|     |  | %                      | 64.5  | 22.4 | 2.8  | 4.7  | 5.6   |      |                |
| 5   | The health facility reverse expired or damaged pharmaceuticals to the disposal center.   | Freq                   | 21    | 19   | 7    | 40   | 20    | 3.18 | 1.439          |
|     |  | %                      | 19.6  | 17.8 | 6.5  | 37.4 | 18.7  |      |                |
| 6   | The facility reverses products to suppliers whenever there is wrong order or delivery.   | Freq                   | 16    | 58   | 10   | 19   | 4     | 2.41 | 1.064          |
|     |  | %                      | 15.0  | 54.2 | 9.3  | 17.8 | 3.7   |      |                |
| 7   | The health center identifies   | Freq                   | 12    | 0    | 3    | 51   | 41    | 4.02 | 1.197          |

|    |  |      |      |      |     |      |      |      |       |
|----|--|------|------|------|-----|------|------|------|-------|
|    | & recorded defects, and expired, unused product.   | %    | 11.2 | 0    | 2.8 | 47.7 | 38.3 |      |       |
| 8  | The health facility collects (defect, expired, unused product) & put on designated place within the facility.                                | Freq | 10   | 3    | 9   | 43   | 42   | 3.97 | 1.201 |
|    |  | %    | 9.3  | 2.8  | 8.4 | 40.2 | 39.3 |      |       |
| 9  | The facility segregates pharmaceuticals (quantity, package, status of product, expired, damaged, spilled, unsealed or any other).            | Freq | 11   | 39   | 5   | 33   | 19   | 3.09 | 1.343 |
|    |  | %    | 10.3 | 36.4 | 4.7 | 30.8 | 17.8 |      |       |
| 10 | The facility sorts pharmaceutical base on their disposal method. (Controlled drug, anti-cancer, toxic medicine, solid, liquid, aerosol etc.) | Freq | 10   | 35   | 5   | 29   | 28   | 3.28 | 1.399 |
|    |  | %    | 9.3  | 32.7 | 4.7 | 27.1 | 26.2 |      |       |
|    |  |      |      |      |     |      |      |      |       |

Source: Own Survey Data, 2023



**Figure 4.1: Percent Implementation of Proper Reverse Logistics**

The above questionnaire is designed to survey reverse logistics implementation status at health facilities. These questionnaires can be summed up in three groups. Identification & record of expired, damaged & unfit medicines (2, 7-10), reverse logistics of same medicines (3-6) and rating the status of implementation of such activities (#1).

The first group of questionnaires which are grouped under the health facilities product identification, segregation and recording practice of relevant medicines were rated by respondents (3.38, 1.34), (4.02, 1.20), (3.97, 1.20),) and (3.09, 1.34) respectively. Although there are facilities which practice these activities, most facilities are not doing it as per the guidelines expectation. The results shows that there is a lot to be improved.

The second group of questionnaires which are designed to survey the health facilities medicine reverse activities were rated as follows: Reverse overstocked, defective and near expiry to suppliers, distributors or other health facilities (2.55, 1.06). Receive unusable prescribed and/or OTC medicines from patients (1.64, 1.12). Reverse expired or damaged medicines to disposal center (3.18, 1.44), Reverse products to suppliers whenever there is wrong order or delivery (2.41, 1.06). The result shows that facilities do not reverse expired, damaged and unfit medicines to supplies, but they send same kinds

of medicines to disposal centres in moderate extent. No return of such medicines to suppliers whenever there is wrong order or delivery. Health facilities do not receive/collect such medicines from patients. Almost all facilities strongly disagree with the practice of receiving medicines from patients.

The third group of questionnaires regarding reverse logistics practice is the question dedicated to implementation status assessment, (2.49, and 1.03). Respondents reply that most facilities do not implement reverse logistics as per the expectation of the guideline. Although there are facilities that gave feedback saying 'reverse logistics is implemented' at their facilities, most of the respondents rated it by looking at some of their fragmented efforts towards recording & disposal of expired items. It is the researchers' observation that respondents gave such responses without considering all requirements dictated by the guideline. It is the expectation of the guideline that unfit medicines be reversed not only due to expiry reasons but also due to overstock, service interruption, lack of professionalism, damage while handling, quality defect, etc.

