SCHOOL OF BUSSINESS AND ECONOMICS DEPARTEMENT OF LOGISTIC AND SUPPLY CHAIN MANAGEMENT

ASSESSMENT OF MEDICINE REVERSE LOGISTICS MANAGEMENT PRACTICE IN SELECTED PUPLIC HOSPITALS IN ADDIS ABABA, ETHIOPIA

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This is to certify that the thesis is prepared by Wendwosen Misganaw, entitled, *Assessment of medicine reverse logistics management practice in selected public hospitals 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 "ASSESSMENT OF MEDICINE REVERSE LOGISTICS MANAGEMENTPRACTICE IN SELECTED PUPLIC HOSPITALS IN ADDIS ABABA" is my original work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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This is to certify that Wendwosen Misganaw has carried out his thesis on the topic entitled: *Assessment of medicine reverse logistics management practice in selected public hospitals* in Addis Ababa. This work is original in nature and suitable for the award of Masters of Arts (MA) in Logistics and Supply Chain Management.

Bush Temesgen (PhD)

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ABBREVIATIONA AND ACRONYMS

WHO: World Health Organization

SCM: Supply Chain Management

AARHB: Addis Ababa Regional Health Bureau

EFMHACA: Ethiopian Food medicine, health care administration and control Authority

MOH: Ministry of Health

PSA: Pharmaceuticals Supply Agency

RL: Reverse logistics

SPSS: Statistical Package for Social Science

ABSTRACT

Reverse logistics is an important process that is often misunderstood. Reverse logistics can cause considerable cost, but provide numerous opportunities. Many organizations including health sectors do not understand the correct processes and procedures to follow and how to manage reverse logistics efficiently. The main purpose of the study was to assess the current practices of reverse logistic management of medicines in public hospitals under AARHB. The study was carried out based on the information from the primary data sources which was administrated using questionnaire and interview of the researcher and secondary data was through publications and regulations, and annual reports. The data was organized using SPSS and the results are presented in tables and figures. The analysis was done by descriptive analysis method. Thus, this study had provided recommendations for the improvement of the practice and also suggested for anybody who has an interest on the topic to use as baseline information for next research to make in depth study to assess the practice of medicine reverse logistics management in health sector in general in hospitals in particular. The findings revealed that the overall existing unfit medicines management practice in public hospitals with respect to collection, storage, transportation and disposal is poor. Based on the findings and identified challenges, the study put recommendations on what should be done and improved by all responsible bodies for proper management of unfit medicines. Therefore, implementing standardized storage and transportation of unfit medicines practice, Operational restructuring and Mobilization of resources, building interdepartmental integration and awareness creation were among the recommendations given to improve the performance level

Key terms: reverse logistics, reverse logistics practices, hospital reverse logistics.

Chapter one: Introduction

1.1 Back ground of the study

It is a well-accepted fact that every man-made product or system is to be returned or discarded at some point in time during its life cycle. Therefore, it becomes mandatory to think of some kind of recovery and reverse logistics activities for recapturing the remaining value or for proper disposal. In many countries, the producer is legally obliged to take care of the returning products (Ali, 2015). The most significant concept related to these issues is reverse logistics.

Reverse logistics involves the collection of goods from end consumers, sorting of the goods received, disposal of goods and retrieval of components at various stages in the supply chain and remanufacturing processes (Bhavin, 2010). Various reasons such as warranty failures, incorrect product orders or shipment, damaged products, product recalls, reusable packaging materials and product upgrading account for reverse flow (Kabir, 2013). In the pharmaceutical industry, reasons for product returns are often associated with damages and product expiry, counterfeits, product recalls and clinical trial recoveries (Bhavin, 2010).

Proper disposal of recalled, unused, and expired pharmaceuticals is an important issue with legal implications, as some of these products contain hazardous chemicals. Also, the sensitive nature of medicines as well as the potential harm from use of expired or non-effective medicines means that pharmaceutical companies must effectively implement reverse logistics to promptly clear their supply chain channels of expired and nonconforming drugs (Shaurabh, Saurabh, & Moti, 2013, pp. 12, 18).

With this in mind, Reverse Logistic becomes also a key to the health supply chain system to help manage unused medicines due to either expiration or damages or oversupply to improve efficiency in supply chain. If Reverse Logistics system is implemented in hospitals, it would ensure that proper procedures are in place to manage the overstocks through redistribution to recapture value, and to manage expiries or obsolete stocks by properly disposing them to prevent endangering the environment. Therefore, this study seeks to provide an evidence-based understanding by assessing the practices of reverse logistics management of medicines in public hospitals under AARHB and suggest measures for further improvement.

1.2 Statement of the Problem

The hazardous consequences on public health, and the environment of having counterfeit drugs, expired drugs, damaged drugs in circulation is a global concern. This global concern further signifies the social, ethical and economic importance of RL practices, programs or systems designed to recapture value, and to ensure proper disposal. Despite the pivotal role RL plays in SCM, RL is still being studied in an isolated fashion, in terms of the problems studied, the methodologies applied, and the context addressed (Narayana et al., 2014).

Accidental dispensing of expired drugs is also possible if they are not collected and stored in separate place until disposal. Moreover, accumulated pharmaceutical wastes that are not disposed at appropriate time interval may lead to inefficient use of storage space in health facilities, limiting available space for inventory of usable pharmaceutical supplies (MOHS, 2008).

A number of researches on counterfeit/substandard medicines have stated that the prevalence of such pharmaceutical crime is higher in low income countries. For instance, WHO's new research that has recently gone viral estimates 1 in 10 medical

products circulating in low and middle income countries is either substandard or falsified. According to the Nigerian Pharmaceutical and healthcare report released in 2013 by Business Monitor International (BMI), up to 80% of cases of kidney failure are attributed to the consumption of fake medicines and up to 85% of malaria drugs in Nigeria are deemed ineffective.

Almost half the fake and low-quality medicines reported to the World Health Organization (WHO) between 2013 and 2017 were found to be in sub-Saharan Africa. According to the Ethiopian Food, Medicines and Healthcare Administration and Control Authority (EFMHACA) report released in 2018 by the Ethiopian herald , out of the total distributed medicines in 2015, 4.82 percent were found to be substandard medicines that do not meet appropriate quality standards and/or specifications.

Improper management of returned drugs can involve rerouting into the black market and relabeled for sale or disposed of into sewerage and landfill. This would have negative impact on the health of the people and the environment in the long term. Therefore, this study seeks to find out the practices and challenges of reverse logistic management of unfit medicines in public hospitals at AARHB and to provide baseline information to track changes and improvements in pharmaceutical reverse logistics management performance over time.

1.3 Research Question

The study was designed in order to address the following research questions:

- How is inspection and selection of unfit medicines being practiced at hospitals under the AARHB?
- What are the warehouse management practices for unfit medicines administered at AARHB?
- How are unfit medicines transportation system managed at public hospitals under AARHB?
- How are unfit medicines disposed at public hospitals under AARHB?

- What are the challenges of medicine reverse logistics in public hospitals under AARHB?

1.4 OBJECTIVE OF THE STUDY

1.4.1 General Objective: -To assess the current practices of reverse logistic management of medicines in public hospitals at ARHB and suggest measures for further improvement.

1.1.2 The specific objective of this study was:

- To assess the inspection and selection of unfit medicines practices of public hospitals under AARHB
- To assess the storage systems (warehouse management practices) of unfit medicines in public hospitals under AARHB.
- To examine the transportation management systems used for practices of unfit medicines in public hospitals under AARH
- To examine the disposal practices of unfit medicines in public hospitals under AARH
- To assess the challenges faced while implementing medicine reverse logistic. in public hospitals under AARHB.

1.5 Significance of the study

We know that Pharmaceutical supply chains in Ethiopia are characterized by high level of expiries, wastage and spillover, issues of returns and recalls of drugs; therefore, in order to solve these challenges, a proper system has to be put in place to deal with such challenges. This study is believed to provide a baseline information on how expired, damaged and unused medicines are managed at public hospitals according to the "how" perspective of reverse logistic. The study will also contribute to improve storage and disposal management of unfit medicines in public hospitals.

The result of this study will also provide some insights and information to policy makers, donor agencies, and program supporting agencies in order to design an appropriate system for the proper management of unfit medications. Furthermore, this study will attempt to make as a source material for further studies.

1.6 Scope of the study

This study was conducted on to assess to the practices of reverse logistic management of medicines in public hospitals under Addis Ababa city Administration health beauro. Geographical this study covers only on in Public Hospitals Case of Addis Ababa city administration. Moreover, currently there are 15 Public Hospitals in Addis Ababa, but this study will be engaged on only 6 Public Hospitals (Zwiditu , Gandi , Minilik ,Yekatit , RasDesta and Tirunesh Bejing hospitals) under Addis Ababa city administration . Reverse Logistic management in health sector has many dimensions/ perspectives / but in this study for the sake of time and resource mainly focus on the "how perspective" of unfit medicine RL management practice. These are Inspection and Selection, Transportation, Warehousing and recovery management practice. The study was conducted from November/2019 –June 2020.

1.7 Limitation of the study

Almost every research work inevitably faces some basic limitations and this study is no exception. Lack of similar studies especially in reverse logistic management in health sector in Ethiopia had made difficult for comparing results. Moreover, the study is an assessment on selected public hospitals practices and challenges in the implementation of medicine reverse logistic. Thus, the finding of this study cannot be taken as a generalization to all hospitals practices. However, the recommendations which are based on the findings can be used as a source of

information for other similar studies in analyzing the practices of hospitals reverse logistic activities deeply.

1.8 Definition of key terms

Recognizing that there may be multiple interpretations for the terms listed below, they are defined as follow for the purposes of this thesis proposal.

Public health facilities: these are health facilities owned by the government of Ethiopia

and managed under FMOH or regional health bureaus.

Pharmacy Department (PD) can be defined as the department staffed by a team of pharmacists, technicians and support staff who are responsible for dispensing medicines to patients

Medicine: Any substance or mixture of substances used in the diagnosis, treatment, mitigation or prevention of a disease in human and includes narcotic drugs, psychotropic substances and precursor chemicals, traditional medicines, complementary or alternative medicine; poisons, blood and blood products, vaccine, radioactive pharmaceuticals, cosmetics and sanitary itemsand medical instruments.

Pharmaceuticals: means any substance or mixture of substances used in the diagnosis, treatment, mitigation or prevention of a disease, and include medical instruments and medical supplies (Proclamation No 553/2007).

Unfit medicines: medicines that are expired, improperly sealed, damaged, improperly stored, improperly labelled, counter fit, substandard, prohibited, and unauthorized

Hazardous Substance: means a waste that poses substantial or potential threats to public health or the environment ignitability, reactivity, corrosiveness and toxicity.

Improper Disposal: Usually means disposing medicines in the garbage, indiscriminate Throw away to unauthorized dumpsites in neighborhoods or even flushing pharmaceuticals down the toilet, whereby they enter the sewage stream.

1.9 Organization of the research

The research paper covered five main parts. The first chapter contains an introduction which discuss all about the research and the second chapter focuses on literature review which is divided into two parts that is theoretical literature review based on theories and concepts and empirical studies done by other researchers. Conceptual frame works were also addressed.

Chapter three is concerned mainly with research methodology which includes; research design, study area, target population, sample size and sampling design, data collection methods, measurements, reliability and validity of measurement, as well as method of data analysis. Chapter four is concerned with data presentation, analysis and discussion of findings. Lastly, chapter five deals about Summary, conclusions, and recommendations related to this research.