#### 4.3.1.3 Challenges of Reverse Logistics Activities

**Table 4.7: Challenges of Reverse Logistics Activities**

| <b>Descriptive Statistics</b>  |      |      |      |
|--|------|------|------|
|  | N    | Yes  | No   |
| Are there written provisions for the redistribution of overstocked and near-expired medicine | Freq | 82   | 25   |
|  | %    | 76.6 | 23.4 |
| Ineffective use of stock status analysis to determine what is redistributable.               | Freq | 56   | 51   |
|  | %    | 52.3 | 47.7 |
| lack of understanding of reverse processes.  | Freq | 42   | 65   |
|  | %    | 39.3 | 60.7 |
| No technical support from FMHACA, EPSS, and disposal firms                                   | Freq | 57   | 50   |
|  | %    | 53.3 | 46.7 |
| Never had a manufacturer or regulatory agency initiated a recall.                            | Freq | 65   | 42   |
|  | %    | 60.7 | 39.3 |
| Lack of a responsible body for collecting, segregation storage, and recording.               | Freq | 46   | 61   |
|  | %    | 43   | 57   |
| Lack of clear guidelines and norms for handling returned goods.                              | Freq | 55   | 52   |
|  | %    | 51.4 | 48.6 |
| No simple procedures and guidelines for Reverse logistics.                                   | Freq | 64   | 43   |
|  | %    | 59.8 | 40.2 |
| Lack of appropriate technology (proper transportation, incineration, etc.)                   | Freq | 81   | 26   |
|  | %    | 75.7 | 24.3 |
| Budget limitation  | Freq | 94   | 13   |
|  | %    | 87.9 | 12.1 |

|  |      |      |      |
|--|------|------|------|
| Transportation problem for reversing the product to the source               | Freq | 80   | 27   |
|  | %    | 74.8 | 25.2 |
| Absence of follow-up and inspection  | Freq | 66   | 41   |
|  | %    | 61.7 | 38.3 |
| Are products unfriendly to the environment?                                  | Freq | 43   | 64   |
|  | %    | 40.2 | 59.8 |
| Lack of clear guidelines & policies for managing unused medicines            | Freq | 47   | 60   |
|  | %    | 43.9 | 56.1 |
| Infrequent inspection  | Freq | 66   | 41   |
|  | %    | 61.7 | 38.3 |
| high cost of disposal & limited resources (land, budget, equipment)          | Freq | 91   | 16   |
|  | %    | 85   | 15   |
| The long procedure of disposal   | Freq | 84   | 23   |
|  | %    | 78.5 | 21.5 |
| Lack of clear policies on the return of products from customer               | Freq | 67   | 40   |
|  | %    | 62.6 | 37.4 |
| Lack of departmental collaboration/communication in reverse logistics        | Freq | 69   | 38   |
|  | %    | 64.5 | 35.5 |
| Lack of communication with supply chain partners in reverse logistics        | Freq | 76   | 31   |
|  | %    | 71   | 29   |
| Lack of top management awareness of the importance of the reverse logistics. | Freq | 68   | 39   |
|  | %    | 63.6 | 36.4 |
| Lack of top management commitment to reverse logistics                       | Freq | 63   | 44   |
|  | %    | 58.9 | 41.1 |

Source: Own Survey Data, 2023

As shown in Table 4.7, the presented challenges can be categorized into three groups; challenges associated with resource limitation, Policies, and management support and collaboration within and external stakeholders. Respondents gave their feedback on each category as follows.

Questionnaires designed to assess reverse logistics challenges associated with resource limitations are Lack of appropriate technology, Budget limitation, transportation problems, and high cost of disposal. Respondents gave their feedback by appreciating the availability of the problem as follows; Lack of appropriate technology (75.7%), Budget limitation (87.9%), Transportation (74.8%), and high cost of disposal (85%).

Another group of questionnaires is those crafted to survey policies & procedures effectiveness. Written provisions availability, Lack of clear guidelines, the Long procedure for disposal, Lack of clear policies on return of products from the customer. Respondents gave feedback as follows: 76.6% of the participants responded 'yes' to written provisions availability, and 56% of the respondents replied 'yes' to having clear guidelines for managing unfit medicines. Respondents significantly appreciated the problem of long procedure, 78.5% said the procedure to reverse logistics is a long procedure. 62.6 % of the respondents said the procedure for the return of products from customers is not clear.

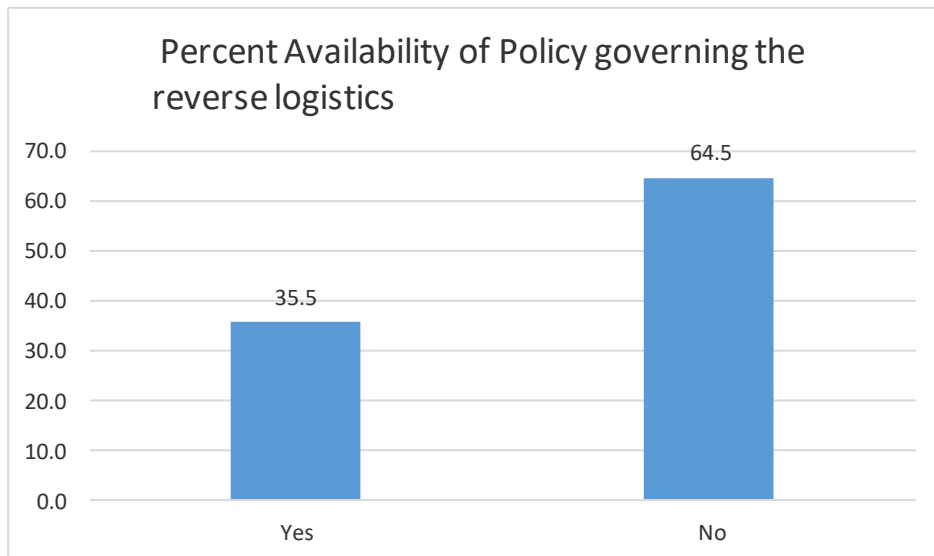
The following questionnaires were designed to assess collaboration and management support with the feedback from the respondents. Technical support from FMHACA, EPSS, and disposal firms (46.7%), Absence of inspection (61.7%), departmental collaboration/communication in reverse logistics (35.5%), Communication with supply chain partners (29%), Management awareness of the importance of reverse logistics (36.4%), and management commitment to reverse logistics (41.1%). Respondents gave negative responses to all questionnaires related to collaboration and top management commitment to reverse logistics activities at health facilities.

#### 4.3.1.4 Guidelines and Policy

**Table 4.8: Guidelines and Policy**

| Descriptive Statistics   |      |      |      |
|--|------|------|------|
|  |      | Yes  | No   |
| Do the health centers have policies & guidelines governing the RL for the medicines? | Freq | 38   | 69   |
|  | %    | 35.5 | 64.5 |
| Is there any guideline governing the disposal of medicines?                          | Freq | 81   | 26   |
|  | %    | 75.7 | 24.3 |

Source: Own Survey Data, 2023



**Figure 4.2: Percent Availability of Policy Governing the Reverse Logistics**

Availability of policies governing the reverse logistics for medicines at health facilities and guidelines on the disposal of medicines were other areas of a survey in this study. Respondents gave a reply by saying no to the availability of policy and yes to the existence of guidelines for disposal. 64.5% of the respondents said that no policy is

available at the health center. 75.7% of the respondents replied yes to the availability of guidelines governing the disposal of medicines.

#### **4.4 Qualitative Finding**

Seven professionals were selected for a qualitative interview and an interview was made with five of them. Three females and two males. These professionals were selected from AACAHB (2), MOH (1), and sub-city (2).

##### 4.4.1 Medicine reverse logistics practices in Health centers against MOH Guideline

According to the above professional's feedback, a guideline was prepared in 2021 for reverse logistics, and training was given to some professionals from different health facilities. But some facilities are not aware of the availability of this reverse logistics guideline. The status of reverse logistics deployment varies from facility to facility. Even in facilities where reverse logistics activities are being implemented, the activity is not being carried out following MOH expectations.

##### 4.4.2 Coordination among Stakeholders

Reverse logistics activity is an area where coordination among stakeholders is highly important. As per the feedback from these professionals, coordination between reverse logistics actors is poor. Suppliers, health facilities, and regulatory bodies are not working in a coordinated manner. Some health facilities perform redistribution of overstocks among facilities but it is not being done in a systematic and organized way.

##### 4.4.2 Medicine Reverse Logistics Challenges

Respondents were asked about the challenges on reverse logistics. The following points were raised as a challenge:

- Guideline for reverse logistics is not available at most health centers
- Role and responsibilities of the facilities, suppliers, and regulatory bodies are not indicated and monitored.

- No designated report for reversed medicines from each facility
- Long procedure for disposal of expired and damaged medicines.
- Budget limitation for transportation and disposal of expired and damaged medicines
- There is redistribution among facilities but no systematic way of managing reverse logistic activities.

## **CHAPTER FIVE**

### **5. Summary of Key Findings, Conclusion, and Recommendation**

#### **5.1 Introduction**

This study was made to find out the practices and challenges related to reverse logistics implemented in selected Public health centers in Addis Ababa.

A reverse logistics system is needed to be utilized to increase availability, reduce the wastage of health products, minimize safety risks, and reduce the economic cost of unused medicines.