2 / Chapter two: Related Literature Review

2.1 Theoretical Literature Review

2.1.1 Defining Reverse logistics

Reverse logistics, what is it? In simplest words it is the management of the path of the products from its end users back to the manufacturers. Below are a few ways of defining the concept of reverse logistics:

According to Vogt, Pienaar and De Wit (2002: 234) the reason for the variety of definitions is that reverse logistics is 'one of the fastest developing fields in business logistics', which results in constant changes in scope and significance. From the introduction, it seems that South African organizations are lagging behind in this 'fast developing field'.

The Council of Supply Chain Management Professionals (CSCMP, 2010: 151) defines reverse

logistics as a 'specialised segment of logistics focusing on the movement and management of products and resources after the sale and after delivery to the customer'. Reverse logistics is also described as 'a concept aimed at waste and cost reduction in the distribution channel by creating procedures to reverse the distribution process' (Hugo, Badenhorst-Weiss & Van Biljon, 2004: 225). Vogt et al. (2002: 234) describe the concept in more detail. According to them, reverse logistics is the management of all activities involved in goods, demand information, and money flowing in the opposite direction of the primary logistics flow. It involves reducing the generation of waste, as well as managing the collection, transport, disposal, and recycling of both hazardous and non-hazardous waste in a way that maximizes the long-term profitability of the business.

There are many definitions of Reverse logistics in the research literature and these are summarized in Table 1.below.

Table 1: Reverse logistics definitions

Definition of Reverse Logistics Author	Author
Summation of processes of gathering, examination, categorization, fixing, refurbishing, remanufacturing, recycling as well as clearance, of the products to take them back from their current source of consumption to their original source of manufacturing or delivering	Agarwal et al., 2016
Reverse logistics is the whole procedure for effectively handling the material, info and money stream so as to renew value from the end-of-use (EOU) and end-of-life (EOL) products via repairing, reutilizing, remanufacturing, recycling and reinstatement to the marketplace. Furthermore, RL comprises the suitable handling of the non-reusable and non-recyclable components.	Yu and Solvang, 2017
RL refers to operations and procedures for returning post-sale and post-consumption goods back into the production cycle, by way of reversing distribution channels.	Chileshe et al., 2018
In reverse logistics systems, a product coming from the reuse of materials embedded into wastes returns to the manufacturer after use and can be repaired or remanufactured to be delivered again to make new products with secondary raw materials to the end	Sun, 2017

consumers. The key processes are identified as product acquisition, collection, inspection and sorting, and disposition.	
RL includes all activities associated with product recovery such as repairing, recycling, remanufacturing, and disposing of. Several partners are required to collaborate efficiently on account of obtaining optimal outcomes. Prakash and Barua (2016) categorized RL into the main activities of waste logistics and recovery logistic.	Tosarkani and Amin, 2018

2.1.2 Related concepts of reverse logistics

It is clear from above that there are many ways to define reverse logistics, and given its novelty as a research area, the definition of reverse logistics may cause certain confusion among those interested in the area, with the result that it can also be confused with other closely related concepts or terms (Rubio, Chamorro & Miranda 2008:1100). These terms include closed-loop supply chain and closed-loop supply chain management (CSCM), reverse supply chain management (RSCM), green logistics and green supply chain management (GSCM) and returns management. The concepts closely related to reverse logistics will now be elaborated on in the sections to follow.

2.1.2.1 Reverse logistics vs. forward logistics

It is useful to highlight the similarities and differences between the concepts of RL and forward logistics and their related activities.

Table 2:-comparison of forward and RL

Forward Logistics	Reverse Logistics
Forecasting relatively straightforward	Forecasting more difficult
One-to-many transportation	Many-to-one transportation
Product quality uniform	Product quality not uniform
Product packaging uniform	Product packaging often damaged
Destination/routing clear	Destination/routine unclear
Standardized channel	Exception driven
Disposition options clear	Disposition options not clear
Pricing relatively uniform	Pricing dependent on many factors
Importance of speed recognized	Speed often not considered a priority
Forward distribution costs closely monitored by accounting systems	Reverse costs less directly visible
Inventory management consistent	Visibility of process less transparent
Product life cycle manageable	Inventory management not consistent
Negotiation between parties straightforward	Product life cycle issues more complex
Marketing methods well know	Negotiation complicated
Real-time information readily available	Marketing complicated

Adapted from Tibben-Lembke and Rogers (2002)

2.1.2.2 Reverse logistics vs. Reverse supply chain

A reverse supply chain is a series of activities involved in retrieving a used or unused product from a customer and either disposes, reuses or resells it (Guide & Wassenhove, 2006:25). Reverse logistics is a part of reverse supply chain management (RSCM) and includes the intake, shipping and other logistics of product returns (Kim, 2001:1). The reverse supply chain is no longer only a disposal channel. Instead, it recaptures resources locked up in the product, package or part returned (Krikke, 2009a:13). RSCM is the automation of business processes to manage the reverse path of a product from the customer to its final disposition and includes the following:

- Managing product returns, real-time inventory and workflow
- tracking warranties
- Ordering and exchanging parts
- collaborating with suppliers
- analyzing data
- performing repairs
- De manufacturing
- Redisposition and customer notification

2.1.2.3 Reverse logistics vs Returns management

Reverse logistics is also part of returns management. Reverse logistics, CSCM and returns describe activities in returns management. However, it does not adequately describe the returns management process. Reverse logistics encompasses only the backward movement of materials in the supply chain, whereas returns management is much broader in scope. Norek (2002:36) maintains that returns management "includes the informational support of the entire returns process, including arrangements for transportation and physical handling". Returns management embraces returns at the

end of a product's life, commercial returns (leasing, mailorder, B2C), contractual returns (newspapers, publishers), returns under warranty (faulty goods), production waste and scraps, and "functional" returns, such as packaging to be reused for the same purpose (containers, packaging) (BearingPoint, 2008:27). Returns management requires collaboration and interaction between the members of the supply chain and is thus a boundary spanning activity. In other words, it is a critical element and requires planning and effective implementation across supply chain firms (Rogers et al., 2008:160).

2.1.3 Fundamentals of REVERSE LOGISTICS

Fleischmann and Dekker (2004) give the fundamentals of Reverse Logistics by analyzing the topic from four viewpoints:

- why are things returned? And why do companies get involved in reverse logistics?
- How Reverse Logistics works in practice?
- what is being returned?
- Who is executing reverse logistics activities?

Why do companies get involved in reverse logistics activities?

In general companies get involved in reverse logistics 1) because they can profit from it; or/and 2) because they have to; or/and 3) because they "feel" socially motivated to do it. Furthermore, Fleischmann and Dekker categorize these threes driving forces as:

- Economics (direct and indirect)
- Legislation
- Corporate citizenship

Why are things returned?

Customers return the products for several reasons. Products once bought may be returned due to physical damage, some of them are returned because the customers are unhappy with the functionality of the product (expectations not met), sometimes customers return products because they discover an alternative product with better functionality after they have made the purchase, sometimes customers misuse the return policy and return it without any reason. These are only some of the major reasons for the return of a purchased product by majority of the customers.

How Reverse Logistics process works in practice?

The how viewpoint deals with how is value recovered from the products that are returned back to the manufacturer.

Recovery is actually only one of the activities involved in the whole reverse logistics process. First there is collection, next there is the combined inspection/ selection/ sorting process, thirdly there is recovery, and finally there is redistribution. Collection refers to bringing the products from the customer to the point of recovery. At this point the products are inspected, i.e. their quality is assessed and a decision is made on the type of recovery. Products can then be sorted and routed according to the recovery that follows. If the quality is (close to) “as good as new”, products can be fed in the market almost immediately through re-use, re-sale and re-distribution. If not, another type of recovery may be involved but now demanding more action, i.e. a form of re-processing

What is being returned?

The third viewpoint on reverse logistics is obtained by looking at what is actually being returned. The three product characteristics those are relevant in this regard are:

- Composition
- Deterioration
- Use-pattern

Who is executing reverse logistics activities?

The three main participants in the reverse logistics activities can be given as:

- Forward supply chain actors (supplier, manufacturer, wholesaler and retailer)
- Specialized reverse chain players (jobbers, recycling specialists etc...)
- Opportunistic players (such as charity organizations)

In any reverse logistics chain two or more of these players are always involved. Often, one or two of these participants play the major role while others act merely as intermediate junctions.

2.1.4 Main Processes of Reverse Logistics

Dale S. Rogers and Tibben-Lembke (1998), de Brito and Dekker (2003), and Fleischmann, Krikke, Dekker, and Flapper (2000) provide a general classification for the key processes in reverse logistics, as shown in Figure 1

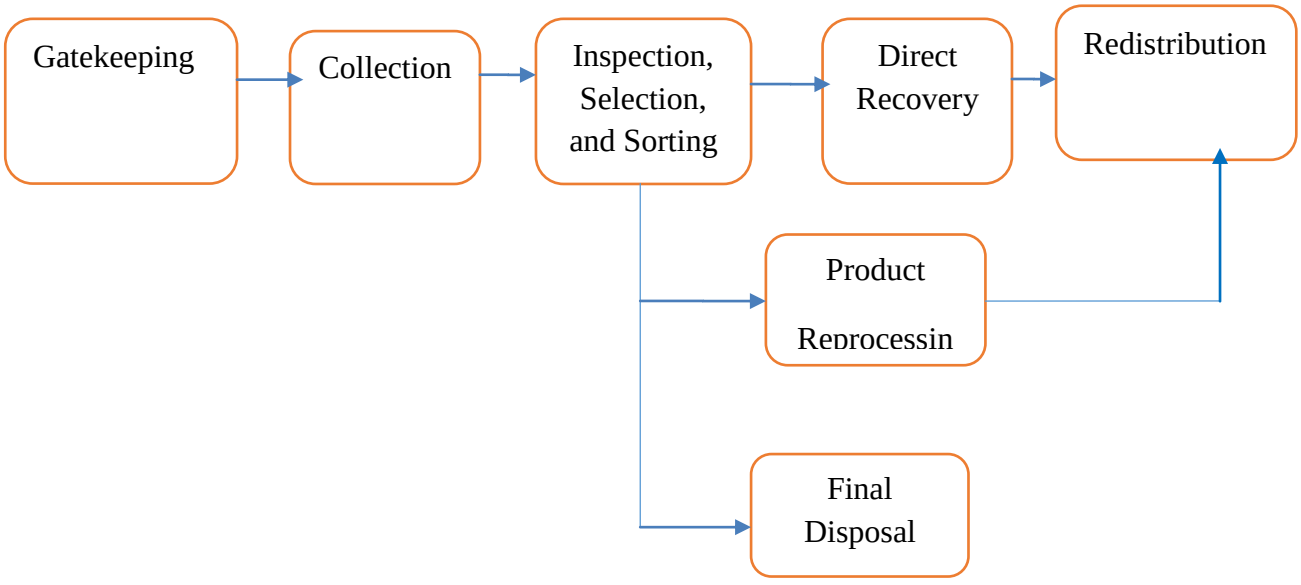

Figure 1: Reverse logistics process Adopted from (Fleischmann et al., 2000, p. 657) and (de Brito & Dekker, 2003, p.12)

2.1.4.1 Gatekeeping

According to Dale S. Rogers and Tibben-Lembke (1998, p. 38), gatekeeping is the first step in the returning process and represents the point of entry into the reverse logistics pipeline. This step determines which products would be considered defective and allowed to be returned, and which would not. Therefore, gatekeeping is the best point to eliminate unnecessary cost associated with returning products as early as possible, by screening the return request, to identify the unwarranted merchandise (Dale S. Rogers & Tibben-Lembke, 1998, p. 38).