A quantitative and qualitative study employing structured questionnaires and interviews was carried out in a descriptive research design. The study analyzed the practice of reverse logistics at health centers as well as the challenges encountered.

#### **5.2 Summary of the Key Findings**

The results of this study lead to the conclusion that the reverse logistics practice at health facilities in Addis Ababa is not implemented as per the guideline of MOH. 71% of the respondents replied that reverse logistics is not implemented at their facilities owing to unavailability of the policy governing the reverse logistics for the medicine was confirmed by 69% of the respondents. In addition, reverse logistics practice from patients is not implemented in all health facilities.

Descriptive analysis of reverse logistics practice against the guideline however indicates that there is a lot to be improved. Feedback from the analysis ranges from mean values (1.05- 1.79) which indicates that there is a lot to be improved items of reverse logistics against the guideline expectations.

Respondents appreciated almost all kinds of challenges that make the implementation of reverse logistics difficult. Challenges associated with resource limitations such as lack of appropriate technology, budget limitation, transportation problems, and high cost of disposal are appreciated by the respondents. Availabilities of policies and procedures are another challenges that are indicated by the respondents. Lack of clear policies on the

return of products from customers. The respondent's feedback was clear on the problem of a long procedure for the practice of reverse logistics.

The absence of collaboration, inspection, and technical support from stakeholders is another challenge indicated by the respondents.

### **5.3 Conclusions**

Based on the results of this study, it is possible to deduce that the reverse logistics practice at health facilities is not implemented as per the guideline of MOH. Health centers are not well aware of the guideline expectations and several challenges are making the implementation of reverse logistics difficult. This contributed by the absence of stakeholder collaboration is making the practice difficult to implement across the board. The overall reverse logistics practice at health centers is found to be stumpy, and inconsistently applied from facility to facility, and collaboration among reverse logistics actors is less effective.

This, in particular, is due to a lack of commitment from management, resource limitation, lack of clear responsibility among logistics actors, and an awareness gap on the important contribution of reverse logistics. In conclusion, the current practice of reverse logistics at health centers is found to be weak, fragmented, and inconsistently performed at the stated facilities.

### **5.4 Recommendations**

Reverse logistics need to be implemented at all health centers systematically and consistently. The AACAHB needs to follow a strategic approach to solve reverse logistics challenges. It starts from the organizational structure of the bureau where a responsible entity must be assigned to be in charge of reverse logistics activities. In planning, the responsible entity should consider the reverse logistics activities and the effective correction of the problems experienced by health facilities.

The strategy must consider training health workers who are involved in reverse logistics and at the same time guidelines needs to monitor the implementation of the need consistently.

The researcher recommends that AACAHB recognize the importance of budgeting, support facilities, and monitor the implementation of reverse logistics at all health centers.

Furthermore, the health centers should consider the adoption of best practices tested at other facility and need to scale up their implementation at their facilities.

### **5.5 Limitations and Suggestions for Further Study**

There are some limitations to this study. Reverse logistic management in the health sector has many dimensions and perspectives, as identified and explained in this study's background theory; however, for the sake of time and resources, I am compelled to concentrate on the practice and difficulties of medicine RL management at public health centers in Addis Abeba in this study. As a result, more research is needed to evaluate the other dimensions.

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**Anexes I**

Annex 1: Questionnaire to experts in Health Center

MEDICINE REVERSE LOGISTICS MANAGEMENT PRACTICES AND ITS CHALLENGE  
IN SELECTED PUBLIC HEALTH CENTERS IN ADDIS ABABA, ETHIOPIA



Questionnaire for Public Health centers in Addis Ababa

March, 2023

**Section I: Informed Consent Form before Administering the Questionnaire**

Dear Respondents,

The following questions are prepared for masters of logistic and supply chain management thesis work. The topic is medicine reverse logistics management practices and its challenge in selected public health centers in Addis Ababa, Ethiopia. The general objective is to assess the medicine reverse logistics practices and its challenge at the stated facilities.

The study is purely for academic purpose and will remain confidential and not to be used to assess your performance; thus, not affects you in any case. For any question, contact at 0911999880 or email: [netsanetdiro7@gmail.com](mailto:netsanetdiro7@gmail.com)

Finally, we would like to appreciate and thank you in advance for your dedication, time and genuine response to the questions.

Do I have your permission?

Yes  No  If Yes, Continue

**Section I I: Background Information**

1. Name of health center .....

2. Socio-demographic characteristics of informants

2.1. Gender

Male  Female

2.2. Age

Less than 25 Years  35-44 Year  Over 54Years  
 26-34 Years  45-54 Years

2.3. Educational Background

Certificate  BA/BSC Degree  Other  
 Specify \_\_\_\_\_

Diploma  MSc/ MA

2.4. Position in the health center.....

2.5. How many years have you been employed in the pharmaceutical sector?

1-5 Years  11-15 Years  
 6-10 Years  Over 15 Years

Section III: - structured questionnaires (please tick your response)

Part A: Question related to Reverse Logistic practice against MOH guideline

| S. N | Operational Standards Assessment Checklist   | Yes | No | Remark |
|------|--|-----|----|--------|
| 1    | Did the facility properly select, quantify, and order/procure/acquire only useable products (medicine & medical device)?   |     |    |        |
| 2    | Did the facility conduct stock status analysis & identify stocks that cannot be used every two months?   |     |    |        |
| 3    | What are the reasons for the products not to be used within the facility?<br>a. Over stock<br>b. Near expiry<br>c. Service interrupted<br>d. Level of health facility<br>e. Damaged medicine<br>f. Expired<br>g. Lack of professionals |     |    |        |
| 4    | Did you notify about unused stock in the facility to responsible (administrative) bodies for further action?   |     |    |        |
| 5    | Can the product (medicines/medical devices) be used with in facility after the stock status reported?  |     |    |        |

|    |  |  |  |  |
|----|--|--|--|--|
| 6  | For products that are unable to be used with in the health facility, did the facility try to exchange with other products, or send to another health facility? |  |  |  |
| 7  | Did the facility report to supplier to reverse the products?   |  |  |  |
| 8  | Did the facility sign mutual written agreement (for reimbursed /disposed product)?   |  |  |  |
| 9  | Did you have authorized permit for reversed logistic from administrative body/health facility higher officials?  |  |  |  |
| 10 | Did you sort products to be returned?  |  |  |  |
| 11 | Did you prepare/arrange and properly pack for return?  |  |  |  |
| 12 | Did you fill necessary data of reversed products in standard issuing formats/ vouchers?  |  |  |  |
| 13 | Did the transportation mechanism ensure manufacturers storage condition recommendations?   |  |  |  |
| 14 | Did the facility reverse to respective supplier, refurbishment center and manufacturer?  |  |  |  |
| 15 | Did the facility receive verification documents for products that are returned to supplier?  |  |  |  |

Part B: Questions related the status of Reverse Logistics Practices and challenges

Please indicate your degree of agreement or disagreement to the below statements or practices that pertaining to the health center reverses logistic practices and challenges.

1= Strongly Disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

| No/<br>Code | Statements/ Items   | 1 | 2 | 3 | 4 | 5 |
|-------------|---|---|---|---|---|---|
| 1.          | REVERSE LOGISTICS PRACTICE AT THE PUBLIC HEALTH CENTERS   |   |   |   |   |   |
| RLP1        | The health center that you are currently working at practice proper reverse pharmaceutical logistics. (RL processes and activities are implemented) |   |   |   |   |   |
| RLP2        | There are products that cannot be used in health facility regularly.  |   |   |   |   |   |
| RLP3        | Reverse practice of overstocked, defective and near expiry to suppliers, distributors or other health facilities is implemented                     |   |   |   |   |   |
| RLP4        | The health facility receives unusable prescribed and/or OTC pharmaceuticals from customer (patients)  |   |   |   |   |   |

|       |  |            |  |  |           |  |
|-------|--|------------|--|--|-----------|--|
| RLP5  | The health facility reverse expired or damaged pharmaceuticals to disposal center.   |            |  |  |           |  |
| RLP6  | The facility reverse products to suppliers whenever there is wrong order or delivery.  |            |  |  |           |  |
| RLP7  | The health center identifies & recorded defect, expired, unused product.   |            |  |  |           |  |
| RLP8  | The health facility collects (defect, expired, unused product) & put on designated place within the facility.                                |            |  |  |           |  |
| RLP9  | The facility segregates pharmaceuticals (quantity, package, status of product, expired, damaged, spilled, unsealed or any other).            |            |  |  |           |  |
| RLP10 | The facility sorts pharmaceutical base on their disposal method. (Controlled drug, anti-cancer, toxic medicine, solid, liquid, aerosol etc.) |            |  |  |           |  |
| 2     | <b>CHALLENGES ON REVERSE LOGISTICS ACTIVITIES AND WASTE MANAGEMENT</b>   | <b>Yes</b> |  |  | <b>No</b> |  |
| CRL1  | Are there written provisions for the redistribution of overstocked and near expired medicine   |            |  |  |           |  |
| CRL2  | Poor implementation of Stock Status Analysis to identify which items are redistributable   |            |  |  |           |  |
| CRL3  | Lack of knowledge about the procedures of recalling  |            |  |  |           |  |
| CRL4  | No technical support from FMHACA, EPSS and disposal firms  |            |  |  |           |  |
| CRL5  | Never received a recall initiation from manufacturers or regulatory authority  |            |  |  |           |  |
| CRL6  | Unavailability of responsible body for segregation, collection, storing and recording  |            |  |  |           |  |
| CRL7  | Lack of definite rules and regulations on managing returned products   |            |  |  |           |  |
| CRL8  | There is no simple procedure and guideline for Reverse   |            |  |  |           |  |
| CRL9  | Lack of appropriate technology (proper transportation, incineration, etc.)   |            |  |  |           |  |
| CRL10 | Budget limitation  |            |  |  |           |  |
| CRL11 | Transportation problem (moving products back to supplier or disposal sites)  |            |  |  |           |  |
| CRL12 | Absence of internal and external follow up and inspection  |            |  |  |           |  |