2.1.4.2 Collection

The next step is the collection process by which companies physically move the products to a point of recovery for further treatment (de Brito & Dekker, 2003, p. 11). Collection may be imposed by legislation and may include transportation as well as storage activity (Fleischmann et al., 2000, p. 5).

2.1.4.3 Inspection, Selection, and Sorting

After collection there is a combined processes involving the inspection of product quality in order to determine the reusability of the returned product, selection of the recovery method, and sorting (routing) of the products in accordance with the selected recovery method (de Brito & Dekker, 2003, p. 11). Therefore, the inspection, selection, and sorting processes result in separating the flow of returned products between direct reuse, reprocessing, or disposal options (Fleischmann et al., 2000, p. 657).

2.5.4 Direct Recovery or Reuse

Direct recovery, resale, and reuse constitute a desirable option for returned products whose quality is as good as that of new products. In this case, the returned products are immediately sent back to the market for potential buyers and users (de Brito & Dekker, 2003, p. 11).

2.1.4.4 Reprocessing

The reprocessing involves transformation of the returned product into a usable product (Fleischmann et al., 2000, p. 657). There are several product recovery options such as product repair, refurbishing, remanufacturing, cannibalization as well as recycling (Thierry, Salomon, Van Nunen, & Van Wassenhove, 1995, p. 117).

2.1.4.5 Disposal

Landfilling or incineration as a disposal method is an option for products that cannot be reused due to technical or economic reasons. Also, during the sorting level, disposal could be an option for those rejected products which do not have satisfactory market potential or which require extensive repair (Fleischmann et al., 2000, p. 657).

2.1.4.6 Redistribution

The final process is the redistribution of reusable products in the market for potential users. This process encompasses different activities such as sales, transportation, and storage activities (Fleischmann et al., 2000, p. 658)

2.1.5 Issues related with Reverse Logistics Management

The main issues related with the reverse logistics management include the activities to be part of, drivers, facilitators, barriers, outsource (self-vs. others), network and inventory management. In this section, researcher has showed the literature relevant to some selected issues of reverse logistics namely reverse logistics activities, drivers for the implementation and the barriers hindering the desired outcomes.

Li and Olorunniwo (2008) tried to investigate the reverse logistics practices with a goal to identify the reverse logistics process flow that may be considered as generic. They also tried to identify the key strategic issues that may be used by a firm for its competitive advantage. Brito and Dekker (2002) explored the fundamentals of reverse logistics by analyzing the issue from four essential viewpoints; why, what, how and

who. Why the things are returned, what is being returned, how reverse logistics works in practice and who is executing the reverse logistics activities?

Breen (2006) has put forward specific facilitators influencing effective returns behavior in B2B and B2C relationships. These facilitators include the contracts, penalties, incentives, deposit systems, trust, goodwill, legal obligation, corporate obligation and long term alliance aspects. These many options are given by the researchers to the practitioners in managing their returns effectively. Fleischmann et al. (2003) suggested that greater opportunities could emerge if companies used information for actively managing their returns. Advances in information technology, including data logging, radio frequency identification, and remote sensing provide ever more powerful means for pursuing this road.

Li and Olorunniwo (2008) studied current reverse logistics practices in US using cases of three companies. The research questions examined current practices with emphasis on strategies, management commitment, returns processing, information technology and information sharing, collaboration mechanisms, and performance metrics. The researchers also examine what constitutes the major drivers of Reverse Logistics as well as how companies plan and fulfill Reverse Logistics activities. Verstrepen et al. (2007) explored the reverse logistics activities in Flanders regarding the return reasons, recovery options, outsourcing, lifecycle length and the value of products. In addition, they aimed at examining the underlying causes of the relatively low reverse logistics performances and pointing out the issues requiring improvements.

Guo (2009) classified the reverse logistics of an enterprise into rejecting goods logistics and recovery logistics. Enterprises' internal reason to rejecting goods logistics and the supply chain reason to rejecting goods logistics are the two main reasons for rejecting goods logistics of enterprises. Recovery reverse logistics can be categorized into four

groups namely direct reuse, repair, recycling and remanufacturing. Returns logistics activities that the companies have include returns flow, remanufacturing, remarketing, recycling, and land-filling. Most returned products are processed to put back to stock shelf without or with a little re-kit, repackage, repair, or refurbish while others are to sell to secondary market, dismantle to harvest components, recycle, or landfill (Li & Olorunniwo, 2008).

Commercial Returns, Repairable Returns, End-of-use Returns, End-of-life Returns, and Recalls are the five kinds of returning products (Janzen & Rosier, 2008). Depending upon the kind of returning product, it may go through all or some of the five reverse logistics activities namely product acquisition, collection, sorting, testing, disposition, recovery, redistribution and sales. Erol et al. (2010) discussed the concept of outsourcing of reverse supply chain activities. Warehousing and packaging, information system and software used, providing services abroad, technology used, the number of people employed, facility capacity, service cost, services provided, and level of expertise are the major criteria which are to be taken into consideration while selecting a third party services for reverse supply chain activities of an organization.

2.1.5.1 Drivers for Reverse Logistics Management

One of the earliest reverse logistics frameworks was put forward by Carter and Ellram (1998). Their conceptual model showed that four entities (suppliers, buyers, governments and competitors) exert major influence on the reverse logistics activities of an organisation. Since their model was published other authors have weighed in on the subject of drivers of and influences on reverse logistics. Brito and Dekker (2003) identified three main drivers: economic (reuse of parts or whole discarded products, reduction of final disposal costs and other indirect benefits such as a green image, improved competiveness etc.); legislation (obligatory product recovery and take-

back); corporate citizenship (values and/or pressures that stimulate an industry or organisation to use reverse logistics).

There is a long list of reasons for products' return. These include repair / Service Codes (factory repair, service /maintenance, agent order error, customer order error, entry error, shipping error, incomplete shipment, wrong quantity, duplicate shipment, duplicate customer order, not ordered and missing part), damaged /defective (damaged, dead on arrival, defective), contractual agreements (stock excess, stock adjustment, obsolete) and other (freight claim and miscellaneous) (Zuluaga, 2006).

Actual reasons for returns include customers' decision, damaged product, ordering error, warranty guaranty, wrong product, invalid reason, seasonal return, late delivery, upgrade and service, excess return, ambiguity manual, end of life, end of use and others (Dissanayake & Singh, 2008). Customer return/dissatisfaction, defective merchandise, incorrect item received, repairs needed, damaged, unsold units, reconditioning, recycling, product recall, and others are the most common reasons for merchandize returns (Daugherty et al., 2001).

Wu and Cheng (2006) mentioned various reasons for return which unclear product market positioning, quality problem, design and binding problems, inaccurate forecasting, unreasonable pricing, slow information flow, lack of marketing support, weak sales function, bad store presentation, weak logistics support, weak transportation support, lack of control over return frequency, quantity, and items, serious back order and late delivery due to the small order quantity, long return process cycle, returned products in large variety yet in small quantity, a large quantity of returned products due to the fixed return period, significant increase in returns at the terminal period of sales for best-sellers, cash flow problem, oversupply of new

book titles to the current market demand, inappropriate selection of a product mix, discrepancy between the return list and actual items and quantities, long distribution channel, frequent promotional activities resulting in lots of returns at the end of promotion, different consumer preference among different geographic regions, high transportation costs due to difficulty in transportation arrangement in advance, no rigid discipline in stock-taking and stocking activities and too many distributors involved.

Tonanont (2009) divided the returns into two kinds; unplanned/undesired/traditional returns and planned/desired returns. The reasons for unplanned product returns include customers' change of minds, product defects, customers' perception of a product to be defective one, product damaged in transit, a vendor error (such as wrong item or quantity shipped), and warranty returns or product recalls while trade-in programs, company take-backs, leased or rented products and service work are the main reasons for planned returns. The researcher argued that planned returns were much easier for the firms to predict and design their reverse supply chain because they know what is coming back and when.

Cespon et al. (2009) in their study examined several reasons for the adoption of reverse logistics. These include importance granted to the competition, the environmental reason, and recapturing value. They also mentioned some underlying objectives like objective to maximize value added of residuals, objective to decrease the cost of residuals returns, objective to decrease the production costs, objective to improve the client service rate, objective to maximize the value added to returns, objective to minimize the environmental impact of residuals and objective to decrease the cost of devolution returns.

There are two kinds of drivers for the retuning expired medicines; demand and inventory related and product related drivers (Healthcare Distribution Management Association, 2009). Pharmacy stock rotation, alignment of manufacturer and distributor ship life policies with manufacturer production and inventory management practices, retail pharmacy practices for short-dated products, drop in demand for seasonal Rx products, warehouse stock rotation, investment buying/forward buying at retail and by institutions are the demand and inventory related drivers while new product failures, unit of dispensing is not standardized, generic product introductions, national drug code (NDC) conversions and government actions, such as FDA enforcement actions are the product related return drivers.

2.1.5.2 Barriers for Reverse Logistics Management

Barriers to the implementation of reverse logistics may be classified into two groups; Industry specific (External) barriers and Organization specific (Internal) barriers. Financial resources, lack of awareness about reverse logistics, problems with industrial infrastructure, environmental legislations, cooperation of the supply chain partners and problems with product quality are the major external barriers while human resource, organizational structure, and management style are the major internal barriers (Yacob et al., 2012).

Lack of awareness about reverse logistics, management inattention, financial constraints, personal resources, problems with product quality, lack of appropriate performance management system, inadequate information and technological systems, company policies, legal issues, administrative and financial burden of tax and cooperative behavior of chain members were the barriers studied by Sharma et al. (2011).

Abdulrahman et al. (2012) have categorized the entire explored barriers into four major groups namely management barriers, financial barriers, policy barriers, and 41 infrastructural barriers. Management barriers included importance of reverse logistics relative to other issues, company polices, competitive issues, management commitment/little senior management attention, personnel resources (Training, poor level of technical knowledge), difficulties in extended producer responsibility across countries, lack of appropriate performance management system, lack of shared understanding of best practices, and lack of strategic planning and structure for reverse logistics while financial resources/ constraints/ funds for training/ return monitoring system/ storage and handling preferential tax policies are included among the financial barriers. Legal issues/lack of supportive policies, loop holes in Chinese WEEE regulations, lack of enforceable law/lack of waste management practices, allinclusive consideration and consultation and lack of inter- ministerial communication, regulations or directives to motivate manufacturers, lack of awareness in environmental regulations and customers not informed of take back channels are the policy barriers while lack of systems/EDI standards, underdevelopment of recycling technologies, coordination and support/ collaboration/reluctance of support from members, limited forecasting and planning, lack of In-house facilities are the major Infrastructural barriers to the implementation of reverse logistics.