|       |  |     |    |
|-------|--|-----|----|
| CRL13 | Most of the time the products are unfriendly to the environment                        |     |    |
| CRL14 | Lack of clear guidelines for managing Unfit medicines                                  |     |    |
| CRL15 | Infrequent inspection  |     |    |
| CRL16 | high cost of disposal & limited resources (land, budget, equipment)                    |     |    |
| CRL17 | Long procedure of disposal   |     |    |
| CRL18 | Lack of clear policies on return of products from customer                             |     |    |
| CRL19 | Lack of departmental collaboration / communication in reverse logistics                |     |    |
| CRL20 | Lack of communication with supply chain partners in reverse logistics                  |     |    |
| CRL21 | Lack of top management awareness of the importance of reverse logistics                |     |    |
| CRL22 | Lack of top management commitment to reverse logistics                                 |     |    |
| CRL23 | Others (Specify)   |     |    |
| CRL24 | Any other comment?   |     |    |
| 3     | GUIDELINES AND POLICY  | Yes | No |
| GAP1  | Do the health center have any policy governing the reverse logistics for the medicines |     |    |
|       | If yes, how is it done?  |     |    |
| GAP2  | Is there any guideline governing disposal of pharmaceuticals?                          |     |    |
|       | If yes, how is it done?  |     |    |
|       | Comments:  |     |    |
|       | Any other comment?   |     |    |

## Annex 2: Interview Guide (Semi structured) for Key Informant Interview

1. Background information of the key informant
  - 1.1. Name of Facility .....
  - 1.2. Highest level of education .....
  - 1.3. Total Work experience .....
  - 1.4. Current position in the health facility.....
2. Reverse Logistics Questions for in-depth interview
  - 2.1. Does the respective health centres practice reverse logistics? If yes, what are the main activates?
  - 2.2. How do you assess the implementation Reverse Logistics practice in the respective health centres?  
  
A: With respect to RL guideline  
  
B: with respect to the directive?
  - 2.3. How do evaluate both internal and external coordination while managing damaged, expired, overstock or unfit medicine?
  - 2.4. Is there any practice of reversing products back to pharmacy store from health centres dispensing units for disposal etc.? If yes, how?
  - 2.5. What are the techniques you use to manage the overstocked, quality defect and expired medicines in the respective health centres?
  - 2.6. Would you suggest some better strategies for the proper and regular RL system in the public health centres, how would you improve?
    - a) Quantification of medicines?
    - b) Policies?

- c) LMIS?
- d) Procurement of medicines?
- e) Storage?

2.7. What are the challenges that you encountered during the implementation of RL?

2.8. Do you think poor implementation of RL affects the environment? If yes, how?

2.10 If you have any comment on improving reverse logistics practice, please explain:

- a) Comment for stakeholders such as Sub city, EPSA, EFDA, FMOH and  
AACAHB

Thank you for your time and cooperation

Netsanet Diro

Annex 3: The AMHARIC version of verbal consent  
አዲስ አበባ ዩኒቨርሲቲ

የንግድ ስራ-ትምህርት-ቤት

የሎጂስቲክስ እና የአቅርቦት ሰንሰለት አስተዳደር ክፍል

የMA ፕሮግራም በአዲስ አበባ ከተማ በተመረጡ “የህዝብ ጤና ጣቢያዎች የመድኃኒት ተገላቢጦሽ የሎጂስቲክስ አስተዳደር “ አዲስ አበባ ፣ ኢትዮጵያ።