Lau and Wang (2009) examined six major barriers for reverse logistics namely the lack of laws and legislation, high costs and lack of supportive economic policies, underdevelopment of recycling technology, lack of publicity and knowledge of reverse logistics, reluctance to devote managerial and financial resources in reverse logistics and the unpredictability of supply and demand for recycled products in four electronics companies of china. High costs and lack of supportive economic policies, lack of

publicity and knowledge of reverse logistics and the unpredictability of supply and demand for recycled products were found to be the common barriers for all the four companies under study.

2.1.5.3 Importance of Reverse Logistics

In some industries, reverse logistics has elevated corporate image of the companies practicing it. For instance, a customer procures a product only to note at home that the product is malfunctioning. Companies with a client-oriented reverse logistics would accept returning the product and provide an opportunity to the client to make another choice. This gives an edge, a competitive advantage to that company as most clients would opt to trade with it as opposed to a company with a clear mark of "goods sold are not retainable". If reverse logistics is implemented in a hospital setting, it can also raise corporate image among patients and other clients by providing quality products leading to quality healthcare.

Khan, A., et al (2009) emphasizes that companies take pride in themselves if they protect the environment and minimize the environmental impact of their supply chains. They further emphasize on considering corporate image, as competitive reasons cited as one of the most important reason for implementing reverse logistics. As a part of customer service companies, they are following liberal return policies of their competitors to stay competitive. Likewise, with inadequate drug budget, Malawi's pharmaceutical supply chain system ought to tap from gains of the reverse logistics in the corporate world to reduce to the minimum possible loss of funds due to expiration or damage of medicines.

In many cases, regulatory requirements to recover or take back items are some of the reasons that compel companies to implement reverse logistics. For instance, if a pharmaceutical company discovers that a certain product has a defect which is going to be harmful to patients, avoiding legal implications, the product has to be recalled for re-manufacturing or proper disposal. Therefore, from regulatory perspective, any product made can be recalled due to manufacturing defects, expiry, safe disposal or recycling. Any product made is considered for discarding after its lifespan, and what happens afterwards is a concern for reverse logistics.

A wake-up call was experienced by some American companies through a study conducted by Rogers, S., et al, (1999), to define the importance of Reverse Logistics and to determine the extent of reverse logistics activity in the United States. The study included companies in manufacturing, wholesalers, retailers and service firm. The study resulted in all companies paying more attention to reverse logistics and putting systems of proper reverse logistics management in place. Companies also realized that the reverse logistics system acts as a strategic variable for competitive reasons.

According to Lee (2013) in his journal suggests that the following be involved in Health care reverse logistics: mapping of the return flow, giving standard times for the returns, defining the cost of the returns and establishing the physical inventory locations. Like is in logistics, transportation plays vital role in reverse logistics. Having a reliable transport, therefore, can help hospitals manage their inventory more effectively in the sense that products that need to be returned to suppliers can be moved quickly.

2.1.5.3.1 Importance of Reverse Logistics for Pharmaceuticals

Reverse logistics in the pharmaceutical industry is very important from the environmental and regulatory points of view, as well as from the economic point of view (Kabir, 2013, p. 96). It is worth mentioning that the lack of proper application of reverse logistics practices for managing the returns of expired drugs would affect the patient.

Also, improper application of reverse logistics would result in facilitating the way for unauthorized intermediaries to exist in the pharmaceutical supply chain and allow them to perform illegal activities such as relabeling the package and extending the expiry date for the purpose of reselling the expired pharmaceuticals into the market (Kwateng et al., 2014, p. 18). Similarly, Kabir (2013, p. 97) highlights that unnecessary multiple handling in reverse logistics and delays of returns increase the chance for unauthorized intermediaries to divert drugs into the black market, where expired products will be modified and labeled as saleable.

Therefore, it is very important for pharmaceutical companies to implement reverse logistics right from the beginning due to the severe impact on human health from using expired or ineffective drugs (Ritchie, Burnes, Whittle, & Hey, 2000, p. 31)

2.1.5.4 Third-party providers of Reverse logistics (3PRLPs)

Given that recycling entails waste collection, sorting, transportation, preparing the products to be recycled and getting the products to suitable recyclers, managing RL requires special infrastructure and investment. Adequate resources and capabilities are needed to provide flexible transportation and warehousing services in order to comply with RL service requirements which are uncertain and inconsistent (Cheng and Lee, 2010). The management of return flow usually requires a specialized

infrastructure with special information systems for tracking and dedicated equipment for processing returns, which can prove very costly.

It is not surprising, then, that smaller organizations do not possess sufficient resources to manage their RL operations, finding it difficult to create and afford the necessary infrastructure investment such activities require (Saen (2010). In addition, many organizations are unable or unwilling to enter RL markets due to their lack of knowledge of RL (Krumwiede and Sheub (2002).

This has opened up opportunities for independent third-party RL providers who can be engaged to help facilitate the recycling process. They are usually responsible for RL infrastructure, collection of returned products, transportation, sorting them according to the various RL operations, inspection, and warehousing (Kannan et al., 2009, Cheng and Lee (2010). They also play an increasing role in supporting integrated supply chain management using sophisticated information systems and dedicated equipment (Govindan et al., 2015), (Ko and Evans, 2007).

2.1.6 Management of Expired/Returned or Recalled Products

The Importance of effective Reverse Logistics management is obvious. The wrongly delivered, expired and products with damaged packaging, need to be quickly recovered and replaced with saleable product to avoid disruption in sales. It is imperative to make sure the channel is completely cleared of all expired medicines to avoid legal complications, Khan, A., et al (2009). However, in most public hospitals, the system is not clear as there are no standard procedures for managing such type of products. Besides legal requirements, the other major factors that affect the choice of medical product disposal are facility's size, ease and access of disposal, and cost. For example, some facilities use flushing to sewers as a primary means of disposal since it is easy and accessible.

A study conducted by Alzahrani, D., (2014), agrees that most hospitals both public and private are suffering in Third World Countries from increasing volume of medical waste. They are struggling to find a proper way to get rid of the size and quantity of hazardous medical waste that is generated among health care providers and patients in hospitals. This has the potential of causing injuries and spread diseases due to improper disposal methods. Moreover, such wastes dumped carelessly in front of hospitals and left in the open are easily tampered with or transfer to municipal waste into landfills. This is unhealthy and can have a serious impact to the citizens. An important call should be made for elimination of the problem of disposing of those hazardous waste through the advanced technologies and special modern equipment with the need to implement integrated environmental management of hazardous medical waste for hospitals, and safe disposal of such waste and prevent access to hazardous chemical wastes generated after the final treatment from penetrating the aquifer to protect the environment and public health.

2.1.7 Waste Management Practices

Sustainable management of waste and hazardous chemical is not only a challenge in developing countries but also in industrial countries. It is worse in developing countries as it is not achievable at present due to limited waste management and treatment capacity and current regulatory frame according to Burkhard, O., W., et al, (2013). The study further recommended that to improve the current situation in developing countries, efficient and effective regulatory framework for the management and control of hazardous chemicals should be developed and enforced.

Another study was conducted in Limpopo Province of South Africa on the management practices of hospital solid waste in Limpopo Province of South Africa looking at two hospitals. The findings revealed a major policy implementation gap

between the national government and the hospitals. While modern practices such as landfill and incineration are used, their daily operations were not carried according to minimum standards. Incinerator ash is openly dumped and wastes are burned on landfills instead of being covered with soil. The incinerators used are also not environmentally friendly as they use old technology. The findings further revealed that there is no proper separation of wastes according to their classification as demanded by the national government, Nemathaga, F., (2008

2.1.8 Pharmaceutical Logistics System in Ethiopia

The current Ethiopian health care system is guided by a National Health Policy which was issued in 1993 following changes of government in 1991 (MOH, 1993a). The policy was the first of its kind in the Ethiopia in a sense that it incorporates elements of democratization, decentralization, inter-sectoral collaboration, collaboration with neighboring countries, and promotion of the participation of the private sector in health care. The policy also calls for the promotion of occupational health and safety, environmental health and the extension of health services to pastoralists and other rural populations, the urban poor and victims of manmade and natural disasters (Kloos H. 1997).

In response to high burden of ill health and high rate of mortality in the country because of poor access to health services and complex health system, the Ethiopian government has sought to reform the health service system into a cost-effective and efficient system for past several years. Accordingly, a twenty-year health development implementation strategy, known as Health Sector Development Program (HSDP) with a series of five- year investment programs was launched in 1998 which is aligned with the wider frame works of Plan for Accelerated Development to End

Poverty and Millennium Development Goals. Currently the country is implementing the fourth year of HSDP IV (FMOH, 2011).

Regarding the health delivery system, Ethiopia implemented a three-tier health service delivery system characterized by a first level of a Woreda/District health system comprising a health center (40,000 population) in urban areas, and primary hospital (with population coverage of 60,000-100,000 people), health centers (1/15,000-25,000 population) and their satellite health posts (1/3,000-5,000 population) in rural areas that are connected to each other by a referral system. A primary hospital, health center and health posts form a primary health care unit with each health center having five satellite health posts. The second level in the tier is a General Hospital with population coverage of 1-1.5 million people; and the third a Specialized Hospital that covers population of 3.5-5 million (FMOH, 2011). As part of the health care reform, Business Process Reengineering (BPR) was employed in Ethiopian Fiscal Year 2001 with key principle of bringing a significant improvement in the quality of health services through the institutionalization of accountability and transparency. One mechanism of achieving this was to seriously consider the separation of purchaser, provider and regulator in the health system (FMOH, 2011). As part of this important endeavor, the former Drug Administration and Control Authority (DACA) has undergone an institutional transformation to a new agency called Food, Medicine and Health Care Administration and Control Authority (FMHACA). The mandate of the new agency is to undertake inspection and quality control of health and health related products; premises, professionals and health delivery processes in an integrated manner (HPR of FDRE, 2010).

The National Drug Policy of 1993 which is part and parcel of the health policy has served as an umbrella for pharmaceutical services in Ethiopia (MOH, 1993). Since the

start of HSDP I, the government of Ethiopia was committed to ensuring community's access to the essential medicines that are safe, effective and of assured quality including rational drug prescription and use. Moreover, since HSDP III a number of reforms have been employed that have significant impact on quality of pharmaceutical service.

One of the reforms is the Pharmaceutical Logistics Master Plan (PLMP) which was introduced in 2009 with the aim of ensuring the uninterrupted supply of essential, quality and cost-effective pharmaceuticals at all health facilities (FMOH, 2009). To achieve this, the Pharmaceutical Fund and Supply Agency (PFSA) was created with mandates: to 13 supply the entire country with both Program and Essential pharmaceuticals, as well as serve as the distribution entity for vaccines, other health facility supplies, and laboratory equipment (The World Bank, 2009). So as to execute its mandate in the area of pharmaceuticals supply in an efficient and effective manner, PFSA developed the integrated pharmaceuticals logistics system that integrates the drug requisition, distribution, and reporting of essential pharmaceuticals that used to be managed vertically into a single mechanism (FMOH, 2009).

PFSA's objectives include:

- Improve availability of program and non-program pharmaceuticals nationwide from 55% to 100%
- Reduce wastage rate from 8% to less than 2%
- Reduce cycle time (forecasting, procurement, storage and delivery to public health facilities) from 491 days to 165 days on average
- Establish a quality complaint system and ensure rational use of pharmaceuticals
- Improve customer satisfaction in terms of availability and quality of service at public health facilities from 51% to 100%

The end goal is for PFSA to be the sole distributor of health-related materials to all public facilities within the country (The World Bank, 2009).