ውድ ተሳታፊ፣

በአዲስ አበባ ዩኒቨርሲቲ የአቅርቦት ሰንሰለት አስተዳደር ውስጥ የ MA ተማሪ ነኝ።ይህ የዳሰሳ ጥናት በዚህ የድህረ-ምረቃ መርሃ ግብር በከፊል የተዘጋጀ ነው ። ርዕሱ ከላይ እንደሚጠቁመው የዚህ ቅኝት ዓላማ በአዲስ አበባ በሚገኙ በተመረጡ የመንግስት ጤና ጣቢያዎች ውስጥ የመድኃኒት ተገላቢጦሽ ሎጂስቲክስ የትግበራ ሁኔታ እና ተግዳሮቶችን ለመገምገም ነው ። የጥናቱ መጨረሻ ውጤቱ ግለሰብን ወይም ተቋምን በተናጠል አይመለከትም ፤ይልቁንም የሁሉንም ተቋማት አጠቃላይ ስዕል ይገልጻል ። እርስዎ የሚሰጡት መረጃ በጣም በሚስጥር የሚያዝ እና ለአካዳሚክ ዓላማ ብቻ የሚያገለግል ነው ። ለማንኛውም ጥያቄ 0911999880 ይደውሉ ወይም በኢሜል netsanetdiro7@gmail.com

ለዚህ አስፈላጊ ጥናት (ቃለ መጠይቅ) ውድ ጊዜዎን ስለሰጡን እናመሰግናለን !!!

ለቁልፍ መረጃ ሰጭ ቃለ መጠይቅ የተዋቀረ መመሪያ (የአማርኛ ቅጅ)

1. የቁልፍ መረጃ ሰጭው ዝርዝር መግለጫ

1.1 የተቋሙ ስም .....

1.2 ከፍተኛ የትምህርት ደረጃ .....

1.3 ጠቅላላ የሥራ ልምድ .....

1.4 አሁን በጤና ተቋሙ ውስጥ ያለው ቦታ .....

2. ለጥልቅ ቃለ መጠይቅ የሚረዱ ጥያቄዎች

2.1. በስራቹ ያሉ ጤና ጣቢያዎች የተገላቢጦሽ ሎጂስቲክስ አሰራር አለው? ካለው ምን ምን ዋና ዋና ተግባራት አሉት?

2.2 በስራቹ ያሉ ጤና ጣቢያዎች በዕርሶ ግምገማ ተገላቢጦሽ ሎጂስቲክስ ትግበራ በምን ደረጃ ይገኛል ይህንንም

ሀ. ከጋይድላይን ጋር በማነፃፀር ይግለጹ

ለ. ከመመሪያው ጋር በማነፃፀር ይግለጹ

2.3 ከሚመለከታቸው አካላት ጋር ያለው መስተጋብር እንዴት ይገልጹታል (የተበላሹ ፤ግዚያቸው ያለፈባቸው እና የጥራት ችግር ያለባቸው መድሐኒቶች)?

2.4 በስራቹ ያሉ ጤና ጣቢያዎች ከተለያዩ ክፍሎች ወደ ዋናው የመድሐኒት ቤት መጋዘን የመመለስ ልምድ አለ ወይ? አዎ ከሆነ እንዴት?

2.5 በስራቹ ያሉ ጤና ጣቢያዎች የጥራት ፤ ከበቂ በላይ ክምችት እና ግዚያቸው ያለፈባቸው መድሐኒቶች በሚኖሩበት ግዜ ምን አይነት አሰራር ተጠቅመው ችግሩን ይፈቱታል?

2.6 በሕዝብ ጤና ጣቢያዎች ውስጥ ለትክክለኛው ተገላቢጦሽ የሎጂስቲክስ ስርዓት የተሻሉ ስልቶችን እንዲጠቁሙ እድል ቢሰጥዎ እንዴት ማሻሻል ይችላሉ? ለምሳሌ፤

- የመድኃኒቶች ትመና ብዛት?
- ፖሊሲዎች?
- የሎጂስቲክስ አስተዳደር መረጃ ስርዓት?
- የመድኃኒቶች ግዥ?
- ማከማቻ?

2.7 በስራቹ ያሉ ጤና ጣቢያዎች ውስጥ ካለው የተገላቢጦሽ ሎጂስቲክስ አተገባበር ሁኔታ ጋር የተያያዙ ተግዳሮቶች ምንድናቸው?

2.8 የተገላቢጦሽ ሎጂስቲክስ ደካማ አተገባበር በአካባቢ ላይ ጉዳት ያደርሳል ብለው ያስባሉ? አዎ ካሉ ይገልጹታል?