In 2009, the USAID aided DELIVER project introduced an automated health commodity management information system (HCMIS) that can significantly improve health facilities' ability to manage supplies in their stores. The HCMIS is a locally-developed, user-friendly software package that helps health facilities manages all EDs, as well as medical and laboratory supplies. The HCMIS automatically receives and issues reports and orders, manages inventory, and produces a variety of commodity reports for store managers, pharmacists, and facility heads. Since the program began, the project has implemented the system in 205 selected health facilities throughout Ethiopia as of 2011 (John Snow Inc./DELIVER, 2011).

Moreover, National Minimum Standards for Health Centers were also developed in order to protect the public from sub-standard services and promote quality of health service. 14 The standard includes minimum standards for pharmaceutical services which include standards for medicine and supply management, and medicine waste management (FMHACA, 2011a).

Over the past few years, pharmaceutical waste management has received more attention in Ethiopia. Accordingly, FMHACA developed a directive on medicines waste management and disposal in 2011 in order to ensure safe pharmaceutical waste management and disposal practice, and hence to protect the public and the environment from health risks and hazards of pharmaceutical waste (FMHACA, 2011b).

2.1.8.1 Policy and proclamation governing Waste Management in Ethiopia

The Environmental Policy of Ethiopia was approved by the Council of Ministers in 1997. It is comprised of 10 sector and 10 cross-sector components, one of which addresses Human Settlements, Urban Environment and Environmental Health. The Policy is based on the findings and recommendations of the National Conservation Strategy of Ethiopia. The Policy contains elements that emphasize the importance of mainstreaming socio-ecological dimensions in development programs and projects. The goal of the Environmental Policy of Ethiopia is to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through sound management of the environment and use of resources so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. The Environmental Policy provides a number of guiding principles that require adherence to the general principles of sustainable development.

Proclamation 513/2007, Solid Waste Management aims to promote community participation to prevent adverse impacts and enhance benefits resulting from solid waste management. It provides for preparation of solid waste management action plans by urban local governments.

Proclamation 300/2002, Environmental Pollution Control requires developmental activities to consider environmental impacts before their establishment. The proclamation requires ongoing activities to implement measures that reduce the degree of pollution to a set limit or quality standard. Thus, one of the dictates of the proclamation is to ensure, through inspection, the compliance of ongoing activities with the standards and regulations of the country through an environmental audit.

Proclamation 661/2009, Food, Medicine and Health Care Administration and Control provides provisions to:

 Ensure proper disposal of expired medicine and foods and raw materials,

 Ensure handling and disposal of trans-regional solid and liquid wastes from different institutions are not harmful to public health,

 Ensure the quality of trans-regional water supply for the public is up to the standard,

 Ensure availability of necessary hygienic requirements in public health institutions,

Ensure any waste generated from health or research institutions is handled with special care and disposed of according to procedures that meet national standards,

 Ensure that untreated waste generated from septic tanks, seepage pits, and industries is not discharged into the environment, water bodies or water convergences

National Health Care Waste Management (HCWM) Strategic Action Plan 2015/16-2019/20 focuses on thematic areas:

 Legal and regulatory framework to provide guidance to health care managers on minimum operation requirements and the need to standardize HCWM practices in all healthcare facilities in the country;

 Process of operational research in pollution reduction and adoption of environmentally friendly technologies;

 Conduct behavioral changes targeting patients, care givers, visitors, and the community in the vicinity of health facilities.

Medicinal Waste Management and Disposal Directive, 2011 is applicable to

(a) disposal of medicinal waste, but not to medical equipment or management of other healthcare waste generated by health institutions; and

(b) all governmental, nongovernmental and private organizations involved in medicinal waste handling and disposal. The Directive requires disposal firms to have secured an appropriate disposal site depending on the Environmental Impact

Assessment conducted with support of the Federal Environmental Protection Authority.

In addition, a disposal firm is required to have all the facility and practice standards prescribed under this Directive.

The Guideline for Waste Handling and Disposal in Health Facilities (2006) was developed to:

 Enable health professionals to protect themselves against health hazards which might be encountered as result of their occupation

 Create awareness among healthcare workers about the importance of safe disposal of Waste generated at health facilities

 Prevent and control environmental pollution by waste carelessly disposed of from health facilities; provide technical support to health professionals and environmental health workers engaged in day-to-day health inspection and control activities.

Proclamation 200/2000, Public Health Proclamation; Public Health Proclamation

Comprehensively addresses aspects of public health including among others, water quality control, waste handling and disposal, availability of toilet facilities, and the health permit and registration of different operations. The Proclamation prohibits the disposal of untreated solid or liquid hazardous wastes into water bodies or the environment that can affect human health

2.2 Empirical Literature Review

The issue of RL practice was not obtained properly focuses by most researchers particularly in Ethiopia. As far as the researcher's knowledge is concerned, there is no study that made an investigation specifically for pharmaceutical companies. However, the researcher comes across five researches (Table 2.1) related to RL practices on different manufacturing sectors indifferent countries. These are:

Table 3:-SUMMARY OF EVIDENCE ON RL

S/N	**Title and Author**	**Objectives of the Studies**	**Major Findings**
1	Directing reverse logistics: a corporate paradigm shift. Reverse Logistics Magazine. (Walker, K. 2010.)	To determine best practices in reverse logistics and to compile framework that can assist organizations to manage their reverse logistics more efficiently.	Effective reverse logistics reduce costs or increase Profits.
2	Investigation of green supply chain management practices in the pharmaceutical industry and their relation drivers, practices and performances. (Verma, A., & Dr. Gangele, A. 2012)	To investigate green supply chain management practice in the pharmaceutical industry and their relation.	Disposal of the medication waste is harmful to the environment and costly.

3	Reverse Logistics in Pharmaceutical Industry: (Kabir, 2013)	To assess aspects of reverse Logistics on the issues that Pharmaceutical organization	Environmental legislation is the important driving factors to engage companies on reverse logistics
4	factors affecting the implementation of reverse logistics in manufacturing businesses in Kenya (Kariuki & Waiganjo 2014)	To evaluate the factors affecting the implementation of reverse logistics in manufacturing businesses	The study revealed legislation, economics, corporate citizenship and collaboration among supply chain partners are factors that can hinder the implementation of reverse logistics in manufacturing companies in Kenya

Source: Compiled by the researcher from empirical evidences\

2.3 Conceptual Framework

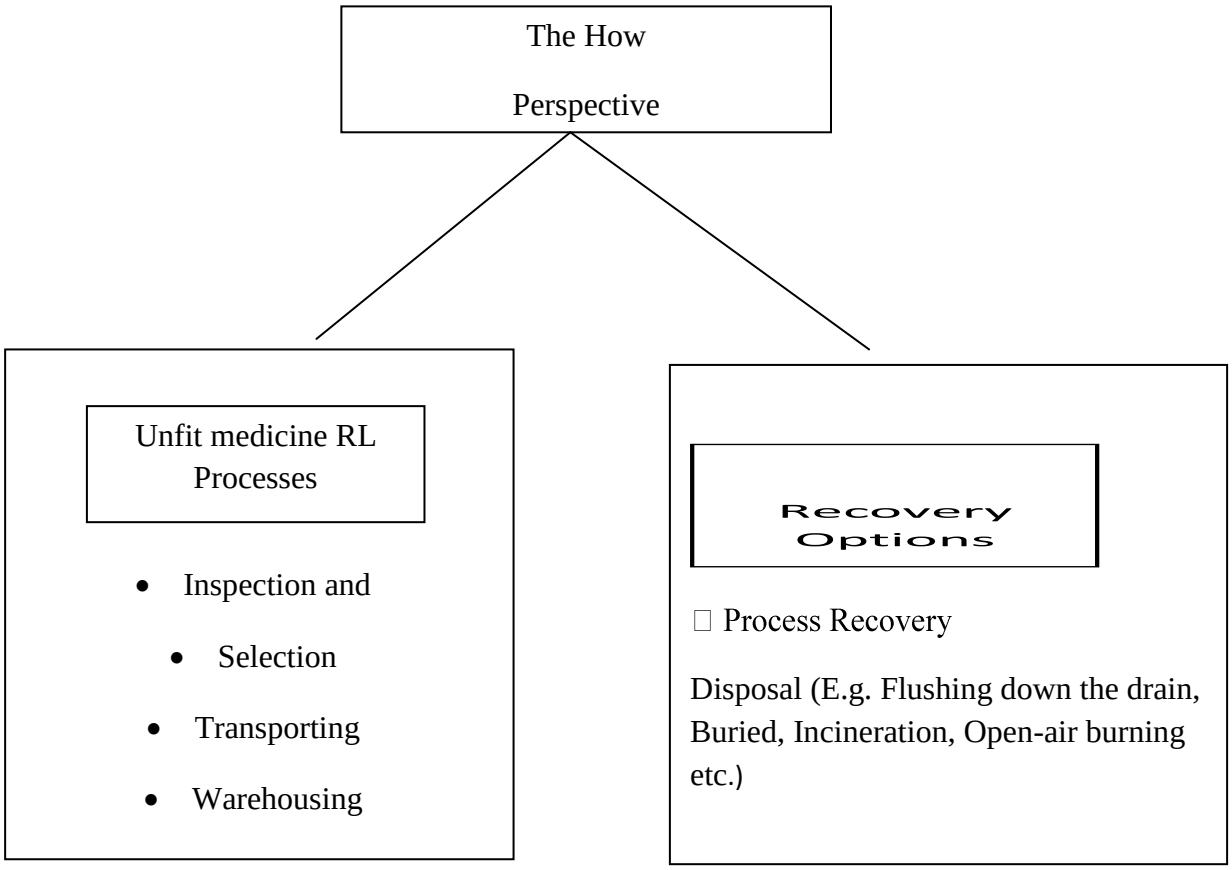

Figure 2; conceptual framework: Unfit medical Rl process and recovery options adapted from De Brito(2003)

3 /Chapter three: - Methodology of the study

3.1 Description of the Study area

Addis Ababa is the capital city of Ethiopia and diplomatic capital of African Union. Administratively the city is divided into ten sub-cities and 116 woredas. It has an area of 540 km2 of which 18.2 km2are the rural side of the city (Addis Ababa City Council, 2015). According to Central Statistical Agency's population projection, the population of Addis Ababa is 3.352 million of which 52.6% are females (FMOH, 2016b). The urban population is 100% with 2.4% annual growth rates.). As a capital city of Ethiopia, Addis Ababa houses many organizations that have stake with the pharmaceutical logistics including, the Central PFSA (FMHACA, 2013). Most of the importers, wholesalers, and pharmaceutical industries in the country are also found in Addis Ababa. Addis Ababa has a total of 56 hospitals (government and private), more than 825 private health facilities, 98 health centers and more than 720 pharmacy outlets and 17 Kenema pharmacies (AACAHB, 2016). Hospitals are complex organization providing a multitude of service to patient, physicians and staff. These services include pharmacy, laboratory, surgery, dietary, linen, housekeeping, administration and others. The study was done at the six public hospitals under Addis Ababa city Administration health beauro namely; Yekatit 12, Zewditu memorial, Ras desta Damitew, Minillik II, Gandi memorial, Tirunesh Bejing.

3.2 Research approach

To overcome some of the limitations with the use of only one of the approach and to increase the validity of the results, the Researcher employed both quantitative and qualitative study approaches to assess unused medicines management in public hospitals under Addis Ababa city administration.

3.3 Research design

Descriptive research design was employed. The descriptive research design was chosen to describe the existing practice of medicine reverse logistic management in public hospitals by answering research questions, i.e. how is the inspection, selection, transportation and storage management of unfit medicine in public hospitals practice? It also intended to assess how public hospitals dispose expired and/or damaged medicines. This study was expected to provide a picture of the existing situation by describing the actual circumstances. and made some recommendations.

3.4 Sampling Design

The populations of the study are mainly professionals in the pharmacy department in the selected six public hospitals under AABH due to the fact that the individual and collaborative work of those professionals has a hand on the unfit medicine management.

3.3.1 **Study Population** Given the time & budget constraint and the volume of the subject matter, this study targeted only public hospitals under Addis Ababa city Administration health beauro namely; Zwiditu, Gandi, Minilik, Yekatit, RasDesta and Tirunesh Bejing hospitals.

3.3.2 Sampling size

In this study, the suitable formula used by the researcher Yaman's formula of sample size with an error 5% and with confidence coefficient of 95%(Yaman,1965), the calculation has been presented as flows

Therefore formula used by:Yaman

n = N / (1 + Ne^2)

Where

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

Table 4:Total number of study population in hospital under AARHB

Study population	zewditu	RasDesta	Yekatit	Minilik	Ghandi memorial	Titunesh Beijing	Total
Medical Directors	1	1	1	1	1	1	6
Pharmacists /druggist	32	30	36	31	18	32	179
Total	33	31	37	32	19	33	185

Total study population in the six hospitals under AARHB (obtained from respective HR departments of Hospitals)

n = N / (1 + Ne^2)

n =185/ (1 +185×0.05×0.05) =126

n=126 being the total number of samples, 12 samples will be taken purposively, taking 2 from each hospital. The rest 114 were selected proportionally from each hospital and respective department to know the sample size of each category, the researcher had used proportion coefficients as follows:

114/173=65.89%

3.3.3 Sampling frame

For this particular study, the sampling frame for selecting public hospitals under Addis Ababa city Administration health beauro was the list of Public Hospitals in Addis Ababa.

Table 5: Descriptive of sampling frame

Sampling frame	Number of population	Number of sample size	Data collection tools	Sampling techniques
Zewditu	28	18	Closed ended questionnaire	Simple random
RasDesta	30	19		
Yekatit	34	22		
Minilik	29	19		
Ghandi memorial	16	10		
Titunesh Beijing	30	19		
Sub-total	173	107		
Department head and medical	12	12	Unstructured	

director			questionnaire	
Total	185	109		

For qualitative interview respondents were selected purposively from employees. The researcher had taken 2 employees from each hospital. Therefore, total numbers of interviews were 12.

3.4 Sampling Technique

To undertake this research, the researcher had used both probability and non-probability sampling techniques. The rationale to use both types of sampling technique was because of the characteristics of the respondent to be used in this research.

Given that supply chain management of medicines and other medical supplies is mainly practiced by pharmacy personnel at the given Hospitals, researcher would take samples from pharmacy department using simple confidence (accidental) sampling technique. The reason for using this is that this technique is easy to get a sample especially in this coronavirus (Covid -19) pandemic time and also it is easy to implement.

For qualitative interview, the head pharmacists & the hospital directors were selected purposely from each hospital as a key informant because they are supposed to be information rich than others.

3.5 Source of Data

Both primary and secondary sources of data were used to meet the objectives of this research.

3.5.1 Primary Data

Primary data is data observed or collected directly from firsthand experiences. It can be generated through interviewing people, questionnaire administration, group discussions, etc. In this research, Primary data were collected using closed ended questionnaires and through open ended interview guidelines.

3.5.2 Secondary Data

Secondary data sources are information collected and published in the past by other parties. It has already been on the shelf and on the internet in the form of books, journals, study papers, reports, etc. to serve as relevant source of information. Hence, the researcher gathered the secondary data from books, proclamations, research works, reports, manuals, journal articles.

3.6 Data collection procedure

To achieve the objective of the research study, both primary and secondary data were used by researcher. The Primary data collection method includes questionnaires and interviews; whereas secondary data were obtained from various documents such as books, Journals, files and other written reports. Consulting this type of documentation has many advantages in addition to its serving as a means of triangulation. This evidence is already in written form, saving the researcher the time and expense of transcribing. Moreover, it enables the researcher to understand the vocabulary and expressions which participants are likely to use, and can be accessed easily (Creswell, 2009).

In this study, Likert scale questionnaires were adopted from different articles. Likert scale Alen Bryaman (2012) is a psychological measurement device that is used to gauge attitudes, values, and opinion. The instrument was given to 107 professionals. Questionnaires were designed using a 5-point scale of strongly agrees coded as 5; agree coded as 4; neutral coded as 3 (which is the middle value of the response); disagree coded as 2, and strongly disagree coded as 1. Moreover, each variable has its own, multiple numbers of questionnaires and aggregated to average to examine the effect of intervening variable and dependent variable. The questionnaire was divided into four parts: Part A covers demographic profile, part B deals with reverse logistic management practice and part c entails the challenges faced by hospitals in reverse logistic management. In addition, face to face interview was applied based with key department heads for the study

3.7 Data Analysis

. By using qualitative and quantitative data analysis technique, the analysis was managed in proper and systematic manner methods. The quantitative data generated is analyzed using SPSS software version 22.0 for windows. Descriptive statistics (frequencies, averages and percentages) is run to explore the data. The qualitative data is transformed into categories related to the topics that is discussed and coded on paper individually in order to identify themes and patterns for thematic analysis.

3.8 Validity and Reliability test

3.8.1 Validity

To test validity of the questionnaire, a pilot study was conducted with two professionals from selected hospital. And then A few changes were made to the questionnaire after a pilot study. Moreover, the researcher discussed with friends and colleagues to give comment on the format and wording of the questionnaire.

3.8.2 Reliability

Reliability refers to the consistency or dependability of a measurement technique, and it is concerned with the consistency or stability of the score obtained from a measure or assessment over time and across settings or conditions. If the measurement is reliable, then there is less chance that the obtained score is due to random factors and measurement error (Sekaran, 2000). The statistical packages such as SPSS can be utilized to determine the reliability through evaluating the reliability coefficients using Cronbach's Alpha (Abdel Fattah, 2008). Hence, it is the researchers' responsibility to assure high consistency and accuracy of the tests and scores (Kothari, 2005). To ensure reliability of this study, a Cronbach‟s Alpha was performed.

Table 6:Cronbach's Alpha statistics for the survey questioner

Cronbach's Alpha	N of Items
0.708	31

As per the above result found from the data collected from 87 respondent based on 31 items the overall Cronbach‟s alpha score is 0.708. Nunnally, (1978) has indicated 0.7 to be an acceptable reliability coefficient, since score of 0.708 is above the standard threshold level the questionnaires were reliable

3.9 Ethical Consideration

Before the start of the data collection, letter of support obtained from Addis Ababa University. Then official letter was sent to the Addis Ababa Regional Health Bureau and got permission to collect date. From Addis Ababa Regional Health Bureau Official letters were written to the selected hospitals to get permission for conducting

the data collection. And then, the study was conducted in the selected health hospitals after securing permission

In order to secure the consent of the research, the researcher had communicated the details and aims of the study. The researcher has stated to the participants that they have to participate in the research willingly. Moreover, the researcher ensured to the respondents not to disclose their names, personal information and the data obtained were treated with high confidentiality.

4 /CHAPTER FOUR: RESULT AND DISCUSSION

4.1 Introduction

This chapter depicts the findings and interpretations of the findings of the study on the practices of reverse logistic management of medicines in public hospitals under AARHB. Both primary and secondary data sources are used for gathering the information. The primary data were in the form of structured Likert scale, and collected through self-administered questionnaire. The questionnaire was self-administered to the 107 respondents, of which 87 answered all questions as required. Therefore, the response rate is 81.3 % percent. Moreover, six people were interviewed which is 60 % of the plan.

4.2 Demographic Characteristics of Respondents

Demographic information shows the characteristics of the units in the sample. The researcher used to establish general information of respondents, which forms the basis under the interpretation are made. This part includes the analysis of general background information of respondents based on gender, age, educational level, and income level of respondents.

4.2.1 Sex of Respondents

The researcher sought to find out the gender of the persons filling the questionnaire, and hence was indicated below.

Table 7:Sex Distribution of Respondents

SEX	Number of Respondents	Percent
Male	49	56.3
Female	38	43.7
Total	87	100

Source: Survey Data, 2020

From table 7 above, the results show that that majority of the respondents 49 who filled the questionnaires were male representing 56.3%, where as to 38 or 47.7 % of them being female.

4.2.2 Age Distribution of Respondents

The researcher was interested in establishing the age bracket of the respondents. Table 8, below, indicates the age distribution of respondents. This information is necessary to enable the researcher to know whether the respondents are young or older people.

Table 8: Age distribution of respondents

Age	Frequency	Percent
less than25	9	10.3
26-36years	72	82.8
35-44years	6	6.9
Total	87	100

Source: Own survey Data, 2020

The study found out that the majority of the respondents were in the age bracket of 26-36 years. In addition, 9 (10.3%) were less than 25 years' age 6 were between ages of 35-44 years.

4.2.3 Work Experience of respondents

Table 9: work experience of respondents

Work experience	Number of Respondents	Percent
1-5years	59	67.8
6-10years	26	29.9

11-15years	2	2.3
Total	87	100

Source: Own survey Data, 2020

From table 9 above, many (67.8%) of the respondents were having between 1-5 years' experience at work, followed by 29.9% who had worked between 6-10 years. On the other hand, 2.3.0 % had 11-15 years' experience.

2.4 Educational level of respondents

This part includes the analysis of general background information of respondents based on educational level

Table 10: Educational level of respondents

Education	Number of Respondents	Percent
Diploma	19	21.8
BA/BSC degree	62	71.3
MSc/MA	6	6.9
Total	87	100

Source: Own survey Data, 2020

The respondents were asked to indicate their level of education. From the findings in Table 9 above, 2(6.9%) of the respondents were Master's degree holders, 62(71.3%) of the respondents were holders of first degree while 19(12.8%) of the respondents had diploma. This is an indication that most of the respondents were degree holders and that they were appropriate for responding to the study questions

4.3 Quantitative findings

4.3.1 Descriptive Statistics of medicine reverse logistic management practice

In this part of the study 's report, analysis conducted on data gathered to assess the reverse logistic management practices & challenges in public hospitals under AHRB is presented in relation to the objectives of the study. Descriptive statistics was used to analyze the data in this study is based on the responses of sample respondents on their in to account that numbers 1, 2, 3, 4 and 5 represent strong disagree, disagree, neutral, agree and strong agree, respectively. The result of the study in reverse logistic management practices and challenges showed that the scores of strongly disagree have been taken to represent a variable which had a mean score of 0 to 1.5, the scores of disagree have been taken to represent a variable with a mean score of 1.5 to 2.5, the score of neutral have been taken to represent a variable which had a mean score of 2.5 to 3.5, the score of agree have been taken to represent a variable which had a mean score of 3.5 to 4.5 and the score of strongly agree have been taken to represent a variable which had a mean score of above 4.5.A standard deviation of >0.9 implies a significant difference on the impact of the variable among respondents. The findings are presented in the below

4.3.1.1 Inspection and selection practice of unfit medicines

Table 11: Inspection and selection practice of unfit medicines

#	Please indicate your level of agreement with the following	1(SD)	2(D)	3(N)	4(AG)	5(SA)	Mean	SDV

	statements.								
1	The hospital has a system to continuously track and analyze damaged, expired, or unfit medicines	Freq	0	37	48	2	0	2.60	.538
		%	0	42.5	55.2	2.3	0		
2	Medicinal products beyond their expiry date or shelf life labeled properly	Freq	2	34	50	1	0	2.57	.563
		%	2.3	39.1	57.5	1.1	0		
3	All unfit medicines are select, stored and handled appropriately	Freq	9	55	23	0	0	2.16	.588
		%	10.3	63.2	26.4	0	0		
4	All unfit medicines-related operations are performed in accordance with written procedures, are properly supervised and adequately	Freq	9	55	23	0	0	2.98	.682
		Freq	10.3	63.2	26.4	0	0		

	documented								
5	adequate provisions exist to handle complaints, recalls, and returned unfit medicines	%	1	64	21	1	0	2.25	.487
		%	1.1	73.6	24.1	1.1	0		
6	properly trained in the handling, loading and unloading, transportation, and disposal of unfit medicines	Freq	14	59	14	0	0	2.00	.571
		%	16.1	67.8	16.1	0	0		
	Aggregate mean and Average standard deviation							2.42667	.5715
Note: Values 1, 2, 3, 4 and 5 represent strongly disagree, disagree, neutral, agree and strongly agree, respectively.									