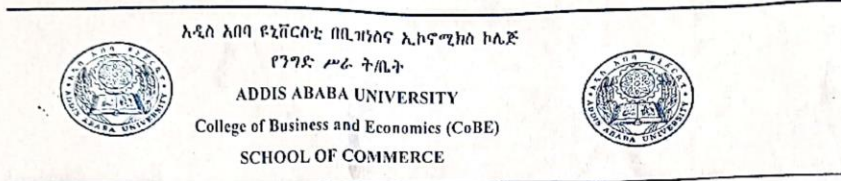
2.9 የተገላቢጦሽ ሎጂስቲክስ አሠራርን ለማሻሻል ተጨማሪ አስተያየት ካለዎት ቢያብራሩ?

2.10 ባለድርሻ አካላትን (FMOH, EFDA, EPSS, AACAHB and sub city) በተለየ ሁኔታ አስተያየት ካሎት ይግለጹ ስለ ከፍተኛ ትብብርዎን እና አቀባበልዎ በጣም አመሰግናለሁ !!!

Annex 4: List of Public Health Centers where data was collected

| S.N | Name of Health Centers               |
|-----|--------------------------------------|
| 1   | <u>Afenchober</u> Health center      |
| 2   | <u>Abuari</u> Health center          |
| 3   | <u>Arada</u> Health center           |
| 4   | <u>Bashawolda</u> Health center      |
| 5   | Beata Health center                  |
| 6   | <u>Janmeda</u> Health center         |
| 7   | <u>Ras Emiru</u> Health center       |
| 8   | <u>Alembank</u> Health center        |
| 9   | <u>Kolfe woreda 3</u> Health center  |
| 10  | <u>Kolfe woreda 6</u> Health center  |
| 11  | <u>Kolfe woreda 9</u> Health center  |
| 12  | <u>Entoto number 1</u> Health center |
| 13  | <u>Kotebe</u> Health center          |
| 14  | <u>Yeka woreda 10</u> Health center  |
| 15  | <u>Yeka</u> Health center            |

Annex 5: Copy of Ethical Clearance Letter



Our Ref: AAU/SOC/SS/2022  
Date: 03/04/2015

**To Addis Ababa City Administration Health Bureau**

Subject: Request for cooperation to allow students conduct Research on your Organization

Dear Sir/Madam,

The Logistics and Supply Chain Management department of Addis Ababa University, School of Commerce is the prominent contributor for the development of Logistics and Supply Chain Management discipline in Ethiopia by crafting and effectively delivering curriculum in the regular, extension and distance program both at under graduate and graduate levels. It also delivers a number of short term custom made trainings and consultancy services to the development of the business sector.

The department strongly believes that a successful way of improving the capacity of our graduates is to create opportunities to acquire industry experience. In line with this, we are requesting your esteemed firm to allow the following graduate student to gather data in your organization for the research work he/she is conducting under topic;  
Medicine Reverse Logistics management practices and its change in selected public Health centers in Addis Ababa

Student name 1. NETSAMET DIRO 4. \_\_\_\_\_  
2. \_\_\_\_\_ 5. \_\_\_\_\_  
3. \_\_\_\_\_ 6. \_\_\_\_\_

Thank you for accepting our students and allowing them to do his/her research in partial fulfillment for the requirement of Masters' of Arts degree In Logistics and Supply Chain Management

Sincerely,  
  
Dr. Busha Tejessegen  
Manager,  
Logistics and Supply Chain Management Unit  
Tel: +251115581787

P.O.Box:3131

Tel : +251115581787

P.O.Box:3131



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City Government of Addis Ababa Health Bureau

REF.N.O. 417/m/11594/227

DATE 27/07/2015

TO:

- KOLFE KERANIYO SUB-CITY HEALTH OFFICE
- ARADA SUB-CITY HEALTH OFFICE
- YEKA SUB-CITY HEALTH OFFICE

Subject: Request to access Facilities to conduct approved research

This letter is to support NETSANET DIRO GUTEMA conduct research which is entitled as "MEDICINE REVERSE LOGISTICS MANAGEMENT PRACTICES AND ITS CHALLENGE IN SELECTED PUBLIC HEALTH CENTERS IN ADDIS ABABA." The study proposal was duly reviewed and approved by Addis Ababa Health Bureau procedures and submit an activity progress report to the Ethical Committee as required. Therefore we request the facility and staffs to provide support to the principal investigator.

With Regards

Ethical Clearance Committee

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የህብረተሰብ ጤና ፖርቶ  
ቡድን ጠ/ሪ



Cc

- NETSANET DIRO GUTEMA
- ETHICAL CLEARANCE COMMITTEE