Where: Less than 2.8 = Disagree, 2.9-3.2 = Neutral, above 3.2 = Agree

As it can be seen from Table 11 above, the average mean and standard deviation of the hospital practice of track and analyze unfit medicines, proper shelf life labeling of unfit medicines, proper supervision performance were rated by respondents (2.60,0.538), (2.57 ,0.563) and (2.98,0.682) respectively. This shows that the above listed practices are applied in moderate extent. The standard deviations indicating that they are small value thus respondents were agreeing to the same idea. However, the hospital has storage area large to handled unfit medicines appropriately, the hospital has adequate provisions t to handle complaints, recalls, and returned unfit medicines, the hospital has properly trained manpower that handle unfit medicines with mean and standard deviation scores (2.16, 0.588), (2.25,0.487) and (2.00, 0.571) respectively shows that disagreement of respondent. Similarly, the standard deviations indicating that they are small value thus respondents were agreeing to the same idea

In sum, most of the respondents from all the hospitals dis-agreed from the data gathered that they had a proper inspection and selection practice of unfit medicines in the hospitals. This is confirmed from the range of the mean values (2–2.98) and an aggregate mean value of 2.4. An aggregate standard deviation of 0.57 supports the fact that there was low(small) variability in opinions concerning this statement.

4.3.1.2 Warehouse and storage practice of unfit medicines

Table 12: warehouse and storage practice of unfit medicines

#	Please indicate your level of agreement with the following statements.		1(SD)	2(D)	3(N)	4(AG)	5(SA)	Mean	SDV
1	Special storage area for unfit medicine is available within the facility	Freq	17	33	36	1	0	2.24	.777
		%	19.5	37.9	41.4	1.1	0		
2	Storage space is Enough to store unfit medicine within the facility	Freq	17	35	35	0	0	2.21	.749
		%	19.5	40.2	40.2	0	0		
3	Storage equipment are fully functional	Freq	5	54	28	0	0	2.26	.559
		%	5.7	62.1	32.2	0	0		
4	equipment are regularly checked for compliance	Freq	1	58	0	27	1	2.32	.517
		%	1.1	66.7	0	31.0	1.1		

5	warehouse/store is inaccessible to unauthorized persons	Freq	3	19	62	3	0	2.75	.575
		%	3.4	21.8	71.3	3.4	0		
	Aggregate mean and Average standard deviation							2.356	.6354

From Table 12 above, the average mean and standard deviation of the hospital warehouse/store is inaccessible to unauthorized people's practice of track and analyze unfit medicines, proper shelf life labeling of unfit medicines, proper supervision performance were rated by respondents 2.75 and 0.575 respectively. This shows that the practice is applied in moderate extent. The standard deviations indicating that they are small value thus respondents were agreeing to the same idea. However, the availability of Special storage area for unfit medicine, enough store space, functional Storage equipment and regularly checked equipment with mean and standard deviation scores (2.2 ,0.777), (2.21, 0.749), (2.26,0.559) and (2.32,0.517) respectively shows that disagreement of respondent. Similarly, the standard deviations within the range values of (0.517-0.777) indicating that they are small value thus respondents were agreeing to the same idea.

As we can see from the mean value of the respondent's response, among five warehouse management measurement items, the four measurement items were below agreed points as shown in the table. This implies that warehouse management

in hospitals of AARHB is poor or contributes a lot to make the medicine reverse logistic management ineffective.

4.3.1.3 Transportation practice of unfit medicines

Table 13: transportation practice of unfit medicines

#	Please indicate your level of agreement with the following statements.	N	1(SD)	2(D)	3(N)	4(AG)	5(SA)	Mean	SDV
1	Required storage conditions are maintained during transportation	Freq	4	64	19	0	0	2.17	.487
		%	4.6	73.6	21.8	0	0		
2	Vehicles and equipment are suitable and appropriately equipped to prevent contamination of any kind	Freq	0	69	18	0	0	2.21	.407
		%	0	79.3	20.7	0	0		
3	Delivery is done within recommended timelines	Freq	10	68	9	0	0	1.99	.470
		%	11.5	78.2	10.3	0	0		

4	The unfit medicine transported safely to disposal sit	Freq	3	64	20	0	0	2.20	.478
		%	3.4	73.6	23.0	0	0		
	Aggregate mean and Average standard deviation							2.1165	.4677

The survey also inquired the level of agreement of respondents regarding the transportation practice of unfit medicines in the hospitals. Five different options, namely, required storage conditions are maintained during transportation, Vehicles and equipment are suitable and appropriately equipped to prevent contamination of any kind, Delivery is done within recommended timelines, Delivery is done within recommended timelines and transported safely to disposal sit were presented before the respondents and the outcome of all the measurement items were below moderate points. This is confirmed with the mean scores 2.17, 2.21, 1.99 and 2.20 respectively.

From Table 13 above results, almost all respondents agreed that the transportation practice of unfit medicines in implementation has not been effective so far and this is confirmed by a mean score of 2.1165 and a standard deviation of 0.4677.

4.3.1.4 Disposal practice of unfit medicines

Table 14: Descriptive statistics for disposal practice of unfit medicines

#	Please indicate your level of	N	1(SD)	2(D)	3(N)	4(A	5(S	Mea	SDV

	agreement with the following statements.					G)	A)	n	
1	The hospital has clear guidelines and procedures on disposal of unfit medicines	Freq	0	2	26	51	8	3.75	.651
		%	0	2.3	29.9	58.6	9.2		
2	The hospital has a functional medicine waste disposal committee	Freq	0	6	52	29	0	3.26	.580
		%	0	6.9	59.8	33.3	0		
3	waste disposal practice Is attended by proper inspector from appropriate organ (FMHACA/Health bureau/Health office	Freq	0	3	63	19	2	3.23	.543
		%	0	3.4	72.4	21.8	2.3		
4	The hospital has used appropriate disposal method to dispose	Freq	15	63	9	0	0	1.93	.524
		%	17.2	72.4	10.3	0	0		
5	Proper security measures are in place at disposal sites and temporary storage areas	Freq	17	45	25	0	0	2.09	.693
		%	19.5	51.7	28.7	0	0		

6	the disposal of unfit medicines Is documented properly	Freq	12	45	28	2	0	2.23	.710
		%	13.8	51.7	32.2	2.3	0		
7	receives certificate of disposal from the appropriate organ after disposal of unfit medicines	Freq	0	14	60	11	2	3.01	.619
		%	0	16.1	69.0	12.6	2.3		
	Aggregate mean and Average standard deviation							2.7857	.6171

This question was posed to find out whether these hospitals had good disposal practice of unfit medicines or not. From table 14, most respondents agreed that their hospitals have clear guidelines and procedures for disposal of unfit medicines, have functional medicine waste disposal committee, the disposal practice Is attended by proper inspector and the hospitals received certificate of disposal from the appropriate organ. This is confirmed with the mean score of 3.75, 3.26, 3.23 and 3.01 respectively. The standard deviations within the range values of (0.543-0.651) indicating that they are small value thus respondents were agreeing to the same idea.

However, the hospital has used appropriate disposal method, Proper security measures, are in place at disposal sites and temporary storage areas, documented the dispose unfit medicines properly with mean and standard deviation scores 1.93, 2.09 and 2.23 respectively shows that disagreement of respondent.

4.3.1.5 Barriers faced in the proper disposal of unfit medicines

Table 15: Barriers faced in the proper disposal of unfit medicines

#	Please indicate your level of agreement with the following statements.	N	1(SD)	2(D)	3(N)	4(AG)	5(SA)	Mean	SDV
1	Lack of clear guidelines for managing Unfit medicines	Freq	32	51	4	0	0	1.68	.560
		%	36.8	58.6	4.6	0	0		
2	Infrequent inspection	Freq	11	60	13	3	0	2.09	.640
		%	12.6	69.0	14.9	3.4	0		
3	high cost of disposal	Freq	2	26	22	32	5	3.14	.990
		%	2.3	29.9	25.3	36.8	5.7		
4	Long procedure of disposal	Freq	0	2	2	39	44	4.44	.659
		%	0	2.3	2.3	44.8	50.6		

5	Inadequate knowledge	Freq	18	57	3	9	0	2.03	.813
		%	20.7	65.5	3.4	10.3	0		
6	Lack of area of disposal	Freq	0	3	12	52	20	4.02	.715
		%	0	3.4	13.8	59.8	23		
7	Lack of technological systems	Freq	0	4	14	66	3	3.78	.579
		%	0	4.6	16.1	75.9	3.4		
8	Lack of top management commitment	Frequency	8	64	15	0	0	2.08	.511
		%	9.2	73.6	17.2	0	0		
9	Weak Relations with partners		3	68	15	1	0	2.1609	.47918
			3.4	78.2	17.2	1.1	0		
	Aggregate mean and Average standard deviation							2.8245	.0006

From table 15, The range of the mean value 3.78 indicated that Lack of technological system tend to be perceived as a problem/challenge to a great extent. The Long procedure of disposal and Lack of area of disposal are perceived to be the main problem/challenge, with mean values of 4.02 and 4.44 respectively. However, Lack of clear guidelines (mean=1.68, standard deviation=0.560, Infrequent inspection (mean=2.09, standard deviation=0.640, Inadequate knowledge (mean=2.03, standard deviation=0.813, Lack of top management commitment and (mean=2.08, standard deviation=0.511) and weak Relations with partners (mean=2.16, standard deviation=0.47918) showing that respondents agreed that those factors are perceived as a problem/challenge to a small extent.

4.4 Qualitative findings

4.4.1 Medicine reverse logistics practice in the hospitals

A sample of key informants was asked if reverse logistics is practiced at their respective hospitals. Even if the magnitude of practice is different all the respondents indicated that they practice reverse logistics. Asked how medicine reverse logistics is done, and the respondents were able to describe the main activates which are performed in the hospitals. These are collection of expired and excess stock, removing expired products from the shelf, packing and labeling them, quantify and sending them to the storage area for disposal, compiles the list for all expired medicines and sends a request to the appropriate body seeking authorization to dispose the products. However, most of the hospitals were challenged with

insufficient space to store the unfit medicines and even the disposed products are not stored in a proper way such with visibly.

From the findings, the researcher is of the view that some reverse logistics is being practiced in the selected hospitals.

4.4.2 Medicine waste disposal management practice in the hospital

Disposal of medicines varies from one type to the other. Improper disposal may therefore have inverse effects to the community. Depending on the nature of the health product to be disposed of, an appropriate disposal method should be chosen to present from further damage. But most respondents who were interviewed sated that there is lack of enough storage place for pharmaceutical wastes and lack of separate places for controlled substances.

4.4.3 Role of Partners and Stakeholders

Reverse logistics processes often suffer from a lack of interdepartmental communication and cooperation (Lang in Hoffman, 2006:1; Rukavina in Walsh, 2007:42). Reverse logistics is a boundary-spanning process between business units in the same organisation, and developing a system that has to work across these boundaries can also exacerbate the problems (Rogers & Tibben-Lembke, 1998:43). Unless all the departments understand the role of the reverse logistics process and its end goals, conflicting goals and priorities will be set across departments (Mollenkopf & Closs, 2005:42; Tompkins, 2010:2).

Managing disposal of unfit medicines at public hospitals is highly associated with daunting challenges that cannot be sorted out by just one player but rather all players involved. Most of the respondents agreed on the importance of partners and

stakeholder's involvement in the effective implementation of reverse logistic in the hospitals. But the engagement is not as such strong as needed.

The researcher's experience is that partners and stakeholders are not involved as enough as needed in the major engagement of issues like expiry and overstocks.

4.4.4 Challenges with Reverse Logistics

The ensuing question therefore asked respondents to be specific in the types of challenges they faced. The challenges brought up by some respondents were poor disposal practices, transportation and lack of top management awareness and commitment.

Furthermore, the main challenges remarked by other respondents in disposing pharmaceutical wastes are; lack of responsible and well trained human resources that are needed for handling and disposing pharmaceutical wastes, lack of proper infrastructure to dispose expired medicines, Long procedure of disposal and Weak Relations with partners

5 /CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of Findings

This study sought to examine medicine reverse logistic management practices in these selected public hospitals under AARHB. Quantitative and qualitative study was conducted in descriptive research design using structured questionnaire and interviews. The practice of inspection and selection, transportation, warehouse and disposal management of unfit medicines in hospitals was assessed and barriers faced in the proper disposal of unfit medicines were assessed in the paper.

. The descriptive analysis of inspection and selection practice range of mean values (2–2.9) indicated that almost all practices perceived to be a best practice/solution, which contributes to the efficient management of reverse logistics, to a lesser extent.

The aggregate mean value for warehouse management, transportation management, assessment questions is 2.356, 2,116 respectively which shows majority of the respondents disagrees for having good warehouse practices and transportation management system

The wide range of the mean values (3.23–3.75) indicated that part of the disposal practice like having clear guidelines and procedures, having functional medicine waste disposal committee and having proper inspection practices tended to be perceived as a potential best practice/solution, which could contribute to the efficient management of reverse logistics, to a moderate extent. However, the mean values (1.93–2.23) disposal practice like appropriate disposal method, Proper security measures and proper documentation had less mean values and contributed less to the efficient management of reverse logistics in the hospitals

Regarding the challenge, lack of storage facilities, lack of proper transportation, lack of proper infrastructure to dispose expired medicines, long procedure of disposal, lack of strong relations with partners, lack of responsible and top management awareness and commitment were perceived to be a major problem.

5.2 Conclusions

Based on the finding of this study it can be concluded that unavailability of enough and standardized warehouse is a great challenge for unfit medicines management in these hospitals. This is contributed by the absence of standard operating procedure for storage management. Irrespective of the availability of strategies and guide line in the hospitals, the overall unfit medicines management performance of public hospitals under AARHB is still weak. This is mainly due to lack of proper infrastructure to dispose expired medicines, long procedure of disposal, lack of strong relations with partners, lack of responsibility and lack of well-trained human resources.

AS a conclusion, by Implementation of adequate storage and transportation of unfit medicines management, Operational restructuring and Mobilization of resources, building interdepartmental integration were among the recommendations given to improve the performance level.

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5.3 Recommendations

All hospitals should include reverse logistics activities in their s planning and should identify the problems/challenges they experience in reverse logistics timely. Furthermore, the hospitals should consider the adoption of best practices needs to be set up and implemented

Almost in all hospitals the storage space is not sufficient. So, AARHB should now recognize the importance of budgeting for disposal activities including building

standardized storage area. Moreover, regular supervision on having standardized inspection, warehouse, and transpiration and disposal management system of unfit medicines in hospitals should be carried out. And also enforcement of policy on medical waste management is paramount.

Adequate and reliable information with regard to the volume and type of unfit medicines accumulated has to be made available to make informed decisions on subsequent interventions. The information will help concerned bodies to allocate budget for safe disposal practices.

Greater commitment is needed in the areas of managing unfit medicines. Managing disposal of unfit medicines at public hospitals is highly associated with daunting challenges that cannot be sorted out by just one player but rather all players should be integrated with all functional areas that affect, or can be affected by the management and control of drugs.

If organizations find the costs of reverse logistics too much of a challenge, they can make use of third party logistics (3PL) providers. These providers have the ability to cut costs at every point of the reverse logistics process (Cain, 2008:15) and can help save the organization money and time (Smith, 2005:179). Hence, as an optional strategy, the hospitals should consider outsourcing their reverse logistics function of unfit medicine.

The importance of managing waste is very critical for health workers. It is an asset for health workers to have knowledge and understanding on the right procedures to manage waste in their health institutions. The hospitals therefore should conduct studies on the extent and its associated risks in handling and disposing pharmaceutical wastes and offers seminars to their employees to raise awareness of reverse logistics practices

5.4 Suggesting for Further Research

Several limitations of this study may be noted. As identified and explained in the background theory of this study, reverse Logistic management in health sector has many dimensions/ perspectives / but in this study for the sake of time and resource mainly focus on the “how perspective” of unfit medicine RL management practice. Hence, Further study is recommended to assess the other dimensions.

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Annexes

Annex 1: Questionnaire to experts in Pharmacy Department

AS ASESSMENT OF MEDICINE REVERSE LOGISTICS MANAGEMENT PRACTICE IN SELECTED PUPLIC HOSP ITALS IN ADDIS ABABA, ETHIOPIA

Questionnaire for Public Hospitals in Addis Ababa
February, 2020

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 topic. The topic is assessment of medicine reverse logistics management practice in selected public hospitals in Addis Ababa, Ethiopia. The general objective is to assess the practices of reverse logistic management of medicines in public hospitals of Addis Ababa and suggest measures for further improvement. The specific objectives are

- To investigate the reverse management practices in the public hospitals
- To assess the strength and weakness of implementing reverse logistics
- To assess the challenges faced while implementing reverse logistic.

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. Please also make sure that you are not forced to reply any of the questions that you are not comfortable with.

You may also refuse responding to any of the questions. However, we encourage you to provide you best of knowledge on the questions so that the study will be useful. 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 hospital …… ……

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

1.3. Educational Background

☐ Certificate ☐ BA/BSC Degree ☐ Other Specify

☐ Diploma ☐ MSc/ MA _____

1.4 Position in the hospital …….

1.5. 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 encircle your response)

Part A: Reverse logistic management Practices

I	**Inspection and Selection practice of unfit medicines**					
		1	**2**	**3**	**4**	**5**
Please rate to what extent the following Unfit Medicines Management are practiced in your hospital. The scale below will be applicable: *1 =strongly disagree, 2 = agree, 3 = neutral, 4 = agree 5 = strongly agree.*						
The hospital has a system to continuously track and analyze damaged, expired, or unfit medicines.						
Medicinal products beyond their expiry date or shelf life labeled properly						
All unfit medicines are select, stored and handled appropriately						
All unfit medicines-related operations are performed in accordance with written procedures, are properly supervised and adequately documented.						

adequate provisions exist to handle complaints, recalls, and returned unfit medicines					
Staff have been properly trained in the handling, loading and unloading, transportation, and disposal of unfit medicines					

II	**Warehouse and storage practice of unfit medicines**

Please rate to what extent the following Unfit Medicines Management are practiced in your hospital. The scale below will be applicable The scale below will be applicable: *1 =strongly disagree, 2 = agree, 3 = neutral, 4 = agree 5 = strongly agree.*

	1	**2**	**3**	**4**	**5**
Special storage area for unfit medicine is available within the facility					
Storage space is Enough to store unfit medicine within the facility					
Storage equipment are fully functional					
Storage equipment are regularly checked for compliance					
warehouse/store is inaccessible to unauthorized persons					

III	**Transportation practice unfit medicines**

Please rate to what extent the following Unfit medicines preceding to disposal process are practiced in your hospital. The scale below will be applicable: *1 =strongly disagree, 2 = agree, 3 = neutral, 4 = agree 5 = strongly agree.*

	1	**2**	**3**	**4**	**5**
Required storage conditions are maintained during transportation					
Vehicles and equipment are suitable and appropriately equipped to prevent					

contamination of any kind					
Delivery is done within recommended timelines					
The unfit medicine transported safely to disposal sit					

IV	**Disposal practice of unfit medicines**

Please rate to what extent the following Unfit medicines preceding to disposal process are practiced in your hospital. The scale below will be applicable: *1 =strongly disagree, 2 = agree, 3 = neutral, 4 = agree 5 = strongly agree.*

	1	**2**	**3**	**4**	**5**
The hospital has clear guidelines and procedures on disposal of unfit medicines					
The hospital has a functional medicine waste disposal committee					
The medicine waste disposal practice Is attended by proper inspector from appropriate organ (FMHACA/Health bureau/Health office)					
The hospital has used appropriate disposal method to dispose					
Proper security measures are in place at disposal sites and temporary storage areas					
the disposal of unfit medicines Is documented properly					

The hospital receive certificate of disposal from the appropriate organ after disposal of unfit medicines.					

Part B: Barriers Faced in the proper disposal of unfit medicines

Please indicate the extent to which you agree with the following statements concerning the Challenges faced your hospital the proper disposal of unfit medicines. *Use the scale of: 1= strongly disagree 2= Disagree 3= Undecided 4= Agree 5= strongly agree*

	1	**2**	**3**	**4**	**5**
Lack of clear guidelines for managing Unfit medicines					
Infrequent inspection					
high cost of disposal					
Long procedure of disposal					
Inadequate knowledge					
Lack of area of disposal					
Lack of technological systems					
Lack of top management commitment					
Relations with partners					

Annex 2: Interview Guide (English Version)

1/lDoes the hospital practice reverse logistics? If Yes, what are the main activates?

2/How do you assess the medicine waste handling and disposal in the hospital giving emphasis to the strengths and limitations?

(a: With respect to using Medicine waste standard

(b): What conditions facilitates for managing of medicines waste and what barriers do you encountered?

3/How do evaluate both internal and external coordination while managing damaged, expired, or unfit medicine?

4/. What are the main challenges associated with reverse logistics management of unfit medicines in this hospitals?

Thank you for your time and cooperation.